

Lasers in Medicine

Official Journal of Iranian Center for Medical Laser (ICML)
Academic Center for Education, Culture and Research (ACECR)

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Laser in Medicine is a peer-reviewed open access medical journal. It was established the leading national pulication in the expanding field of the Medical application of Lasers and Lights. It provides a forum of papers on technical, experimental and clinical aspects of the medical Lasers applications. Furthermore, the journal publishes the articles on Lasers, Light delivery systems, sensor to monitor Laser effects, basic Laser-tissue interactions and modeling of Laser-tissue interactions. All other authors are cordially invited to submit their relevant studies on Lasers or any other light tissue interactions to the journals of the Lasers in Medicine. The journal of Lasers in Medicine provides an online platform for the high quality academic manuscripts, making the JLM an important acamedic journal in the field of Lasers and Light therapies.



دوینمین گنرپه رمللی چهارمین گنرپه ملی زخم و ترمیم بافت

The 2nd International Congress &
4th National Congress of

Wound and Tissue Repair

October 25-27th, 2017
Gharazi Halls, Milad Hospital
Tehran, Iran

Congress organizer:
Medical Laser Research Center, Academic Center
for Education Culture and Reseach

Clinical Sciences Contents

- Dermatology and Wound Repair
- Internal Medicine, Ophthalmology and Reconstructive Surgery
- Environmental Factors, Occupational Wounds, Disasters and War
- Rehabilitation, Nursing, Prevention and Psychosocial Factors
- New Technologies (Diagnostic-Therapeutic)
- Transplant Wounds
- Platelet and Tissue Repair

Basic Sciences Contents

- Tissue Engineering and Regenerative Medicine
- Biotechnology in Wound Repair
- Physiopathology, Pharmacology and Microbiology
- Biochemistry, Biophysics and Biophotonic
- Bioinformatics in Wound Repair
- Genetic and Nanbiotechnology in Wound Repair

Abstract Submission Deadline
September 22, 2017

For Registration and submission refer to the website

www.wtrc.ir

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۳ تا ۵ آبان ماه ۱۳۹۶
تهران بیمارستان میلاد
مرکز همایش های دکتر غرضی

برگزارکننده:

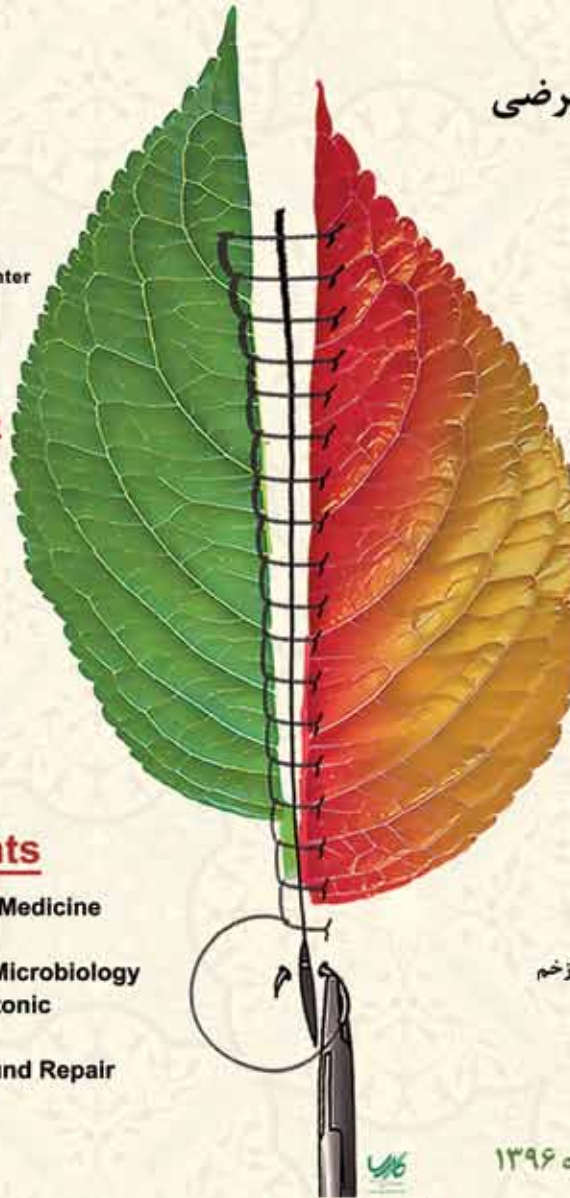
مرکز تحقیقات لیزر در پزشکی جهاد دانشگاهی
واحد علوم پزشکی تهران

محورهای بخش بالینی:

- درماتولوژی و ترمیم زخم
- طب داخلی، چشم پزشکی و جراحی های ترمیمی
- زخم ناشی از عوامل محیطی، شغل، حوادث و جنگ
- توانبخشی، پرستاری، پیشگیری و عوامل روانشناختی اجتماعی
- تکنولوژی های نوین (تشخیصی-درمانی)
- زخم های پیوند اعضا
- پلاکت و ترمیم بافت

محورهای بخش علوم پایه:

- مهندسی بافت و طب بازسازی در ترمیم
- زیست فن آوری در ترمیم
- فیزیوپاتولوژی، فارماکولوژی و میکروبیولوژی در زخم
- بیوشیمی، بیوفیزیک و بیوفوتونیک در ترمیم
- بیوانفورماتیک در ترمیم زخم
- ژنتیک و نانوبیوتکنولوژی در ترمیم زخم



مهلت ارسال مقالات: ۳۱ شهریورماه ۱۳۹۶

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Dr. Seyed Mehdi Tabaie

President of 2nd International and 4th
National Congress of Wound and Tissue Repair

In the name of God

Say Hello to all professors, colleagues, and students in the field of wound and tissue healing. It is a pleasure to invite all dears for a warm attendance and presence in the 2nd international congress and the 4th national congress of wound and tissue repair. This congress aims to develop the diagnostic and therapeutic services in the field of wound and tissue repair for 3 days in 25-27 October 2017 in Milad hospital.

This congress is a chance for exchanging the science and knowledge in all clinical and scientific aspects of healing and repair. We hope that by active attending in this congress, and by conducting discussions, the academic solutions will be achieved for developing the healthcare.

My colleagues and I in scientific and executive committees of the congress, hope that holding this congress including scientific lectures, workshops and exhibition, makes the optimized bed for developing the science in this issue.

Hoping to welcome you all in this congress



Dr. Parvin Mansouri

Scientific Chair in Clinical Sciences of 2nd International and 4th National Congress of Wound and Tissue Repair

Dear Colleagues,

Wounds and the relevant disorders are considered as the main challenges among worldwide health organizations. There are many people all around the world who suffer from, wounds, delayed or non-unions and their relevant problems. Many relevant psychosocial issues or economic concerns may even affect the societies and/or health rules and policies.

Academic Center for Education, Culture and Research_the branch of Tehran University of Medical Sciences (ACECR_TUMS) has stepped into this important field at the recent years. As the scientific president of the congress, I am honored to present the 4th national congress and 2nd International Congress of Wound and Tissue Repair (ICWTR) held in Tehran at October 2017, 25-27th. On behalf of scientific board and organizing committee, it is my pleasure to invite all relevant experts, specialists, residents, nurses, therapists, and other health professionals to share their latest research results, novel ideas and/or new experiences in the fields.

In scientific and organizing committees, we are trying to include the most novel and challengeable topics on wounds and tissue repair, and schedule multidisciplinary expert panels and specialists' presentations. The main highlighted categories are scheduled at the congress as:

“Novel Diagnostic / Therapeutic Approaches in Wounds and Tissue Repair”

“Wounds due to Chemotherapy and Transplantation”

“Wounds due to Environmental Factors, Occupation, Disasters and/or War”

“Bio photonics and Genetics in Wounds and Tissue Repair”

“Nano-biotechnology and Bio-informatics in Wounds and Tissue Repair”

I am looking forward to see you all and your active participation in the coming 2nd International Congress of Wound and Tissue Repair held in Tehran at October 2017, 25-27th.



Dr. Mansour Jamali Zavareh

Scientific Chair in Basic Sciences of 2nd International and 4th National Congress of Wound and Tissue Repair

To heal a wound the body undertakes a series of action collectively known as the wound healing process. Nowadays the wound healing process involves much more than simply stating there are three phases: inflammation, proliferation and maturation. The healing is a complex series of phenomena involving reactions and interactions among cells and “mediators”. Each year new mediators are discovered and our understanding of inflammatory mediators and cellular interaction grows. Many intrinsic and extrinsic factors affect wound healing. Understanding basics and mechanisms of wound and wound healing process can find new applications for healing methods and materials introduced by basic sciences. Therefore collaboration between clinicians and basic scientists based on national and international knowledge of healing can create a clear vision of wound healing and regenerative medicine. This year the scientific committee of the congress has selected “New Technologies specially Nano-Biotechnology” as the theme of the 2nd international congress in wound healing and regenerative medicine. We hope the congress creates a platform for effective scientific communication and information sharing regarding wound healing and regenerative medicine.



Dr. Mohsen Fateh

Executive Chair of 2nd International and 4th National Congress of Wound and Tissue Repair

Wound healing and tissue repair is one of the major problems in medicine and also paramedical fields. Delay in healing process may lead different critical injuries in a wide range of risk of life to even social and/or economic problems. These problems affect patients, families, care providers, sanitary services, colleagues, and many parts of society. So, considering changes in life style, rate of mortality and amputation, rate of people at risk of danger, frequency of relevant problems, and psychosocial issues, wound healing and care is a major concern in Medicine. Base on this fact, The Academic Center for Education, Culture and Research (ACECR) - Branch of Tehran University of Medical Science, as an organization in pattern and codification methods to preferment health of society, has performed the international congress of wounds and tissue repair. The goal of this performance is providing an appropriate opportunity for consultation of physicians, paramedicals, and researchers to get high quality evidence based knowledge and share the new and novel effective methods in wounds and tissue repair. The congress lines are categorized in two scientific fields; including clinical and basic science lines.

The Congress Clinical Sciences Lines: Dermatology, Internal Medicine and Surgery / Wound due to Environmental Factors, Disasters, War and Job Accidents / Rehabilitation, Nursing, Prevention and Psychosocial Issues / New Technologies in Wound Care (PRP, Lasers, Negative Pressure, ...)

The Congress Basic Sciences Lines: Tissue Engineering and Regenerative Medicine in Wound Repair / Biotechnology in Wound Repair / Physiopathology, Pharmacology and Microbiology in Wounds / Biochemistry and Biophysics in Wounds / Bioinformatics in Wounds

This congress will be held at the Gharazi hall in Millad hospital, at October 26-28th, 2016. The congress will start a day earlier, 25th October 2016, by the scientific workshops and will be followed by official congress for next three days.

All specialists in relevant clinical and basic fields of medicine, paramedics, nursing and interested students who are active in the fields of tissue healing are invited to present their valuable works and/or idea in this international scientific opportunity. Besides, relevant appropriate workshops and training sessions may help the practitioners to share their knowledge and learn novel approaches and provide best possible care for the patients. The scientific and executive committees of the international congress of wound and tissue repair hope to enrich evidence based knowledge for all relevant fields of care providers.

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Hall A

2nd International and 4th National Congress of Wound Healing and Tissue Repair

Wednesday, 25th October 2017 (8:30 a.m. – 10:00 a.m)

Opening Session

Holy Quran	8:30 – 8:40
Seyed Mehdi Tabaie <i>President of Congress</i>	8:40 – 8:55
Parvin Mansouri <i>Congress Scientific Chair in Clinical Sciences</i>	8:55 – 9:10
Mansour Jamali Zavareh <i>Congress Scientific Chair in Basic Sciences</i>	9:10 – 9:25
Aziz Ghahary <i>Honorable Key Speaker</i>	09:25 – 9:40
Keynote Speaker	9:40– 10:00

Break and Poster Presentation

10:00 – 10:30

Wednesday, 25th October 2017 (10:30 a.m. – 12:15 p.m.)

Dermatology and Wound Repair

Chairpersons	Seyed Mehdi Tabaie, Parvin Mansouri, Mansour Jamali Zavareh, Aziz Ghahary, Mohammad Ali Nilforoushzadeh	
Parvin Mansouri	The Power of Healing Dermatologists Break New Ground in the Treatment of Wounds and Scars	10:30 – 10:45
Seyed Mehdi Tabaie	Assessing and Comparing the Quality of Wound Centers	10:45 – 11:00
Mohammad Ali Bahar	Novel Biomarkers in Wound Healing Process	11:00 – 11:15
Nikoo Mozafari	Potentials of Hair Follicles in Wound Healing	11:15 – 11:30
Mohammadreza Mohajeri	Novel Treatment on Diabetic Foot Ulcers	11:30 – 11:45
Ehsan Shamsi Gooshki	Professional Independence: A Moral Commitment for Medical Professionals	11:45 – 12:00
Nasrin Zand	Scalp Cooling to Survive Hair Follicles During Chemotherapy: a Literature Review	12:00 – 12:15

Pray and Lunch

12:15 – 13:15

Poster Presentation

13:15 – 14:00

Wednesday, 25th October 2017 (14:00 p.m. – 16:00 p.m)

Dermatology and Wound Repair

Chairpersons

**Nosratollah Boddouhi, Mohammad Javad Fatemi,
Alipasha Meysamie, Saeid Amini Nik**

Mohammad Javad Fatemi	How to improve the cosmetic results of surgical wound healing in terms of residual scar?	14:00 – 14:15
Nosratollah Boddouhi	Diabetic Wounds Management	14:15 – 14:30
Saeid Amini Nik	Skin Healing in Elderly, Pathobiological Response by Aging	14:30 – 14:45
Karima Al Salihi	The Future of Application of Skin Bio-Scaffolding Nanotechnology as Anti-Inflammatory and Gene Therapy Delivery System	14:45 – 15:00
Alipasha Meysamie	Systematic Review Articles can provide the Best Evidences for Wound Healing and Tissue Repair Interventions	15:00 – 15:15
Parvaneh Mohammadi	Therapeutic Potential of Copper Nanoparticles in Full Thickness Wounds in Wistar Rat Model	15:15 – 15:30
Ehsan Valavi	Severe Skin Injuries in a Hemiscorpius Lepturus Scorpion Stung Patient	15:30 – 15:45
Mohamad Nazari	Review of Minimally Invasive Treatments of Lower Extremity Varicose Veins	15:45 – 16:00

Hall A

2nd International and 4th National Congress of Wound Healing and Tissue Repair

Thursday, 26th October 2017 (8:30 a.m. – 10:00 a.m.)

Tissue Engineering and Regenerative Medicine

Chairpersons	Hamid Mirzadeh, Mohammad Reza Noorani, Mohammad Ali Bahar, Majid Pornour	
Hamid Mirzadeh	Cell-Loaded Nanofibrous Gelatin-Chondroitin sulfate Scaffolds for Skin Tissue Engineering: In-Vivo Study	8:30 – 8:45
Alireza Farsinejad	Platelet-Rich Plasma Preparation for Regenerative Medicine: The Necessity of Standardized Methods	8:45 – 9:00
Saeed Mohamadi	The Effects of Autologous Platelet Gel on Wound Healing	9:00 – 9:15
Mohammad Hossein Mohammadi	Evaluation of Wound Healing in Diabetic Foot Ulcer Using Platelet-Rich Plasma Gel: A Single-Arm Clinical Trial	9:15 – 9:30
Daryoush Hamidi Alamdari	A Novel Method for Treatment of Recalcitrant Vesicovaginal Fistula and Perianal Fistula:	9:30 – 9:45
Gholamreza Hassanzadeh	Inflammasome Complex and Sex Dimorphism in Wound Healing	9:45 – 10:00

Break and Poster Presentation

10:00 – 10:30

Thursday, 26th October 2017 (10:30 a.m. – 12:15 p.m.)

Tissue Engineering and Regenerative Medicine

Chairpersons	Gholamhossein Riazi, Seyed Mostafa Fatemi, Maryam Moghaddam Matin	
Gholamhossein Riazi	Effects of Psychological and Physical Factors on Heart Injury in Female Rats	10:30 – 10:45
Hamidreza Bidkhorri	Reparative and Immunoregulatory Characteristics of Mesenchymal Stromal Cells: Aligned or in Contrast?	10:45 – 11:00
Hojjat Naderi-Meshkin	Cell-Based Products for Wound Healing	11:00 – 11:15
Nasrin Takzaree	Cell Therapy and Mesenchymal Stem Cells on Cutaneous Wound Healing	11:15 – 11:30
Taki Tiraihi	Healing Mechanisms Trade - off in Skin Wound: the Role of Tissue Engineering	11:30 – 11:45
Bagher Minaii	A Review of Wound Healing and Human Tissue Reproductive Methods	11:45 – 12:00
Seyed Mostafa Fatemi	Effect of Ga-Al-As Laser on Biocompatibility and Bioactivity of a Biodegradable Composite Scaffold	12:00 – 12:15

Pray and Lunch

12:15 – 13:15

Poster Presentation

13:15 – 14:00

Thursday, 26th October 2017 (14:00 p.m. – 16:15 p.m)

New Technologies (Diagnostic-Therapeutic)		
Chairpersons	Ezeddin Mohajerani, Nasrin Zand, Leila Ataie-Fashtami	
Ezeddin Mohajerani	Effect of Laser-Light Wavelength Selection in Wound Repair	14:00 – 14:15
Saeid Amini Nik	Wound Dressings: Challenges, Novel Approaches, and Future Opportunities	14:15 – 14:30
Gholamreza Esmaceli Djavid	The Potential Application of Photobiomodulation in Radiation Oncology: Radioprotection or Radiosensitization?	14:30 – 14:45
Reza Fekrazad	Mesenchymal Stem Cells and Photobiomodulation in Regenerative Medicine	14:45 – 15:00
Hamid Reza Ghomi	Plasma medicine: Applications in Wound Healing, Sterilization and Cancer Treatment	15:00– 15:15
Saeed Shafieyan	Cell Based Hair Reconstruction	15:15 – 15:30
Nooshafarin Kazemikhoo	Comparison the Effects of Low Level Laser Therapy and Split Thickness Skin Grafting in Children with Grade 2b and 3 Burn Ulcer (A Randomized Clinical Trial)	15:30 – 15:45
Sepideh Arbabi Bidgoli	Wound and Burn Healing Nanohealth Products: Effectiveness and Challenges from National and International Viewpoints	15:45 – 16:00
Ehsan Taghiabadi	The Role of Exosomes Derived from Human Adipose Mesenchymal Stem Cells for Skin Wound Healing	16:00 – 16:15

Hall A

2nd International and 4th National Congress of Wound Healing and Tissue Repair

Friday, 27th October 2017 (8:30 a.m. – 10:15 a.m.)

Wound Healing; Diagnosis; Management; Nutrition and Rehabilitation

Chairpersons	Parvin Mansouri, Mahnoush Momeni, Gholamreza Esmaeeli Djavid, Zahra Sadat Rezaeian	
Marco Romanelli	Atypical Wounds: Diagnosis and Management	8:30 – 9:15
Mahnoush Momeni	Comparing the Effect of ColActive Plus Ag Dressing Versus Nitrofurazone, Vaseline Gauze Dressing in the Treatment of Second Degree Burns	9:15 – 9:30
Zahra Sadat Rezaeian	Does Modalities Routinely Used in Physical Therapy of Knee Osteoarthritis Improve Joint Structure and Function? An Experimental Basic-Applied Study	9:30 – 9:45
Laila Shirbeigi	Nutritional Habits and Diets in Chronic Wound Healing Process According to Traditional Persian Medicine	9:45 – 10:00
Fatemeh Montazer	Histopathology, Chronic Wound Healing	10:00 – 10:15

Break

10:15 – 10:45

Friday, 27th October 2017 (10:45 a.m. – 12:00 a.m.)

Wound Healing; Novel Idea, Monitoring, Assessment

Chairpersons	Siamak Bashardoust Tajali, Mohsen Ghadami, Mohammadreza Shafii	
Siamak Bashardoust Tajali	Effects of Photodynamic Bio-stimulation on Inflammatory Phase in Healing Process	10:45 – 11:00
Mohsen Ghadami	Chronic-Wound Healing and Genetic Factors	11:00 – 11:15
Fariborz Moayer	Evaluation of Open Wound Healing by Animal Models	11:15 – 11:30
Nasim Kashef	Antimicrobial Photodynamic Therapy in Wound Infection	11:30 – 11:45
Afshan Shirkavand	Fluorescence Optical Imaging in Wound Monitoring and Assessment	11:45 – 12:00

Friday, 27th October 2017 (12:00 a.m. – 12:45 p.m.)

Closing Session

Holy Quran	12:00 – 12:05
Closing Ceremony	12:05 – 12:45

Hall B

2nd International and 4th National Congress of Wound Healing and Tissue Repair

Wednesday, 25th October 2017 (10:30 a.m. – 12:30 p.m.)

Biochemistry/Molecular Biology and Stem Cells		
Chairpersons	Khatereh Khorsandi, Reza Fekrazad, Masoumeh Majidi Zolbin	
Monireh-Sadat Mousavi	Study of Ischemia in Heart Injury Caused by Physical and Psychological Stress in Female Rats	10:30 – 10:45
Vahid Moghimi	Assessment of different sides of amniotic membrane as a scaffold for mesenchymal stem cell in skin wound healing	10:45 – 11:00
Fahimeh Rezaie	The Effects of Y-27632 Rho-Kinase Inhibitor and Mesenchymal Stem Cells Conditioned Medium on Isolation and Lifespan of Keratinocyte Stem Cells	11:00 – 11:15
Asieh Rahimi	The Effect of Vitamin D on the Patient with Oral Lichen Planus	11:15 – 11:30
Hamzeh Alipour	Molecular Characterization of Collagenase in <i>Lucilia Sericata</i> Larvae as a Potential for Wound Healing	11:30 – 11:45
Mahdieh Shirzad	Lactobacilli Exopolysaccharides Promote Wound Healing in Human Skin Fibroblast	11:45 – 12:00
Vajihe Nayebzade	Effect of Transforming Growth Factor- β 1 (TGF- β 1) on Bovine Nasal Cartilage Against the Tissue Degradation Induced by Interleukin1 α (IL-1 α) in Explant Culture	12:00 – 12:15
Motahareh Rezvan	A New Paradigm in Photobiomodulation of Brain: A Review	12:15 – 12:30
Pray and Lunch		12:30 – 13:15
Poster Presentation		13:15 – 14:00

Wednesday, 25th October 2017 (14:00 p.m. – 16:00 p.m.)

Natural and Herbal Agents in Wound Healing & Tissue Repair		
Chairpersons	NasrinTakzaree, Mahboobeh Nazari, Ali Khatibi	
Partow Mirzaee Saffari	Effect of Liposomal Animal and Herbal Lecithins on Wound Healing and In vitro and In vivo Anti-Oxidant Activity	14:00 – 14:15
Ebrahim Salimi Sabour	Preparation and In vitro Evaluation of an Oral Colon Specific Formulation of Aqueous Extract of <i>Malva Sylvestris</i> for Treatment of Inflammatory Bowel Disease (IBD)	14:15 – 14:30
Bahareh Khabbaz	Soy Protein Isolate Based Film for Wound Dressing Applications	14:30 – 14:45
Shima Jahani	Aloe Vera Efficacy on Wound Healing: A Review	14:45 – 15:00
Seyed Mahdi Tabatabaei	The Effect of Sesame Oil and Cucurbita on Healing Wounds Caused by Third-Degree Burn in Male Balb/c Mice	15:00 – 15:15
Melissa Emamalipour	The Significant Effects of Propolis on Wound Healing by Using of PCL/PEG Nanofibers	15:15 – 15:30
Maryam Tajik	Evaluation of the Effect Iveness of Topical Mentha Piperita Essence in Wound Healing: An Animal Study	15:30 – 15:45
Atefe Sadeghi Lari	Electrospun Biodegradable Polymeric Nanofibers Containing Herbal Extracts Used for Burn Wound Dressings	15:45 – 16:00

Hall B

2nd International and 4th National Congress of Wound Healing and Tissue Repair

Thursday, 26th October 2017 (8:30 a.m. – 10:00 a.m.)

Biophysics Approaches and Physical Medicine in Wound Healing and Tissue Repair

Chairpersons	Gholamreza Esmacili Djavid, Reza Hosseinzadeh, Hojjat Naderi Meshkin	
Motahareh Aghamolaei	Effect of Static Magnetic Field on Cell Activities in an In-vitro Spinal Cord Injury Model	8:30 – 8:45
Giti Torkaman	Effect of Ga-As Laser on the Serum Vascular Endothelial Growth Factor and Hypoxia-Inducible Factor-1 Expression in Diabetic Foot Ulcers	8:45 – 9:00
Mina Sadat Naderi	Stabilizing the Chondroitinase ABC I: New Strategy for Improving the Repairing of Spinal Cord Injuries	9:00 – 9:15
Hoda Keshmiri-Neghab	Application of Light Sensitive Opsin Proteins in neuroscience	9:15 – 9:30
Sajede Ebrahim Damavandi	Static Magnetic Field Guides the Cell Migration of NIH3T3 Cells to Improve Wound Healing	9:30 – 9:45
Saeed Valavi	Effects of "High-Voltage Pulsed Electrical Stimulation Currents" on Repair of Pressure Sores in Subjects with Spinal Cord Injuries	9:45 – 10:00

Break and Poster Presentation

10:00 – 10:30

Thursday, 26th October 2017 (10:30 a.m. – 12:15 p.m.)

Best Idea Challenge in Wound Healing & Tissue Repair (Students Competition)

Chairpersons	Khatereh Khorsandi, Hamidreza Bidkhori, Mohsen Fateh	
Vahideh Assadollahi	Targeted Delivery of CRISPER/Cas9 to Repair for Heart Tissue after Heart Infection by Modified gRNA Using a Flexible Aptamer-PEGylated Liposome	10:30 – 10:45
Tahereh Jalilvand	Loading of Exosomes Derived from Mesenchymal Stem Cells with Ginseng Extract (Ginsenoside GRg3) to Repair Spinal Cord Injury	10:45 – 11:00
Faezeh Vahdati	The Effects of Azulene on TNF- α & IL-8 Factors During Repairing Process of Skin Wound of BALB/c Mice	11:00 – 11:15
Dorsa Morshedi	Application of MicroRNAs Regulating Hippo Signaling Pathway in Tissue/Wound Healing	11:15 – 11:30
Saeed Rava	Providing a Model in Cell Dimensions and Equivalent Suture Function in Wound Healing to Increase the Repair Speed with Use the Property of P-Fimbriae in E.coli	11:30 – 11:45
Ideas Infographic Poster Presentation		11:45 – 12:15

Pray and Lunch

12:15 – 13:15

Poster Presentation

13:15 – 14:00

Nanotechnology in Wound Healing & Tissue Repair		
Chairpersons	Reza Hosseinzadeh, Amirhomayoun Keyhan, Sharareh Sajjadi	
Fedora Khatibi Shahidi	Nanocarbons as Drug Delivery Systems in Wound Healing	14:00 – 14:15
Elnaz Famkar	Smart Biomedical Hydrogel Nanocomposite Wound Dressings for Drug Delivery and Wound Healing Based on Polyvinyl Alcohol/Nano Graphene Oxide and Nano Poly (Dopamine)	14:15 – 14:30
Fatemeh Asghari	Electrospun Nanofiber Mats for Wound Healing	14:30 – 14:45
Shirin Rafeian	Aloevera Incorporated Chitosan Wound Dressings Containing PVA Nanofibers with Improved Cellular and Mechanical Behavior	14:45 – 15:00
Ghader Nworozi	Design and Construction of Scaffolding PCL-GO-VEGF to Accelerate the Healing Process of Diabetic Wound	15:00 – 15:15
Maryam Eskandariy Nasab	The Effect of Formulation Containing Vitamin D in a Rat Model of Glucocorticoid-Induced-Osteoporosis(GIOP) and its Effect on RANK/RANKL/OPG	15:15 – 15:30

Hall B

2nd International and 4th National Congress of Wound Healing and Tissue Repair

Friday, 27th October 2017 (8:30 a.m. – 10:15 a.m.)

Novel Approaches in Tissue Engineering

Chairpersons	Seyed Mostafa Fatemi, Hamidreza Bidkhor, Zahra Jamalpoor	
Atefeh Shamosi	L929 Mouse Fibroblast Cell Adhesion and Proliferation on Chitosan- Gelatin-Bioglass Nanofibrous Scaffolds as an In vitro Model of Wound Healing	8:30 – 8:45
Mina Razzaghzadeh Bidgoli	Design and Fabrication of Hierarchically Porous Composite Scaffold for Bone Regeneration	8:45 – 9:00
Peiman Brouki Milan	Sustained Release of Stromal Cell-Derived Factor 1- α from Nanofibrous Collagen-Coated Decellularized Human Dermal Matrix Hybrid Scaffolds for Regeneration of Full-Thickness Skin Wounds	9:00 – 9:15
AliReza Rafati	Evaluation the Mesenchymal Stem Cells Cultured on Nanofibrous Scaffolds for Skin Tissue Engineering and Wound Healing	9:15 – 9:30
Masoumeh Majidi Zolbin	Potential Role of Stem Cell in Treatment of Uterine Injury	9:30 – 9:45
Zahra Hajian Foroushani	Design and Fabrication of Fibrin Scaffold for Corneal Regeneration	9:45 – 10:00
Zahra Jamalpoor	Preloaded 3-D Bio-Composite Scaffold Can Potentially Enhance Angiogenesis in Bone	10:00 – 10:15

Break

10:15 – 10:30

Friday, 27th October 2017 (10:30 a.m. – 11:45 a.m.)

Diabetic Foot Healing Strategies & Nursing

Chairpersons	Majid Pornour, Elia Damavandi, Mehrangiz Totouchi	
Mohamad Afshar	The Effect of Platelet Rich Plasma Dressing on Depth of Diabetic Foot Ulcers: A Randomized Controlled Clinical Trial	10:30 – 10:45
Sara Fathollah	Atmospheric Pressure Plasma: Novel Therapy for Diabetics Wound Healing	10:45 – 11:00
Mohammad Reza Asadi	Effects of Electrical Stimulation on the Expression of Vascular Endothelial Growth Factor and Rate of Healing in Diabetic Foot Ulcer	11:00 – 11:15
Seyed Ehsan Asadi	Intensive Care Unit Nurses' Perceived Barriers Towards Pressure Ulcer Prevention in Isfahan	11:15 – 11:30
Mojtaba Senmar	Relationship between Oxygenation Status with the Risk of Pressure Ulcers Development in Patients after Open Heart Surgery	11:30 – 11:45

Workshop

2nd International and 4th National Congress of Wound Healing and Tissue Repair

Wednesday, 25th October 2017 (Hall C)

Workshop		
Daya Teb Co.	Advanced Dressings	10:00 – 12:00

Thursday, 26th October 2017 (Hall C)

Workshop		
Hossein Taji Zadegan (Paya Teb Tajhiz)	Vacuum Therapy and NPWT in Wounds	10:00 – 12:00

Thursday, 26th October 2017 (Hall B)

Workshop		
Aziz Ghahary	Writing a successful Research project, a grant proposal and Manuscript	15:30 – 16:30

Oral Presentations

Multi - Functional Powdered Re - Constitutable Liquid Skin Substitute in Wound Healing

Ghahary Aziz, Kilani R, Pakyari MR

BC professional Fire fighters' Burn and Wound Healing Research group, University of British Columbia, Vancouver, BC, Canada

Background: We have previously formulated a temperature sensitive liquid skin composite that solidifies at body temperature (34-37C). This composite which made of cross-linked collagen-GAG scaffolds containing polyvinyl alcohol (PVA) showed no cytotoxic effects for both fibroblasts and keratinocytes as well as exhibited a significantly higher tensile strength. These findings set the stage to exam the functionality of this shield ready powdered reconstitutable liquid skin substitute (Refer to as MeshFill) in promoting the healing of a delayed splinted wound healing model in mice.

Hypothesis: Here we hypothesized that filling up delayed splinted healing wounds with MeshFill would accelerate wound closure with a better healing outcome.

Material and Methods: A total of 32 punch wounds (6mm) were generated on the back of 8 mice (4 wounds/ mouse) and they were splinted to prevent contraction. Half of these wounds received nothing (Untreated control) and another half were filled up with MeshFill (MF). Mepitel was used as wound coverage to prevent adhesion and non-adhesive gauze was sutured over the Mepitel dressing. Wounds were daily monitored for healing, dressing and photographed on Day 7 and 14 post applications. On day 7 and 14, mice were terminated and wound areas were harvested and stained for infiltrated immune cells (CD45+ cells), tissue histology and cellularity.

Results: The results showed a significantly faster epithelialization and wound closure of splinted wounds

received MeshFill as compared to those of control. The findings further showed an early appearance and clearance of infiltrated immune cells (CD45+ cells) in treated wounds as compared to control indicating that the inflammation phase was shifted to early time points of healing process.

Conclusion: The results demonstrated that the use of in situ forming scaffold accelerates wound closure and shifting the inflammation phase to an earlier time points in a delayed splinted wound model in mice.

The Power of Healing Dermatologists Break New Ground in the Treatment of Wounds and Scars

Mansouri Parvin^{1*}, Nikkhah Nahid¹, Chalangari Reza², Martits - Chalangari Katalin²

1. Skin & Stem Cell Research Center, Tehran University of Medical Sciences, Tehran, Iran

2. Kassir Dermatology, Dallas, Texas, USA

Never has the need for effective approaches to treating skin wounds and scars been greater. We now have a better survival rate for our wounded warriors and our civilians who are burn and trauma patients. It used to be that many of those patients would die. Dermatologist have stepped up their role as wound care experts by advancing research and utilizing new tools to support the healing process.

New devices for skin grafting are reducing damage at the donor site.

Ablative fractional lasers are being used to treat old and new scars to prevent scar tissue from forming and to kick-start the healing process in chronic wounds.

Cell and tissue-based products (CTBs) promote tissue

regeneration and wound closure in wounds where the healing process has stalled.

Assessing and Comparing the Quality of Wound Centers

Tabaie Seyed Mehdi, Omomi Alireza

*Photo Healing and Regeneration Research Group,
Medical Laser Research Center, ACECR, Tehran, Iran*

Multidisciplinary wound centers are currently facing an increase in both the incidence of wounds and the complexity of care. This has resulted in rising costs and increased interest in the effectiveness of treatments. Little evidence is available regarding optimal wound center organization and effectiveness; therefore, measuring the quality of wound centers has become more important. This study aims to assess the evidence concerning quality by describing the state of the art of wound centers and organizational effectiveness by developing indicators of quality and by assessing their suitability in a pilot study. A multi-method approach was used: a literature review performed resulted in the development of an indicator list that was consequently subjected to expert review, and a benchmark study was completed comparing eight wound centers in the Netherlands. We thus provide a description of the relevant state-of-the-art aspects of wound center organization, which were multidisciplinary collaborations and standardization of the organization of care. In literature, significant patient-related effects were observed in improved healing rates and decreased costs. A total of 48 indicators were selected. The indicator list was tested by a benchmark study pilot. In practice, the outcome indicators were especially difficult to generate. Six indicators regarding structure, three regarding process and five regarding outcome proved feasible to measure and improve quality of wound centers.

Novel Biomarkers in Wound Healing Process

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2. Department of Immunology, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

Wound healing process consists of four continuous and overlapping phases, including hemostasis, inflammation, proliferation and remodeling. However, the pathophysiological process of wound healing is poorly defined. To obtain this objective, research into biomarkers may be essential. Researchers have indicated that wound healing depends on several cells, including neutrophils, platelets, macrophages and fibroblasts. In fact, they can affect the process of wound healing by production of numerous biomolecular mediators such as cytokines. These cells release various cytokines, including Interleukins (ILs), Tumor necrosis factor (TNF- α) and growth factors, which platelet derived growth factor is introduced as the most important factor. The cytokines and growth factors modulate the inflammatory phase of wound healing. The level of inflammatory cytokines such as IL-1, IL-6 and TNF- α are higher in non-healed wounds than healed wounds. Epigenetic modifications and circulating microRNAs are sensitive and novel biomarkers. MicroRNAs (miRNA) are small regulatory but noncoding RNAs. It is accepted that miRNAs firstly impact the stability of mRNA and/or the initiation and elongation of protein translation. Nonetheless, more complicated regulatory roles have been proposed. Altogether, biomarkers have commonly been considered as an interesting area of medical research, the measurement of specific biomarkers has resulted into enhanced understanding of wound healing. In this lecture we want to introduce several biomarkers which participate in wound healing. However, more investigations are needed to fully determine the whole valuable biomarkers which are involved in wound healing process.

Key Words: Wound Healing, Biomarker, Cytokine, Micro RNA, Interleukin

Potentials of Hair Follicles in Wound Healing

Mozafari Nikoo

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Numerous studies emphasize the role of hair follicle derived cells in promoting the wound-healing response. Clinicians have observed for a long time that the healing of skin wounds starts around the hair follicles and that wounds made in hairy skin areas heal faster than those in non-hairy skin.

It seems clear that the hair follicle is the main repository of cutaneous stem cells that bulge epithelial stem cells are recruited on wounding to help re-epithelialize the skin, and that perifollicular mesenchymal cells can contribute to the dermal wound healing repair in a more practical approach, Jimenez et al. compared punch skin grafts derived from hair-bearing skin to non-treated areas in refractory leg ulcers. They reported superior healing with greater wound size reduction (27% vs. 7% at 18 weeks), improved granulation tissue appearance and wound border reactivation in the areas that received hair-bearing skin grafts.

Given the great availability of follicular stem cells (FSC), easy access to tissue containing FSC and the advantages over interfollicular stem cells, therapeutic potential exists for a variety of conditions, including non/slow healing wounds, large wounds and epidermal depigmentation disorders. Emerging research will further elucidate the role of hair follicle in wound healing and perhaps create innovative technologies to improve healing or optimize existing therapies already in use.

Novel Treatments in Diabetic Foot Ulcer

Mohajeri - Tehrani Mohammad Reza, Amini Mohammad Reza, Aalaa Maryam

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It is estimated that the global prevalence of diabetes mellitus will rise to almost 600 million by 2035, and most of patient suffering from diabetes will live in developing countries. There are different long term complications of diabetes in which Diabetic Foot Ulcer (DFU) could be a source of major patient suffering. DFU has a yearly incidence of around 2-4% in developed countries and would be expected higher in developing countries. In other words every 20 seconds a lower limb is lost to diabetes somewhere in the world.

However this complication could be preventable, many different methods in order to accelerate the wound healing have been proposed. Principle treatment of DFU would be Debridement, Dressing, Offloading, Antibiotic therapy and Revascularization. Novel treatment include Maggot therapy, Vacuum therapy, BioImplant, Laser therapy, Plasma medicine, Ozone therapy, Plasma Rich Platelet, Stem Cell Therapy, Graft and Hyperbaric Oxygen.

However different methods could have a partial effect in ulcer improvement, use of appropriate method would be decrease the amputation rate. It should be noted that none of the treatment methods could be superior to the other methods.

Key Words: Diabetic Foot Ulcer, Treatment, Novel

Professional Independence: A Moral Commitment for Medical Professionals

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Medical profession has been trying to remain independent from external pressures during the history. This issue could be seen in many important and influential documents including ancient “Hippocratic Oath” and more recent ones such as “Declaration of Geneva” by “World Medical Association”. This independence helped medical professionals to put the benefit of the patients as the most important goal of their medical practice. Despite the fact that during the history different cultural, social and political factors affected this discipline in various aspects, the medical sector could still know as a relatively independent area. But the establishment of modern health systems in which health care providers is only a part of medical sector has increasingly affected medical decision-making process.

This relative independency is respected today by most of other stakeholders in national and international levels including governments and also international organizations. This neutrality and independency of medical practice is an appreciated value that guarantees the “Trust” between patients and physicians. In recent years there are some evidences that show this historical and prominent feature of medical practice is in danger. This paper tries to explore the historical roots of professional independence. In addition some examples of threats to this issue in modern medicine environment are discussed. In conclusion it is recommended that professional organizations such as medical councils and medical associations need to be more sensitive about this issue. It is required for this organizations to search for such threats and address them.

Scalp Cooling to Survive Hair Follicles During Chemotherapy: A Literature Review

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2. Department of Regenerative Medicine, Royan Institute for Stem Cell Biology & Technology, ACECR, Tehran, Iran

3. Cancer Quality of Life Department, Breast Cancer Research Center, ACECR, Tehran, Iran

Chemotherapy-induced alopecia is one of the most psychologically distressing complications of chemotherapy. Chemotherapeutic agents generally target rapidly proliferating cells such as hair follicles causing apoptosis and hair loss. Despite the importance of this side effect, satisfactory management strategies to survive hair follicles during chemotherapy are elusive. Scalp cooling has been used since the late 1970’s to prevent alopecia following chemotherapy in spite of disagreements. In this review we focus on the level of evidence for application of scalp hypothermia to survive hair follicles during chemotherapy, its safety, pitfalls, imitations and complications, the different types of cooling packages and the modern digitized, controlled, scalp-cooling system.

How to Improve the Cosmetic Results of Surgical Wound Healing in Terms of Residual Scar?

Fatemi Mohammad Javad

Burn Research Center, Iran University of Medical Sciences, Tehran, Iran

Wound healing is usually a highly successful biological process to restore the integrity of the skin following injury. The mechanisms of

wound healing typically fall along a spectrum between tissue regeneration, the end result of which would be functionally equivalent to the uninjured skin, and tissue repair, during which the skin's functional characteristics are sacrificed in favor of rapidly closing the wound with fibrotic scar tissue.

Cutaneous scars are one of the most frequently encountered conditions. The process of wound repair and restructuring is complicated, and various factors contribute to the creation of various types of scars such as hypertrophic, atrophic, or normotrophic.

Cosmetic and functional impairment caused by scars remains a great challenge to plastic surgeons. Scars are characterized by the proliferation of a large number of fibroblasts, accumulation of collagen and infiltration of inflammatory cells.

The ideal scar should be imperceptible, narrow, flat, and homogenous, with no surrounding distortion or functional disturbance. Factors affecting scar revision surgery may be classified as patient factors (age, comorbidity, medications, nutritional status, and smoking), local factors (blood supply, fluid collection, infection, and radiotherapy) or technical factors (technique, over mobile sites e.g., and joints).

There are a lot of articles about scars, but less attention has been paid to scar prevention. This review will study the importance of each of the following factors in the Cosmetic results of the scars: The importance of low tension lines, Importance of suture type, the material of the Suture, Dressing type, Moisture, Sunshine, Use of sunscreen, Corticosteroid injection, Time of removing stitches, Antibiotics, multivitamin, Pineapple and food, Massage, Laser, Stretch on the wound, Ultrasonography, Glue, Fat Injection, Cell Therapy, Pressure dressing, Ointment, movement.

Diabetic Wounds Management

Boddouhi Nosratollah

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Nowadays continuously diabetic wounds treatments are challenges in the world so in Iran. Diabetic wounds are complex chronic wounds which have a major long-term impact on the morbidity, mortality and quality of patient lives.

It is estimated that 415 million people are living with diabetes in the world and in Iran is estimated 5 million. Because of diabetes prevalence has been rising more rapidly, in the world as in Iran, so it is caused diabetic wounds too more rising about 25% of them. For this reason, treatment of these wounds is so difficult and important. In this article will be tried to discuss and present all of beneficial approaches in treatment of this kind of wounds.

Skin Healing in Elderly, Pathobiological Response by Aging

Amini Nik Saeid

Department of Surgery, Department of Laboratory Medicine and Pathobiology (LMP), University of Toronto, Sunnybrook Research Institute, Sunnybrook's Trauma, Emergency & Critical Care (TECC) Program, Ross Tilley Burn Centre

As the population expands, the number and percentage of individuals over the age of 65 is expected to double. This population expansion is expected to constitute a costly and ever-increasing healthcare burden. Specifically, the elderly population are at a greater risk for traumatic injuries like burns, attributed to both biological (thinning skin, deregulated metabolism) and neurological (mental decline, decreased sensations) alterations with aging. Therefore, a paradigm shift is required in both burn care and research to place a greater emphasis to

not only reduce mortality but also identify novel treatments in this rapidly growing aging population.

Reporting a large cohort trial, conducted in elderly burn patients, here we show that this population has significantly longer hospital stay and more complications compared to adult burn patients, which was associated with impaired wound healing. The impaired wound healing observed in elderly burn patients was associated with a reduced pool of mesenchymal progenitor cells in their skin and a deficient migration of mesenchymal stem cells (MSCs) *in vitro*. Elderly patients demonstrated a failure in the initiation of the systemic inflammatory cascade, an essential step for optimal skin healing. Between inflammatory cells, it has been shown by us and other groups that myeloid lineage cells are crucial for effective skin healing. Myeloid cells have an essential role in recruiting mesenchymal cells into the wound bed either through a paracrine effect or cell-cell adhesion. Here, I further discuss the cell-cell interplay during wound healing.

The Future of Application of Skin Bio-Scaffolding Nanotechnology as Anti-Inflammatory and Gene Therapy Delivery System

Al Salihi Karima

Al Muthanna University, Health Campus (College of Veterinary Medicine & College of Dentistry), Iraq

Nanotechnology is an emerging interdisciplinary tool that has progressed rapidly. Moreover, its applications have expanded to include the materials science, medicine, and biomedical engineering. Regenerative medicine and tissue-engineering are relying on cell and gene therapies, and it is one of the most promising approaches to repair damaged tissues. In the last decade, bio-scaffolding and tissue-engineered skin has delivered considerable benefits to patients with burns and chronic wounds and has revealed enormous potential. Nonetheless, in the current decade, the researchers intend to use the engineered skin graft as a platform to

incorporate the anti-inflammatory agents and introduce a precise genome editing *in vitro* with its effective application *in vivo*. This advancement will offer significant promising benefits for treatment of many human diseases in the future such as Epidermolysis Bullosa (EB), Recessive Dystrophic Epidermolysis Bullosa (RDEB), Melanoma, Ichthyosis, vitiligo Wound Healing and more recently Diabetes and diet Obesity. This paper intends to summarize the knowledge on the application of *in vitro* engineered skin and to discuss their essential characteristics, moreover, to consider the future approaches recently designed to use the engineered skin as gene therapy or anti-inflammatory agents delivering system.

Systematic Review Articles Can Provide the Best Evidences for Wound Healing and Tissue Repair Interventions

Meysamie Alipasha

Tehran University of Medical Sciences, Tehran, Iran

Main activity in Evidence Based Medicine is to find relative, reliable and valid evidences. Between different types of studies, some are observational which provide us some preliminary information. Case reports, case series, cross sectional studies, case control studies and cohorts studies are from this group which have limited efficacy to prove causal relationship because of different types of biases.

In experimental studies, randomized concurrent controlled clinical trials (RCTs) have a good eligibility to prove causal relationship if all principles have been considered correctly. RCTs may also provide insufficient evidence because of limited sample size or heterogeneity in results so may be conflicting or statistically non-significant.

In one best case, all similar studies will be searched and the data will be extracted according the same methodology and structure for making a

new pooled measure for different variables if they have had the same definition and measurement in those studies.

In methodology part of a systematic review, the authors shall report all steps in key word selection, search strategy and inclusion and exclusion criteria for each study may be included. All those steps can be depicted in a PRISMA diagram.

Then meta-analysis can be performed on those data extracted. If the studies are not similar or are different methodologically and in measurement of variables, meta-analysis results are not scientifically acceptable and qualitative discussion of results of individual studies shall be considered.

Systematic reviews with meta-analysis provide the highest level of evidence which is labeled as level A in clinical practice guidelines.

Different software can be used for designing a systematic review and performing a meta-analysis. One which is more common and very user-friendly is Review Manager (RevMan) which has been provided by Cochrane's collaboration for free use. Some complicated analysis shall be performed by other software like STATA.

Therapeutic Potential of Copper Nanoparticles in Full Thickness Wounds in Wistar Rat Model

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Background: Impaired wound healing results

in a large burden of morbidity and mortality worldwide. Current treatments based on the use of autografts, allografts, xenografts and bioengineered skin substitutes suffer from limitations such as, quantity of donor skin available, donor-site infection, potential risk of disease transmission and rejection of the graft. Given this problem, nanomaterial such as copper nanoparticles (cu-NP) have been receiving considerable research interest because they have high surface area to volume ratio, high stability, clinical safety and antibacterial effect. In this study, we explore the potential therapeutic effect of copper nanoparticle in vitro and in vivo model of wound healing.

Material and Methods: cultured human fibroblast, endothelial and keratinocyte cells were exposed to copper nanoparticles of concentration (1-10-100uM,1-10mM) and sizes (20-40-80nm) for 24,48 and 72 h. MTS assay for cell viability, scratch assay for migration and real time for collagen I deposition were performed. Next, full thickness wounds (2*2cm) were created on the back of Wistar rat (n=50). Copper nanoparticles were topically applied onto the wounds. Deionized water-treated wounds served as a control. Wound closer was measured on days 3, 7, 14, 21. Furthermore, tissue sections were subjected to histological evaluation.

Results: The results from cell viability (MTS) showed cu-NP of concentration (1-10-100uM) and sizes (40-80nm) was not toxic to fibroblasts, keratinocyte and endothelial cell, and Real time PCR revealed cu-NP (80nm/1uM) significantly increased collagen I expression. Also, treated wounds displayed increased angiogenesis than control wounds in the same rat. Moreover, copper nanoparticles enhance the migration of fibroblasts, keratinocytes and endothelial cells which further accelerate the wound healing process.

Conclusion: The findings have indicated a simple topical application of Copper nanoparticles accelerates the healing of full-thickness dermal wounds in rat model. This study suggests the therapeutic potential of copper nanoparticles for

topical treatment of wounds.

Key Words: Copper Nanoparticle, Wound Healing

Severe Skin Injuries in a Hemiscorpius Lepturus Scorpion Stung Patient

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Background: Scorpionism is a life threatening emergency and one of the most significant health problems in many tropical and subtropical countries. Khuzestan province, in the southwest of Iran, has the highest prevalence (about 60%) of scorpion stings in Iran and Hemiscorpius Lepturus (HL) species consisting a quarter of them. HL scorpion, from Hemiscorpiidae family, is usually less than 9 cm in length and is easily identifiable by its bead-shape jointed tail. The most significant manifestations of HL envenomation are skin necrosis, pigmenturia and hemolysis which can develop to depressed skin scare, acute kidney injury and cardio-respiratory failure in severe cases. Heminecrolysin displayed higher hemolytic activity to human erythrocytes (ED50 of 0.025 mug/ml) and strong inflammatory and dermonecrotic effects when injected intradermally to rabbit skins. In this study, however, we have presented an HL scorpion stung child with severe renal and skin manifestations followed for three months.

Case Report: An 11-year-old female child presented with an 8-h history of local pain in her left leg, bloody urine and restlessness following a sting of Hemiscorpius lepturus scorpion. She had an ecchymotic area with

local edema and tenderness on the left leg (4×7 cm²), her temperature was 38.2 C, the blood pressure of 110/75mmHg, the pulse was 125/min and she had normal consciousness. At the admission time, urinary analysis showed 3+ hemoglobinuria without hematuria and proteinuria. Hematology studies revealed a hemoglobin of 10.8 g/dl, platelets 175000/mm³, serum creatinine (SCr) 0.7 mg/dl and a blood urea nitrogen (BUN) of 18 mg/dl. Coombs test was negative and G6PD level was normal. The patient received polyvalent antivenom, acetaminophen and 20 meq/L of Na-Bicarbonate in dextrose water serum. Serum hemoglobin and platelets dropped rapidly to 8.3gr/dl and 66000/mm³ respectively, and blood smear showed fragmented erythrocytes. Serum lactate dehydrogenase raised to 10800 IU/L after 24h of envenomation. In day 3, BUN and Cr gradually raised (110 and 8.3 mg/dl, respectively), and the urine analysis showed 3+ proteinuria, 3+ hemoglobinuria and erythrocyte casts. During these days, the prothrombin time and the partial thromboplastin time were normal. She received 10cc/kg packed cell for two times and 10 cc/kg fresh frozen plasma (FFP) every 12h. Also, daily hemodialysis was performed for seven times. During the first five days, skin ecchymosis developed to about 7×9 cm² necrosis and crusted lesion so we added cefazolin to prevent secondary infection. After that, the lesion changed to a wide depressed scar with the exposure of subcutaneous tissue. In the second week, pigmenturia improved, platelets raised to normal level (178,000/mm³) and lactic dehydrogenase decreased to 2560 IU/l. The hemodialysis was discontinued after the improvement of renal function and the patient was discharged with SCr 1.7 mg/dl for follow-up. After one month, she had 0.9 mg/dl serum creatinine, normal complete blood count and more healing in her lesion of stung site. Ultimately, a 4×6 cm² scare was remained in the end of month 3 and all other complications were improved.

Various treatments have been used for skin

lesions including skin graft for extensive lesions and prophylactic antibiotics to prevent superinfections. In recent years, we have used a topical Alpha ointment containing Lawsone (natural Henna) in severe cases which ended in good results in the restriction of lesion and the acceleration of healing.

Review of Minimally Invasive Treatments of Lower Extremity Varicose Veins

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Varicose veins are enlarged, dilated, and tortuous vessels and a common clinical manifestation of chronic venous insufficiency. It occurs most often in the lower extremities. Symptoms range from pain, burning, and itching to edema, skin discolorations, to ulcerations.

Venous insufficiency is a common medical condition, with varicose veins and/or telangiectasias present in hundreds millions of people worldwide.

In addition to causing symptoms such as leg pain, superficial venous insufficiency can progress to cause complications of venous hypertension including skin ulceration, even in the absence of deep venous disease.

Traditionally, treatment for symptomatic lower extremity varicose veins has consisted primarily of surgical stripping of pathologic veins. Over the past 2 decades, therapeutic options for lower extremity varicose veins has greatly expanded and now includes several percutaneous and endovascular techniques.

This article will discuss the pathophysiology, clinical significance and current therapy for varicose veins and therapeutic options that we perform for patients in our clinic at jdtums.

Key Words: Varicose Veins, RFA, Venous Insufficiency

Cell - Loaded Nanofibrous Gelatin - Chondroitin sulfate Scaffolds for Skin Tissue Engineering: In - Vivo Study

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Background: Gelatin and Chondroitin sulphate (GAG) are natural polymers which have effective role in wound healing and tissue regeneration. In this study, gelatin/ chondroitin sulfate nanofibrous scaffolds were successfully fabricated using electrospinning technique and the human dermal fibroblast (HDF) cell-loaded nanofibrous scaffold.

Material and Methods: Gelatin and chondroitin sulfate (Sigma Aldrich) blend solution were prepared by dissolving the polymers in the co-solvent system of TFE and water (50:50). The solution was taken in a syringe and was subjected to the electrospinning process. The in-vivo wound healing was evaluated using 12 male Wistar rats aged at 60days with an average body weight of 200-250 g. A full-thickness of epidermis, 1.5 cm in diameter, was experimentally created on the back of rats.

Results and Discussion: The SEM images of gelatin/chondroitin sulfate nano fibers fabricated at 19kV and 0.6 mL/hr shows that nano fibrous structures are achieved successfully. The biocompatibility of the gelatin/GAG nanofibrous scaffolds were evaluated in vitro by investigating the adhesion and spreading of HDF cells onto electrospun scaffolds. Four layers were attached to each other using engaging of interface fibers. The prepared samples were crosslinked, washed and

sterilized as described previously.

In-vivo study showed that full thickness wound implanted with gelatin/GAG nanofibrous scaffolds accelerated wounds healing in rat compared with the control groups during 14 days.

Conclusion: We presented novel gelatin/GAG biocompatible and biomimetic nanofibrous scaffolds fabricated using electrospinning technique at optimized condition. The In-vivo study and biological assessment on gelatin/GAG nanofibrous scaffolds proves that they have a great potential for using in skin tissue engineering

Key Words: Gelatin/Chondroitin Sulfate, Electrospinning, HDF Cells, In-Vivo

Platelet - Rich Plasma Preparation for Regenerative Medicine: The Necessity of Standardized Methods

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Non-healing ulcers are a major health problem worldwide and have great impact at personal, professional and social levels, with high cost in terms of human and material resources. Application of platelet-rich plasma (PRP) has spanned various fields of dermatology from chronic ulcer management to trichology and aesthetics, as it is an easy and cost-effective method, and provides the necessary growth factors that enhance tissue healing. Though PRP is being used over a long time, there is still confusion over proper terminology to define, classify and describe the different variations of platelet concentrates. There is also a wide variation in the reported protocols for standardization and preparation of PRP, in addition to lack of accurate characterization

of the tested products in most articles on the topic. In this lecture, we review the principles and preparation methods of PRP based on available literature and place our perspective in standardizing protocol that can be followed to obtain an optimal consistent platelet yield.

The Effects of Autologous Platelet Gel on Wound Healing

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Non - healing ulcers and also wounds after surgery are two major health problems worldwide and have great impact at personal, professional and social levels, with high cost in terms of human and material resources. Recalcitrant non-healing ulcers are inevitable and detrimental to the lower limb and are a major cause of non-traumatic lower limb amputations. Application of autologous Platelet Rich Plasma (PRP) has been a major breakthrough for the treatment of non-healing, diabetic foot ulcers and surgery wounds, as it is an easy and cost-effective method, and provides the necessary growth factors that enhance tissue healing. PRP is a conglomeration of thrombocytes, cytokines and various growth factors which are secreted by α -granules of platelets that augment the rate of natural healing process with decrease in time. The purpose of this abstract was to evaluate the safety and efficacy of autologous platelet rich plasma Gel for the treatment of chronic non-healing ulcers and also pilonidal sinus resection wound.

Evaluation of wound healing in diabetic foot ulcer using platelet-rich plasma gel: A single - arm clinical trial

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Aims: The aim of the present study was to evaluate the effectiveness of using autologous platelet rich plasma (PRP) gel for treatment of diabetic foot ulcer (DFU) during the first 4 weeks of the treatment.

Material & methods: In this longitudinal and single-arm trial, 100 patients were randomly selected after meeting certain inclusion and exclusion criteria; of these 100 patients, 70 (70%) were enrolled in the trial. After the primary care actions such as wound debridement, the area of each wound was calculated and recorded. The PRP therapy (2mL/cm² of ulcers) was performed weekly until the healing time for each patient. We used one sample T-test for healing wounds and Boots trap resampling approach for reporting confidence interval with 1000 Boots trap samples.

Results: The p-value <0.05 were considered statistically significant. The mean (SD) of DFU duration was 19.71 weeks (4.94) for units sampling. The ratio of subjects who withdrew from the study was calculated to be 2(2.8%). Average area of 71 ulcers in the mentioned number of cases was calculated to be 6.11cm² (SD: 4.37). Also, the mean, median (SD) of healing time was 8.7, 8weeks (SD: 3.93) except for 2 mentioned cases. According to one sample T-test, wound area (cm²), on average, significantly decreased to 51.9% (CI: 46.7–57.1) through the first four weeks of therapy.

Conclusion: Furthermore, significant correlation (0.22) was not found between area of ulcers and healing duration (p-value>0.5). According to the results, PRP

could be considered as a candidate treatment for non-healing DFUs as it may prevent future complications such as amputation or death in this pathological phenomenon.

Key Words: Diabetes, Diabetic Foot Ulcer, Platelet-Rich Plasma, Wound Healing

A Novel Method for Treatment of Recalcitrant Vesicovaginal Fistula and Perianal Fistula: Autologous Platelet - Rich Plasma Injection and Platelet Rich Fibrin

Glue Interposition

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Abstract: Purpose: Vesicovaginal and perianal fistula remains a challenge in surgical therapy. In this study autologous platelet rich plasma and platelet rich fibrin glue were used as a minimally invasive approach for vesicovaginal and perianal fistula closure.

Material and Methods: Data including age, parity, ICIQ-UI (International Consultation on Incontinence Questionnaire-urinary incontinence), ICIQ-QOL (International Consultation on Incontinence Questionnaire-quality of life), duration of leakage, fistula diameter and complications were collected before and after the intervention. Platelet rich plasma and platelet rich fibrin glue were prepared from 12 patients' own blood. De-epithelialization was performed around the fistula until a small hemorrhage occurred. Platelet rich plasma was injected around the fistula into the tissue and platelet rich fibrin glue was

interpositioned in the tract. Also one case (45 years old) was recalcitrant perianal fistula and several surgeries were done for him but he did not any response to surgery and finally the same procedure (platelet rich plasma and platelet rich fibrin glue) was done for him.

Results: No complications were observed during and after the injection. Mean±SD patient age was 39.75±8.45 years. At 6-month follow up 11 patients considered themselves clinically cured, and transvaginal physical examination and cystography were normal. ICIQ-UI and ICIQ-QOL showed remarkable improvement in 11 patients. One patient had significant improvement but did not consent to the second injection. None of the patients had voiding dysfunction, urinary incontinence, retention or urinary tract infection. Also perianal fistula completely cured after 3 years follow up.

Conclusions: Autologous platelet rich plasma injection and platelet rich fibrin glue interposition offer a safe, effective and novel minimally invasive approach for the treatment of vesicovaginal fistula which obviate the need for open surgery. For perianal fistula, this method should be done for more patients in order to substantiate the efficacy of this method for fistula closure.

Key Words: Vesicovaginal Fistula, Perianal fistula, Platelet-Rich Plasma, Fibrin Tissue Adhesive, Wound Closure Techniques

Inflammasome Complex and Sex Dimorphism in Wound Healing

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Background: Wound healing has four dynamic overlapping phases; Hemostasis, Inflammation, Proliferation and Remodeling. During the Inflammation phase, Leukocytes infiltrated into the wound in order to clean and disinfects the wound's environment. Additionally, these cells play the role in repair and reconstruction of wounds

by serratation of cytokines and growth factors. Proinflammatory signals cause the formation of inflammasome complex that these complexes are important in secretion of IL-1 β and IL-18.

In pathologic conditions, the effective impact of sexual dimorphism which is well recognized in immunity system in normal condition has been identified too.

We decided to investigate the role and activity of the inflammatory complex in wound healing in both male and female rats based on the role of testosterone/androgen in an inhibition of wound healing process and the role of estrogen in accelerating wound healing.

Methods: In the present study, 24 Male and 24 Female rats were used with the weight between 220-250 gr. After making a full thickness wound on back of the animals, the sizes of the wounds were measured periodically in 2, 7, 14 and 21 days later and by collecting the sample from each lesions. We calculate the expression of NLRP3, ASC, Caspase1, IL-1 β and IL18 genes by Real-time PCR. Moreover, the IL-1 β and IL18 portions synthesis also tested by ELISA technique from the blood sample of the test animals. Data analysis was performed by the SPSS software, one-Way ANOVA and Tukey post test. Statistical significance was determined as P< 0.05.

Results: Gene expression of NLRP3, ASC, Caspase 1, IL-1 β and IL18 was more in first two days in male samples rather than females and significantly these differences observed between male and female rats in first week. However, the expression rates do not show any change between these two groups of samples in second and third weeks. The size wound in the female rats was noticeably smaller than male rats.

Conclusion: Sexual hormones have a difference impact on formation and activity of inflammasome complexes and based on this role at inflammatory conditions, consequently they have direct effect on inflammasome complexes establishment, production and secretion of inflammatory cytokines.

Effects of Psychological and Physical Factors on Heart Injury in Female Rats

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Background: Wounds and injuries are tissue fractures that lead to cellular changes and the withdrawal of a biological system from the state of Structure-Function-Balance (SFB). Factors of making injuries could be physical or psychological which cause different health problems by different group of neurons processing. As yet, little is known about the psychological injuries and its effect on SFB in living organisms. Since any variation in the heart rhythm caused by heart injury would change the rhythm of other fluctuating systems in the body like blood pressure and respiration, evaluation of heart physiological parameters seem to be helpful in comparing the effects of two physical and psychological factors in health problems and making injury. Meanwhile, assessment of blood glucose and Pro-oxidant Antioxidant Balance (PAB) would be supportive, as fluctuations in these two parameters play an important role in all kind of injuries.

Material and Methods: In our study, 30 female Wistar rats and a two-compartment box were used to study the comparative effects of physical (electrical foot shock) and psychological (witnessing their counterpart's suffering through exposure to the electrical foot shock) factors on heart injury by evaluating some blood biochemical parameters (glucose and PAB), heart tissue histology, immunohistochemistry, and heart rate variability.

Results: According to blood sampling results, rats of psychological stress group exhibited more hyperglycemia and significant increase of ROS.

Under the influence of psychological stress, heart rate variability revealed a very non-coherent pattern representing major sympathovagal imbalance. Furthermore, immunohistological results of this group demonstrated significant increase of GFAP indicating high level of inflammation.

Conclusion: Since psychological factors were more effective in severity of heart injuries in comparison to physical factor, it can be concluded that psychotherapy might have an effective potential for tissue repair in various injuries.

Key Words: Heart Injury, Heart Rate Variability, Psychological Stress, Physical Stress, Immunohistochemistry, Pro-Oxidant Antioxidant Balance

Reparative and Immunoregulatory Characteristics of Mesenchymal Stromal Cells: Aligned or in Contrast?

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Mesenchymal stromal cells (MSCs) are adult multipotent cells capable of differentiating into different mesenchymal lineages, thus representing an attractive tool for tissue regeneration and wound repair. Early investigations were focused on either their capacity to differentiate directly into end-stage phenotypes or their healing effects due to secreting trophic factors which contribute to repair. Besides their reparative roles, the increasing evidences demonstrate that MSCs have immunoregulatory potential and were showed to be beneficial to treat various immune-based disorders. MSCs which were previously defined as “the sentinels of injury” after this paradigm shift are now called: “sensors of inflammation”.

However, a significant barrier to the clinical application of MSCs is the low efficacy especially after few passages during in vitro expansion. Therefore, modification of stromal cell properties seems to be necessary to fully exploit their therapeutic potential. In both paradigms, given their poor therapeutic effect, priming of mesenchymal stromal cells to promote their reparative or immunoregulatory properties is the subject of intense investigation. These priming methods particularly genetic modification of MSCs to enhance their immunomodulatory characteristics open up new possibilities to achieve beneficial clinical abilities in the near future.

MSCs express immunosuppressive molecules and various growth factors that facilitate tissue repair and maintain immune homeostasis and the immunomodulatory characteristics and the tissue regenerative functions of MSCs are induced by Mediators of inflammation. These two different but interconnected processes rely on sophisticated inflammatory mediators and gene networks which are not yet fully discovered. This talk shall highlight whether manipulating MSCs to augment their immune-related characteristics may impair their reparative properties.

Key Words: Mesenchymal Stromal Cells, Reparative, Immune-Regulation, Modification

Cell - Based Products for Wound Healing

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Wound care is an important part of both acute

(for example; trauma, burns and surgery) and chronic (for example; pressure ulcers, venous ulcers and diabetic ulcers). Although conventional wound care often helps in the healing process of wounds, however; many of these wounds fail to heal, so it is necessary to develop different strategies. Recent advances have shown the great potential of cell-based therapies in improving the rate and quality of wound healing and skin regeneration. Cell-based therapy is thus considered a new alternative to classical methods of wound healing.

A successful approach is to create and use three-dimensional scaffolds that mimic the natural extracellular matrices (ECM). These scaffolds foster cell adhesion, growth and differentiation to restore damaged skin both structurally and functionally. Candidate cell populations for seeding on an appropriate scaffold include differentiated cells (fibroblast and keratinocyte) and stem cells (mesenchymal stem cells (MSCs), embryonic stem cells, and induced pluripotent stem cells).

Concerning MSCs-based skin substitute, in whose development we were involved, wound regeneration is enhanced by the addition of MSC into the scaffold. Our aim was to develop a MSCs-based skin substitute, wherein the implantation of scaffold loaded with MSC induces keratinocyte proliferation and maturation. In several ongoing projects, we have established the key knowledge and tools for MSC-based skin substitutes.

This lecture aims at an updated overview of the application of cell-based therapies in wound treatment and will present our own results in this regard. We have shown that using the MSCs in combination with keratinocytes will help to develop off-the-shelf, safe, and efficient skin substitute.

Cell Therapy and Mesenchymal Stem Cells on Cutaneous Wound Healing

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Background: Wound healing is a process followed by cutaneous lesions. One of the medical science objectives is attempting to heal a wound in a shorter time span, with fewer side effects. From the long past times with development of effective methods, physicians have been seeking ways to heal wounds in the shortest possible time with the least side effects. Clinicians have been searching for ways to obtain “super normal” wound healing. MSC populations in cells derived from Bone Marrow tissue has been studied as an alternative source of MSCs, providing multipotent differentiation. We aimed to evaluate the wound contraction and stem cell properties on managing full-thickness wounds in vivo.

Methods: In this experimental study was carried out on 54 adult male Wistar rats weighing 200-210 gr, and ages of 3-4 months. A square 1.5*1.5 wound was made on the back of the neck. The rats were divided into control and two experimental groups. Additionally, the control and experimental groups were separated into three subgroups corresponding to 4, 7, and 14 days of study. Mesenchymal stem cells isolated from BONE MARROW, Cell collected and cultured.

The control group did not receive any treatment. In first experimental group, MSCs was used once on the wound. The second experimental group received 1% phenytoein cream on the wound. For histological studies, samples were taken from the wound and adjacent skin. This tissue was examined using histological staining (H&E). Wound surface and wound healing were evaluated. Data were analyzed by using one-way ANOVA with post hoc Tukey test and ($P < 0.05$) was significant.

Results: Wound healing process was assessed by microscopic and macroscopic study. The results of microscopic study showed histological parameters in wounds bed in the experimental group were significantly different than the control group. The macroscopic and microscopic evaluations showed that the percentage of wound healing on different days in the control and experimental group were significant ($P < 0.05$).

Conclusion: The beneficial activity of MSCs in wound healing is complemented by the effects of growth factors and ECM produced by the native placenta tissue cells. Using Mesenchymal stem cells on open wounds enhanced the healing process, shortening the inflammatory phase, an increase of granulation tissue, angiogenesis and early proliferative phase and remodeling and finally wound heal faster.

Key Words: Wound Healing, Open Skin Wound, Rat, Mesenchymal Stem Cells

Healing Mechanisms Trade-Off in Skin Wound: The Role of Tissue Engineering

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Purpose: The purpose of this presentation is to discuss the trade-off between tissue regeneration and scar formation.

Background: Following initial onset of skin injury, there is tissue reaction characterized by acute inflammatory process followed by repair mechanisms. If the wound is surgical one, the repair mechanism is basically of regenerative type, otherwise, it is a trade-off between regenerative mechanism and scar formation. Several factors play important roles in achieving acceptable regeneration; such as debris (necrotic tissue and contaminant), infection, microenvironment (epidermal basement membrane and extracellular materials), proper approximation of two edge of wound and the presence of active stem cells (Stratum germinativum).

Methods: literature review

Discussion: If the regenerative mechanisms failed, then tissue engineering triad (TET) should be practiced so as to achieve better regeneration. TET includes scaffold, stem cells and growth factors. These will be discussed in the presentation.

A Review of Wound Healing and Human Tissue Reproductive Methods

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Background: Due to the disease, the damage affects the body tissue in a different way, and this leads to the development of treatments that can rebuild the tissues without using alternative methods or transplants. In the revitalizing medical sciences, an interdisciplinary course, which includes tissue engineering and other sciences, has established the basis for a treatment that potentially returns injured and damaged tissues and organs.

Methods: In these methods, the use of multi-talented cells, along with micron-sized meshes

and proteins that contribute to the formation of signs for the repair, or induction into cells, of the role of migration, migration, and deposition are used.

Results and Discussion: Increasing the capacity of human tissue retrieval has recently been developed by changing its environment, in other words by injecting cells or inducing immunity, as well as methods for exploiting cellular resources. Techniques such as triangulation of human tissues help research into regenerative medicine approaches in wound healing, and improve the effectiveness of reproductive methods in repair, and these promising clinical approaches, by recognizing the body's histological structure to rise.

Effect of Ga-Al-As Laser on Biocompatibility and Bioactivity of a Biodegradable Composite Scaffold

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Background: It is assumed that low level lasers are able to affect the biological activity of cells. In this study the biological activity, biocompatibility and bioactivity of some biomaterials have been studied in conjunction with LLLT.

Material and Methods: Ga-Al-As low level laser was applied on a PLGA – HA composite and its ingredients in presence of L929 fibroblasts. MTT and ALP assays were used to measure biocompatibility and bioactivity.

Results: Laser has a significant effect

on biocompatibility of composite and its ingredients but no effect on bioactivity.

Conclusion: Laser may facilitate bone defects' repair during their healing period.

Key Words: LLLT, Bone Materials, Biocompatibility, Bioactivity

Effect of Laser-Light Wavelength Selection in Wound Repair

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The use of laser or light sources at non-thermal irradiances as effective method to treat a wide variety of pathological conditions, for healing and pain relief of inflammatory processes, reduction of pain in both acute and chronic conditions, nerve regeneration, and wound healing acceleration among other medical applications is reported as effective method in the literature. This regimen of the light or laser irradiation which is known as low-level light/laser therapy (LLLT) has large numbers of reports demonstrating positive effects of LLLT in various in vitro, in vivo and clinical studies.

However, there it still remains controversial issues in this field since there have remained uncertainties about the fundamental molecular and cellular mechanisms that take place in the tissue-light interactions and also selection the effective dosimetry parameters including wavelength, irradiance or power density, pulse structure, coherence, polarization and etc.

Here we are presenting the importance and effectiveness of the wavelength selection of the light-laser sources for an optimized wound healing and repair.

Wound Dressings: Challenges, Novel Approaches, and Future Opportunities

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Wound healing and coverage are the crucial determinants of burn patient survival, however, these are limited by factors such as limited skin availability, size, and cell availability. In the proliferation phase of wound healing, mesenchymal and epithelial cells migrate to the wound bed to reconstitute new tissue but limited cell migration leads to deficient healing. Full-thickness burns normally do not heal or heal over prolonged time with devastating scarring. A fundamental limitation is the time necessary for cells such as keratinocytes to efficiently migrate and cover the wound surface. Mortality rates of burn patients remain high, due to infection/sepsis and the hypermetabolic-catabolic response. Of the current treatments for skin tissue regeneration, autografts are limited in the extent of available tissue, cell cultured epithelial autografts (CEA) grafts have limited thickness and mechanical stability, and synthetic skin grafts (such as collagen/silicone bilayers) have slow cell infiltration. Conventional wound dressings simply protect from infection and absorb exudate fluid as passive layers. There is a significant potential for wound dressings as active *devices* to dynamically participate in the wound repair process through cell and scaffold delivery to the wound. I discuss here a recently developed non-adhesive microfluidic wound dressing that can potentially deliver cells, growth factors and antibiotics to the wound. Time allowed I will also discuss a novel skin substitute that has been manufactured in the lab with the preclinical studies.

The Potential Application of Photobiomodulation in Radiation Oncology: Radioprotection or Radiosensitization?

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Photobiomodulation (PBM) or low level laser irradiation (LLLI) is used as a therapeutic and to reduce the incidence of muco-cutaneous side effects of ionizing radiation. Despite much clinical and experimental study, few studies reported that LLLI causes adaptive responses to ionizing radiation in normal and cancer cells according to radiobiological approaches. PBS, as photo-oxidative stress could enhance radiosensitivity in cancer cells selectively. Recently, the radiomodulatory effects of PBM have been reported in various cancerous and normal cells. However, the mechanism of the radiomodulatory effects of PBM is still uncertain. This study aimed to investigate the cellular responses when PBM was followed with X-ray ionizing radiation in human cervical cancer cells. Additionally, we evaluated the role of oxidative stress, DNA damage and cell cycle progression. Our findings show that PBM at 685nm significantly decreases cell survival fraction of HeLa cell at higher energy density in a dose-response manner. In contrast, PBM at 830nm could significantly protect normal NIH 3t3 cells against ionizing radiation at lower energy density. PBM at higher energy densities significantly enhanced radiosensitivity in cancerous HeLa cells by exceeding oxidative stress and DNA damage and increasing radiation-induced apoptosis and autophagy. Based on these finding, 685nm PBM at higher energy density could use as a radiosensitizer to decrease the ionizing radiation dose delivered to patients and subsequent side effects. In contrast, in lower dose, it can be a radioprotection via a sub-lethal photo-oxidative stress.

Mesenchymal Stem Cells and Photobiomodulation in Regenerative Medicine

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The effects of coherent and non-coherent light sources such as low level lasers and LEDs on cells and tissues, known as photobiomodulation, is the basis of photomedicine. This treatment technique effects cell function, proliferation, and migration and plays an important role in tissue regeneration. Phototherapy has an inhibitory or stimulatory effect on cells; however the exact mechanisms of phototherapy are unclear. Stem cells have been found to be helpful elements in tissue regeneration and the combination of stem cell therapy and laser therapy appears to positively affect treatment results. In this presentation the results of 4 in vitro and in vivo current studies of our team will be presented.

In conclusion we can indicate that photobiomodulation has positive effects on stem Cells. This review concluded that doses of 0.7 to 4 J/cm² and wavelengths of 600 to 700 nm are appropriate for light therapy. The results were dependent on different parameters; therefore, optimization of parameters used in light therapy to obtain favorable results is required to provide more accurate comparison.

Plasma Medicine: Applications in Wound Healing, Sterilization and Cancer Treatment

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Plasmas medicine is growing rapidly. Today's, gas discharges interacting with biological target are hot topic with greatly interesting in plasma physicists, biologists and plasma chemists due to the broad field of potential applications. Plasma medicine represents

a great opportunity for developing novel biology-chemistries and related technologies.

Potential technological impact is foreseen in a range of application fields such as cancer and wound treatment, blood coagulation, dentistry, catalysis activation, drug delivery, biosensors, surface decontamination of tools, water and air treatment formation of new organic compounds, and biochemistry.

In this paper, a short overview of our experiences in plasma medicine is mentioned. Using plasma in biology due to its structure can lead to many useful effects such as wound healing and cancer treatment due to the present of ROS and RNS (especially NO) in the medium, bacteria and fungi reduction because of bombardment of the microorganism's cell by charged particles like electrons and ions can result in physical damage of the bacterial cell membrane and the excited and reactive species in the plasma including OH, O, O₂, O₃ and NO can oxidize the compounds of the outer surface of cells like fatty acids and proteins. In addition the present of different radiations such as UV in plasma can pave the way for sterilization.

The plasma medicine's activities exhibit a strongly interdisciplinary character and will represent the basis for future developments.

Key Words: Plasma, Wound Healing, Cancer Treatment, Bacteria, Fungi

Cell Based Hair Reconstruction

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Background: Through cell-based approaches, it is possible to produce hair-like structures in the laboratory setting in order to reconstruct the hair follicle. However, challenging issues still exist with the functionality of cultured human hair cells, the proper selection of non-hair cell sources in cases of shortage of donor hair, development of defined culture conditions.

Material and Methods: Thus, maintenance

of HFSCs and DPCs along with their well-orchestrated interactions are necessary for normal hair regeneration as well as hair bioengineering and reconstruction in vitro. In vitro hair reconstruction involves four key steps: i) selection of proper starting cell sources; ii) isolation of desired cell sources and the development of effective protocols that generate adequate numbers of functional HFSCs and DPCs; iii) assembling organized HF-like structures by co-culturing HFSCs and DPCs in conditions enabling proper epithelial-mesenchymal interaction and compartmentalization; and iv) transplantation of bioengineered hair follicle-like structures in patients or animals to generate fully organized hair structures.

Results: To date, isolation, maintenance and expansion of hair and non-hair cell sources have witnessed a series of tremendous advances in the development of culture conditions and production of starting cell materials for human hair reconstruction in vitro. Development of xeno-free/defined expansion and differentiation culture systems for scalable and clinical grade production of hair and non-hair cell sources remains challenging.

Conclusion: Recent advances in human hair biology dramatically improved our understanding on hair regeneration and neogenesis mechanisms. Thus they have raised new hopes and paved the way for developing regenerative hair loss therapies. This can be achieved by in vitro/vivo reconstruction of the hair follicle. To date, isolation, maintenance and expansion of hair and non-hair cell sources have witnessed a series of tremendous advances in the development of culture conditions and production of starting cell materials for human hair reconstruction in vitro. The next emerging and challenging field is development of innovative bioengineering strategies for mimicking/reconstruction of the hair niche in vitro using the proper cell combinations and their integration with well-designed scaffolds for clinical grade hair reconstruction, followed by subsequent large-scale production of relevant

clinically applicable numbers of hair. To overcome these challenges, in vivo induction of hair resident cells in their native niche, to stimulate the regeneration process, is a promising cell-free approach. More research can overcome these issues and bridge the gap between current hair regenerative therapy technologies and widespread clinical applications.

Key Words: HFSCs, DPCs, In vitro Hair Reconstruction, HF Assembling, Bioengineered Hair Follicle

Comparison the Effects of Low Level Laser Therapy and Split Thickness Skin Grafting in Children with Grade 2b and 3 Burn Ulcer (A Randomized Clinical Trial)

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Background: A skin graft is standard therapeutic technique in patients with deep ulcers, but hospitalization, surgery and managing donor site may cause several complications for the patient Low Level Laser Therapy (LLLT) has been used in several medical fields, including healing of diabetic, surgical and pressure ulcers, but there is not any report of using this method for healing of burn ulcers.

Material and Methods: The protocols and informed consent were reviewed according to Medical Ethics Board of Shahid Beheshti University of Medical Sciences (IR.SBMU.REC.1394.363) and Iranian Registry of Clinical

Trials (IRCT2016011726069N1). 60 children with grade 3 burn ulcer candidate for STSG were selected and randomly divided to laser and surgery group. Children with underlying disease were excluded. Laser area was irradiated by a red, 655 nm laser light, 150 mW, 1 J/Cm² every other day until complete healing. STSG was done for the children in control group. Dressing and other therapeutic care for both sites were the same. The patients and the person who analyzed the results were blinded.

Results: Evaluation the burn area after healing showed significant difference in scar and hypertrophic scar formation (P<0.001).

Discussion: In the present study, for the first time we compared the effects of LLLT and STSG on the healing process and prognosis of burn ulcers. The results showed that local irradiation of red laser decrease the rate of scar and hypertropic scar formation significantly.

Key Words: Low Level laser Therapy, Skin Graft, Wound Healing

Wound and Burn Healing Nanohealth Products:

Effectiveness and Challenges from National and International Viewpoints

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Background: Antibiotic resistance to

microorganisms is one of the major problems faced in the field of wound care in burn patients. Silver nanoparticles have come up as potent antimicrobial agent and are being evaluated in diverse medical applications ranging from silver based dressings to silver coated textiles. Other than therapeutic effects ,high biocompatibility, excellent biodegradability, low-cost and easy availability are the basic desired properties for engineered nanomaterials (ENMs) which have been considered as new candidates for wound and burn healing properties .Despite the extensive use of nanotechnology based products , the potential safety of ENMs and possible mechanisms by which they may induce adverse reactions have not received sufficient attention and no specific knowledge translations exists in a practical model to describe and quantify their toxic effects for their regulation ,standardization and clinical applications.

Material and Methods: The systemic absorption of ENMs should be clarified and it should be considered whether they undergo routine biotransformation pathways ,how is their biological fate and half-life. Moreover it should be determined well ,if they may interfere with biotransformation of other pharmaceuticals which may cause drug overdosing or under dosing, or may cause harmful and even life-threatening consequences for patients. Other parameters, such as surface/volume ratio, chemical stability, and tendency to aggregation can result in reactivity of ENMs with critical genes and proteins in target organs.

Results: On the basis of our 8 years efforts in Iran Nano-health committee on out of 310 registered products ,31 products (10%) were introduced us for wound and burn healing effects using nanosilver, silver nanoemulsion, collagen and chitosan, nano herbal extracts, nanocurcumin-nanoApmicillin combinations, PAMAM etc. Although we are not able, at present, to identify all possible toxic effects of

registered burn and wound healing nanohealth products, we used a battery of toxicology tests using cellular and animal models as well as clinical settings to predict local and systemic effects of them by focusing on their genotoxic potentials, hematological ,biochemical and histopathological effects and adverse drug reactions respectively using international standards.

Conclusion: We tried to provide an opportunity for clinical application of more than 6 Nanohealth products in the market of Iran by developing great toxicological models but there are still ongoing studies to authorize the rest of registered products and lack of knowledge translation for many classes of ENMs to provide realistic health risk assessment and management. In this lecture more details about safety and efficacy of these products will be explained in comparison to similar products in international markets.

The Role of Exosomes Derived from Human Adipose Mesenchymal Stem Cells for Skin Wound Healing

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Prolonged healing and scar formation are two major challenges in the treatment of soft tissue trauma. Adipose mesenchymal stem cells (ASCs) play an important role in tissue regeneration. Adipose mesenchymal stem (stromal) cells (ADSCs) are multipotent cells with the ability to differentiate into several cell types, thus serving as a cell reservoir for regenerative medicine. Much of the current interest in therapeutic application of ADSCs to various disease settings can be linked to their immunosuppressive and anti-inflammatory

properties. One of the key mechanisms of ADSCs anti-inflammatory effects is the secretion of soluble factors with paracrine actions. Recently it has emerged that the paracrine functions of ADSCs could, at least in part, be mediated by extracellular vesicles (EVs). EVs are predominantly released from the endosomal compartment and contain a cargo that includes miRNA, mRNA, and proteins from their cells of origin. Recent animal model-based studies suggest that EVs have significant potential as a novel alternative to whole cell therapies. Compared to their parent cells, EVs may have a superior safety profile and can be safely stored without losing function.

In this review, we explain current knowledge related to the potential use of ADSCs -derived EVs in skin wound healing and discuss the promising future for EVs as an alternative, cell free therapy.

Key Words: Wound Healing, Exosome, ADSCs, miRNA, Extracellular Vesicles

Atypical Wounds: Diagnosis and Management

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New treatments for chronic wounds have led to improvements in lesion management and in the quality of assistance provided by medical and paramedical staff, but lesion monitoring methodologies have not kept pace with this progress.

The constant improvement of diagnostic and therapeutic procedures, together with the increase of life lasting, results in a higher frequency of patients suffering from chronic cutaneous ulcers.

Due to the high costs these pathologies imply for treatments and often poor outcomes in terms of quality of life, a decrease in patients' hospitalization,

without a corresponding worsening of the quality of therapy, would provide important benefit.

Moreover, since the healing process is remarkably slow, the clinical perception of the phases that lead a chronic wound to complete restoration is often penalized: this effect is dramatically amplified in those cases in which the patient is followed by more than one operator.

Therefore, the study of wound healing pathophysiology and the development of new tools for the monitoring of the healing process may represent a possible optimization of the treatment efficacy for these lesions.

The morphologic features of an ulcerative cutaneous lesion can be substantially analyzed according to two distinguished modalities: the quantification of the loss of substance such as the extension and depth of the lesion, characteristics of the edges, and the qualitative discrimination of the several areas of the wound bed like the presence of necrosis, fibrin, fluid, extension of the surrounding skin inflammation. Molecular and histologic analysis of chronic wounds has been suggested as a method to validate the use of debridement. The non healing edge contains cells with molecular markers indicative of healing impairment. The use of wound and skin biomarkers will provide substantial information in the near future to better understand the non healing wounds process.

Comparing the Effect of ColActive Plus Ag Dressing Versus Nitrofurazone, Vaseline Gauze Dressing in the Treatment of Second Degree Burns

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Background: Wound care quality and speed of

burns healing are an important factor that affects the treatment, prognosis and complications of burns. The care of burns is challenging, but an ideal method is controversial. The aim of this study was to compare the effects of a new dressing (ColActive dressing) in treatment of superficial second degree burns versus traditional dressing including Vaseline and Nitrofurazone.

Material and Methods: This was a randomized clinical trial study to compare two kinds of dressing in patients with superficial second degree burns. 25 cases were enrolled in this study. A superficial second degree burn area was divided in two parts in every patient; randomly one of two areas was dressed by traditional dressing and other area by ColActive plus Ag dressing. Every 3 days after removing of dressings and washing the wounds, wound surface area was evaluated by medical photographic records and J image software. Statistical analysis was conducted by SPSS-16 and using t test and the results were compared between two groups.

Results: The wound surface area was compared in two groups in days before and 3, 6, 9 and 12th days after dressing. The difference was nonsignificant before dressing but it was significant in 3th, 6th, 9th and 12th post operative days, the repeated measure test in all duration in every group was taken the difference was significant in both groups, but it was more prominent in ColActive group ($p < 0.001$) than traditional group ($p < 0.05$).

Conclusion: Considering the results of this study and good results in many previous case reports, it may be more effective than traditional dressing and we suggest a more comprehensive study in a longer period in a larger number of cases to compare other important variables such as the quality of scar, the cost of dressings and pain in two dressings.

Key Words: Nitrofurazone, Vaseline, ColActive Plus Ag, Second Degree Burn

Does Modalities Routinely Used in Physical Therapy of Knee Osteoarthritis Improve Joint Structure and Function? An Experimental Basic-Applied Study

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Background: Present study determines and compares the effect of low level laser and ultrasound wave on biomechanical properties of articular cartilage, knee joint friction, tissue histology and articular tissues morphology following secondary knee osteoarthritis in rabbits.

Material and Methods: Traumatic osteoarthritis induced in Dutch white male rabbits by ACLT. After 62 days of surgery, biomechanical properties use a Stress-Relaxation test, joint friction using a simple free oscillation system, articular cartilage thickness using indentation and histological features compared to control group. These tests repeated after 10 session of using laser and ultrasound in intervention groups.

Results: ACLT results in grade II osteoarthritis within 62 days following surgery. Cartilage thickness, maximal force, equilibrium force, elastic modulus and aggregate modulus reduced significantly following ACLT. In addition, joint coefficient of friction increased and cycle number decreased significantly following surgery. Laser and ultrasound improved joint friction state by

reducing coefficient of friction and increasing cycle number. These changes were more prominent in ultrasound group. Biomechanical properties of femur reached normal values in both groups but in tibia, maximal force, equilibrium force and elastic modulus improved significantly only in laser group

Conclusion: Rabbit ACLT is a proper strategy to induce osteoarthritis. Changes in biomechanical properties can reveal degenerative process sooner and more accurately than histological evidences. Ultrasound reduces joint friction more effectively than laser irradiation and in turn, laser improves biomechanical properties of articular cartilage better than ultrasound

Key Words: Articular Tissue, Biomechanics, Joint Friction, Low Level Laser, Pulsed Ultrasound

Nutritional Habits and Diets in Chronic Wound Healing Process According to Traditional Persian Medicine

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Background: Chronic wounds reduce patient's quality of life by complications such as pain, secretions, and reduction of movement and impose large costs to health system. Thus, looking for treatment methods with higher success and less complications seems to be necessary. In Traditional Persian Medicine (TPM), a variety of specific nutrients and medicinal plants have been recommended for chronic wounds. The aim of present study is to scientifically evaluate the nutritional habits and diets claimed to be effective

for chronic wounds in TPM.

Material and Methods: This article is a narrative review. Traditional Persian medical textbooks from 8th to 12th century AD were selected for the study. Nutrients, diets and medicinal plants recommended for chronic wounds in TPM have been extracted from above mentioned manuscripts. The obtained items were individually searched in electronic databases to obtain any in vitro, animal, or clinical evidence of their efficacy and possible underlying mechanisms.

Results: The treatment of chronic wounds in TPM consists of three steps. First, correcting nutritional habits and diets. Second, systemic herbal medicine in order to reduce internal inflammation and improve wound healing process, Third topical herbal lotions. The diet of patients with chronic wounds should contain hematopoietic components and also should have the ability to strengthen the gastrointestinal system and liver. This kind of diet seems to be effective in reducing fever, internal inflammation and systemic infection. By examining the components of foods, it is found that the diet of patients should contain a variety of ingredients to compensate anemia in the body, have anti-inflammatory and anti-bacterial properties and be effective in the wound healing process. Among animal products, the low-fat lamb meat and egg yolk are effective in hematopoiesis. In vitro and in vivo studies show the fruits such as figs, pomegranates, grapes, lettuce, and barberry have shown strong anti-bacterial properties. Moreover figs, pomegranate extract and pumpkin have demonstrated wound healing effect in several studies.

Conclusion: According to TPM, correcting nutritional habits and diets are prior to topical treatments for management of chronic wounds. This strategy provides a new approach for management of chronic wounds and seems to be more useful than conventional treatment which is mostly focused on topical treatment.

Key Words: Traditional Persian Medicine, Chronic Wound, Medicinal Plant, Nutrition, Diet, Homeostasis

Histopathology, Chronic Wound Healing

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The normal response to tissue injury is a timely and orderly reparative process that results in sustained restoration of anatomical and functional integrity. Wound repair, is a complex integration of dynamic interactive processes involving cell-cell and cell-matrix interactions mediated by humoral messengers. A chronic wound is a wound that does not heal in an orderly set of stages and in a predictable amount of time the way most wounds do; wounds that do not heal within three months are often considered chronic. Chronic wounds seem to be detained in one or more of the phases of wound healing. For example, chronic wounds often remain in the inflammatory stage for too long. To overcome that stage and jump-start the healing process a number of factors need to be addressed such as bacterial burden, necrotic tissue, and moisture balance of the whole wound. In acute wounds, there is a precise balance between production and degradation of molecules such as collagen; in chronic wounds this balance is lost and degradation plays too large a role. In addition to poor circulation, neuropathy, and difficulty moving, factors that contribute to chronic wounds include systemic illnesses, age, and repeated trauma. other disease that may contribute to the formation of chronic wounds include vasculitis, immune suppression, pyoderma gangrenosum. A chronic wound may also be a malignancy; especially squamous cell carcinoma, may also form as the result of chronic wounds, probably due to repetitive tissue damage that stimulates rapid cell proliferation. On histopathologic view the predominant findings in the epidermis are hyperkeratosis; Parakeratosis and necrosis, Histologic examination of the dermis mostly show granulation tissue and fibrosis

Key Words: Histopathology, Chronic Wound Healing

Effects of Photodynamic Bio-stimulation on Inflammatory Phase in Healing Process

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Therapeutic benefits of Photodynamic Therapy in treatment of wounds have been reported since 1960s. However, many of the relevant results described inconsistency, mainly due to methodology bias or lack of standard method in different studies. Beyond, the application of some of the light sources as a therapeutic modality is still controversial, especially when it comes to apply the modality in initial stages of tissue repair.

Clinical practice with photodynamic therapy, especially low or high level laser therapies, helps the researchers to identify benefits of these modern care strategies. However, the questions on biological causes and mechanisms are still arising. The initial effects of laser biostimulation on an injured tissue cause to release some preforming substances such as histamine, serotonin, bradykinin. Simultaneously, Laser application may modify normal enzymatic reactions, accelerate or delay some of the biological chains and promote ATP production. Inflammation, as the first stage of repair, is essential to preserve the integrity of the organism and involves a homodynamic interaction between inflammatory and vascular cells. Laser application has shown to be an anti-inflammatory alternative with similar effects with the NSAIDs lead to inhibit PGE₂, COX and histamine. As a result, laser application seems to be able to modulate inflammation for different tissues. This presentation aims to explain anti-inflammatory effects of low and high level lasers and provide some clinical examples

that demonstrate tissue healing process in initial phases under photodynamic therapy.

Key Words: Photodynamic, Biostimulation, Laser, Healing, Inflammation

Chronic Wound Healing and Genetic Factors

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Number of patients with chronic-wound is increasing worldwide because of two reasons: raising the number of patients with chronic disorders such as obesity and diabetes which both can result in an increased incidence of ulcerations such as leg or foot ulcers, and aging populations. Wound repair is one of the most complex biological processes our bodies must perform after embryonic development. The ability to heal wounds is really linked to our survival and is a big challenge of public health. This process composed of three overlapping phases: inflammation, proliferation, and remodeling. Impairments at any one or more of these stages can lead to compromised healing.

It is necessary to understand the molecular and genetic basis of wound healing and underlying wound's cause in order to care towards particular patient groups. From a molecular perspective, wound healing is a process that is usually mediated by growth factors and cytokines released by specialized cells such as fibroblasts, endothelial cells, phagocytes, platelets and keratinocytes which are activated by the immune response. Two fundamental factors in the organization of the molecular processes involved in wound healing are growth factors and cytokines. Many single nucleotide polymorphism (SNPs) have been reported to have a significant role in the fluctuation

of growth factors and cytokines. Recently, a key role for epigenetic mechanisms such as DNA methylation and non-coding RNAs have been suggested in the complex interplay between genes and the environmental factors. MicroRNAs (miRs) are non-coding RNAs that act as post-transcriptional regulators of multiple proteins and associated pathways. Thus, identification of the appropriate miR involved in the different phases of wound healing could reveal an effective therapy in chronic wound care. Several miRs have been shown to be upregulated or downregulated during the wound healing process. These are prime miR candidates that could be considered as a gene therapy option for patients suffering from chronic wounds.

In addition to genetic factors, ethnicity can also play a significant role in the development of underlying diseases lead to chronic-wound.

Evaluation of Open Wound Healing by Animal Models

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Wound is defined as the loss of breaking cellular and functional continuity of the living tissues and management of wounds is frequently encountered with different problems.

Wound healing is a biological process that is initiated by trauma and often terminated by scar formation.

Drug resistance and toxicity hindered the development of synthetic antimicrobial agents with wound healing activity. Many factors should be considered before selecting a wound healing model for a specific study. A wide variety of models have been developed for examining different aspects of the repair response thus many animal models are used for the evaluation of wound healing activities. Rats and mice have been

widely used in the study of skin wound healing and efficacy of different treatment modalities.

The process of wound healing also gets affected by other disease such as diabetes etc, antineoplastic drugs and antibiotics may also interfere. Although animal wound healing models are imperfect reflection of wound healing processes in human beings and its clinical challenges, these models continue to be crucial tools for the development of new strategies and approaches for therapy of wound healing.

In this review, we discussed about the wound and types of wound models that can be used along with the topics like wound location, where it is feasible to create the wound, wound size, strain and sex of rat, weight and age range as well as anesthetics and analgesics and analytical measures that are used in wound healing studies. The present review will be helpful for the evaluation of wound healing activity in animal models.

Animal wound healing models are important biological tools to understand basic process of tissue repair and to develop and validate strategies for treatment of wounds. Wound healing in human beings have many unique aspects that related to physiology, age, environmental factors, etc. but the opportunities to carry clinical experiments.

Antimicrobial Photodynamic Therapy in Wound Infections

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Antimicrobial photodynamic therapy (aPDT) is an emerging strategy to kill multidrug resistant bacteria that is rapidly improving in the face of the worldwide rise in antibiotic resistance. aPDT relies on the use of a harmless dye or photosensitizer (PS) molecule that only becomes microbicidal when excited with the correct wavelength of light.

aPDT can be used against various microorganisms including viruses, bacteria, and fungi. Due to

confined delivery of light, aPDT can be used only for localized infections. Advantages of aPDT compared to classic therapies include the following. The development of resistance to aPDT is thought to be very unlikely. Antibiotic resistant strains are as easily killed as sensitive strains. aPDT may have less toxicity as compared to other topical antimicrobial strategies. Also, side effects can be reduced by the use of PS targeted towards microorganisms rather than host cells.

Traumatic wounds and burns may contain significant amounts of non-perfused tissue due to compromise of the capillary circulation. These factors seriously limit the use of systemic antibiotics. Also, topically applied antimicrobial agents may not penetrate to bacteria that have colonized the damaged tissue. aPDT of bacteria in wounds may be an effective approach of killing bacteria while simultaneously stimulating the host immune system and enhancing wound healing.

All open wounds contain microorganisms from endogenous or exogenous sources. If microbes attach to the wound surface and proliferate, a biofilm will begin to develop. Biofilm is a community of microorganisms attached to a surface and encased within an extracellular matrix of polysaccharides, proteins, and glycoproteins. When the biofilm is well established, it will exhibit resistance to destruction by the host immune system and antimicrobial agents. At this stage, the biofilm is considered mature and more difficult to eradicate. In these situations the risk of a wound not healing and becoming clearly clinically infected (i.e., showing signs of inflammation) is increased.

It has been shown that bacteria growing as biofilms are more resistant to aPDT compared to their equivalent planktonic forms. The dye concentration and the light dose used for the photo-inactivation of biofilms are considerably higher than those required to inactivate planktonic bacterial suspensions. In fact, cells growing in biofilms differ from their planktonic counterparts in a number of aspects, such as the cell wall composition, rate of growth, and presence of

polysaccharide intercellular adhesin (PIA), which may block both the uptake of the PS and the penetration of light, and thereby reduce the photosensitizing efficiency. Generally, higher concentrations of PS (up to 25 times) and light exposure times (up to 30 min) are required to reach a phototoxicity against biofilm growing bacteria compared to their planktonic counterparts.

Fluorescence Optical Imaging in Wound Monitoring and Assessment

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Wound management is a challenging and costly problem that is growing in importance as people are living longer. Instrumental methods are increasingly being relied upon to provide objective quantitative measures of wound assessment instead of the qualitative subjective ones to help guide management. Already, there are new technologies in optical imaging systems being developed. Functional light-based imaging provides wound care practitioners information on parameters related to the ability for a wound inflammatory, perfusion assessment, and healing assessment that helps to guide clinical decision-making by directing treatment based on individual patient needs. Fluorescence optical imaging (FOI) which takes advantage of the wavelength range of around 650–900 nm, wherein the major tissue chromophores are hemoglobin, lipid, and water, is the technique to visualize inflammation based on the accumulation of fluorescence optical contrast media (e.g., indocyanine green) in inflammatory-altered tissue. Here we review the basic of FOI technique and its application of the

field of wound that have the potential to be clinically relevant to wound monitoring and assessment.

This imaging technology is still in its infancy. Clinical translation is extremely promising as optical imaging is noninvasive, cost-effective, portable, and safe from ionizing radiation. At the moment, NIR optical tracers hold the greatest promise in fluorescence-guided imaging and endoscopy due to their centimeter-magnitude tissue penetration capability.

Potential Role of Stem Cell in Treatment of Uterine Injury

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Background: Asherman's Syndrome (Ash) results from injury to the endometrium and healing process are coordinated by complex actions within different cells in which specific molecular pathways have emerged. It is accompanied by the scar band progression, formation of fibrotic tissue and adhesions. The atrophic endometrium is generally a symptom of Asherman's Syndrome, which results from the obliteration of the uterine lining leading to infertility. We have previously demonstrated that bone marrow-derived mesenchymal stem cells (BMDSCs), in this study we focused in supplementation of stem cells to expedite the migration of stem cell and evaluate the role of cell therapy in regeneration of injured tissue.

Methods: 8-12 weeks-old C57BL/6 female mice were used to create Asherman's syndrome mouse model and GFP mice were used as source of stem cell for harvest purpose. Stem cells were injected through retro orbital venous system. Wound healing process evaluated by stem cell

engraftment and scar tissue removal from matrix content that mainly produced by myofibroblast through the deposition of alpha smooth muscle actin (α SMA) and Collagen from the uterus with IHC staining and FACS analysis. Tissue regeneration investigated by immunofluorescence staining for proliferation protein markers.

Results: GFP positive stem cells were successfully grafted in the uterus but the migration of stem cells in the group who supplemented with SDF1 was significantly higher than other groups. Trichrom mason staining also confirmed these findings. Stem cell efficiently will target wound bed as well as fibrosis pathway in the uterus through different aspects

Conclusion: After uterine injury, we demonstrate that SDF1 augmentation increased stem cell engraftment. Cell treatment led to improved fertility and litter size. Atrophic endometrial epithelial cells rapidly regenerated and formed a normal uterine epithelial layer, indicating a robust epithelial-regenerating capacity of treatment.

Assessment of different sides of amniotic membrane as a scaffold for mesenchymal stem cell in skin wound healing

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Background/Objective: Human amniotic

membrane (HAM) was an excellent biological, biophysical and biocompatible scaffold. HAM has beneficial properties including anti-inflammatory effect, low antigenicity, anti-bacterial and anti-viral, as well as the easy and low cost to prepare advantages.

Methods: In this study, epithelial cells of the cryopreserved HAM were decellularized by using NaOH 0.5 μ for less than one minute, and mesenchymal stem cells (MSCs) were isolated from male rat bone-marrow and the BM-MSCs were seeded on the two different sides of the HAM (i.e. dAM (decellularized epithelial side) and sAM (stromal side)). To evaluate expansion of cells cultured on AM, BM-MSCs were stained with live-dead staining protocol (PI- FDA) and observed under invert florescent microscope. MSCs-seeded HAMs were also examined with scanning electron microscopy (SEM) and haematoxylin and eosin (H&E) staining. Further, real-time polymerase chain reaction (PCR) was performed for gene expression assay of VEGF-a (Vascular endothelial growth factor- A, Igf-1 (Insulin-like growth factor-1), Fgf-1 (Fibroblast growth factor 1), and Fgf-2 as markers of wound healing process. MSCs-seeded HAMs were applied to repair of full-thickness skin defects in rat animal model. The forty female rats were randomly divided into five groups of 8 each with two full-thickness wounds on the back skin of each rat. The first group was the control group with no treatment; the second group treated with the decellular epithelial surface; the third group received both dAM + BM-MSCs; the fourth group take only sAM without any cells cultured on them, and the fifth group remedied with sAM+ BM-MSCs. The skin wound healing process was followed up for the duration of 28 days. The wound area alteration was obtained separately at day 3, 7, 14, and 28. H&A staining and immunohistochemical analysis of transforming growth factor beta-1 (TGF- β 1), vascular endothelial growth factor (VEGF) and alpha-smooth muscle actin (α -SMA) were used to evaluate wound healing

in all five experimental groups.

Results: The results of real-time PCR showed the enhanced expression of the genes involved in wound healing. Histological and immunohistochemical studies showed that the healing process was much faster in HAM+MSCs groups rather than control groups.

Conclusion: Our findings suggest the capacity of HAM to deliver MSCs on skin defect for increasing healing process potentially by preserving matrix for cells, localizing cells within the wound as compared to control groups.

Keywords: Regenerative medicine, wound healing, amniotic membrane, mesenchymal stem cells.

The Effects of Y-27632 Rho-Kinase Inhibitor and Mesenchymal Stem Cells Conditioned Medium on Isolation and Lifespan of Keratinocyte Stem Cells

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Background: Although, primary human epithelial keratinocytes (HEKs) are used in many clinical settings, however, they are difficult to isolate and expand. Furthermore, clinical application of these HEKs faces with some other challenges. For examples, HEKs culture requires a feeder layer and loses their lifespan during serial passages. With respect these

difficulties; we studied the effects of Y-27632 (a Rho kinase inhibitor) and mesenchymal stem cells-conditioned medium (MSCs-CM) on proliferation, migration, and lifespan of HEKs.

Material and Methods: Human skin and lipoaspirate wastes obtained from healthy women, who undergo aesthetic surgery. Conditioned medium of adipose-derived MSCs was collected and used for the treatment of HEKs. The effects of Rho-associated protein kinase inhibitor Y-27632 and MSC-CM on keratinocyte proliferation and expansion was investigated by treatment of keratinocytes at passage 1 with Y-27632 (10 μ M/ml) and MSCs-CM (0.48 μ g/ml). The result was evaluated by colony forming efficiency, population doubling time, MTT assay, and surface markers evaluation by flow cytometry.

Results: We found that, the treatment of HEKs with Y-27632 (10 μ M/ml) and MSCs-CM (0.48 μ g/ml) promo proliferation, viability, and colony forming efficiency of HEKs in a monolayer system. Additionally, we examined the effects of Y-27632 and MSCs-CM treatment on expression of differentiation (involucrin and K10) and stemness (K14, P63, and α 6integrin) markers by flow cytometry and real-time PCR. This work in ongoing and our results will be wrapped up in one month.

Conclusion: Treatment of HEKs with Y-27632(10 μ M/ml) and MSCs-CM (0.48 μ g/ml) increase the proliferation capacity, expansion potential, and lifespan of HEKs in a feeder-free system.

Key Words: HEKs, Y-27632, Conditioned Medium, Mesenchymal Stem Cells, Keratinocyte

The Effect of Vitamin D on the Patient with Oral Lichen Planus

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Background: lichen planus is a chronic inflammatory disease of the skin, mucous membranes and nails with an immunological origin that cytokines such as TGF- β , IFN- α , TNF- α , and IL-6... contribute to its pathogenesis. Considering the high prevalence of vitamin D deficiency in Iran (nearly 80%), and since the effect of vitamin D on the immune system and many of these cytokines is known, this study aimed to investigate the effect of vitamin D in patients with Oral lichen planus (Olp), which simultaneously had deficiency or insufficiency of this vitamin.

Methods: In this double-blind randomized clinical trial, 52 patients with erosive-atrophic oral lichen planus referred to Oral and Maxillofacial Diseases Department of Mashhad Dental School from September 2015 to May 2016, after clinical diagnosis and histopathologic confirmation of oral lichen planus Vitamin D, calcium, and phosphorus tests were performed in which 24 of them did not have vitamin D deficiency. 28 patients with OLP with vitamin D deficiency and insufficiency, and other inclusion exclusion criteria, were entered in this study, and divided two groups of intervention (n = 13) and controls (n = 15). For all patients, routine treatment (oral dexamethasone + nystatin 2-3 times a day) was administered for 8 weeks. Patients in the intervention group weekly received 1 capsule of 50,000 units of vitamin D and patients in the weekly control group received 1 placebo capsule for up to 8 weeks, and they were examined once every two weeks for the degree of pain and burning and the type and severity of clinical lesions. At the end of the

study, patients were referred to the lab again to determine the level of vitamin D and cytokines. Data were entered into SPSS software (version 20) and data were analyzed by using t, mann-withney, Qi-squaqr, Pierson tests.

Results: The mean age of all patients was 48.86 \pm 12.77 years and 20 of 28 patients were women. Reducing of the type and severity of lesions based on Thangprosam criteria was significant in the intervention group but this trend was not significant between the two groups Also, the severity of pain and burning was statistically significant based on the VAS criteria in both control groups (p = 0.019) and intervention (p = 0.001). However, the intergroup changes were not significant. The mean IL-6 reduction was significant between the two groups (p = 0.001). The mean of TNF- α in the intervention group after administration of vitamin D decreased (p = 0.49), while the control group this rate increased after treatment. However, the changes in this cytokine were not significant in each group or intergroups.

Correlation coefficient of Pearson was found in control group between VAS and Thangprosam and in intervention group between IL-6 and TNF- α (p=0.02, r=0.82).

Conclusion: Based on the results of this study, it can not be argued that vitamin D can be used as an auxiliary or substitute for improving pain and burning and the severity of oral lichen planus lesions. However, the degree of type and severity of lesions in the group treated with vitamin D showed a significant decrease compared to the beginning of treatment. Also, TNF- α level in the intervention group, in contrast to the control, had a decreasing trend. Although the changes between two groups were not significant, so more studies with higher sample sizes could better assess the effect of D-vitamin on oral lichen planus improvement.

Key Word: TNF- α , IL-6, Oral lichen planus, Vitamin D

Molecular Characterization of Collagenase in *Lucilia Sericata* Larvae as a Potential for Wound Healing

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Background: The salivary glands of *Lucilia sericata* are the first organs to express specific endopeptidase enzymes. These enzymes play a central role in wound healing, and they have potential to be used therapeutically.

Methods: Rapid amplification of cDNA ends and rapid amplification of genomic ends were used to identify the coding sequence of collagenase from *L. sericata*. Different segments of collagenase gene, namely the middle part, 3' end, and 5' end, were cloned, sequenced, and analyzed using bioinformatics tools to determine the distinct features of collagenase protein.

Results: Assembling the different segments revealed that the complete mRNA sequence of collagenase is 1932 bp long. CDS is 1212 bp long and is responsible for the production of collagenase of 404 amino acid residues with a predicted molecular weight of 45.1 kDa. The middle part, 3' end, and 5' end sequences were 933, 503, and 496 bp. In addition, it was revealed that the collagenase genomic sequence includes three exons and two introns. Furthermore, the three-dimensional structure of *L. sericata* collagenase protein was evaluated, and its alignment defined that it has high similarity to chain A of human MMP-2 with 100% confidence, 52% coverage, and 38% identity according to the SWISS-MODEL modeling analysis.

Conclusion: Collagenase of *L. sericata* has a close relationship with its homologs in invertebrates and other insects. The present study significantly

contributes to understanding the function, classification, and evolution of the characterized collagenase from *L. sericata* and provides basic required information for the development of an effective medical bio-product for wound healing.

Lactobacilli Exopolysaccharides Promote Wound Healing in Human Skin Fibroblast

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Background: During skin healing, both collagen and elastin degradation occur along with the synthesis and maturation of them, then dermal architecture moves closer to the original normal structure. In aging, levels of collagen and elastin degradation in wounds appear to increase and it cause a delay in wound healing process. The enzymes that are most active in collagen and elastin degradation are the matrix metalloproteinases (MMPs). The MMPs are secreted by various cells including fibroblasts are known to degrade collagen, gelatin, elastin and other ECM components.

Any studies have investigated the potential of probiotics bacteria to promote wound healing in skin. The aim of the current investigation was to determine whether exopolysaccharides (EPS) extracted from probiotic bacteria could be beneficial in cutaneous wound healing.

In this study, sixty Lactobacilli were isolated from dairy products and herbal plants. EPS extracte.

Material and Methods: from all species was quantified by phenol sulfuric acid method. Molecular identification by 16s rDNA gene sequencing was performed for 20 high EPS producer strains. In vitro anti-collagenase, anti-elastase, and antioxidant activity was measured for them. Cytotoxicity was assayed by MTT method on normal primary human fibroblast after 48 hours exposure to each EPS. Scratch test was performed on the fibroblast with 2% FBS. Expression of MMP_s was measured for two of the EPS_s by real time PCR.

Results: Some extracted EPS_s show high anti-collagenase (up to 100%), anti-elastase (up to 87%) and antioxidant (up to 60%) activity. Most of them had no cytotoxicity for fibroblast and some of them promote cell proliferation (up to 10%). In scratch assay, all of investigated EPSs stimulated wound healing process in fibroblast (up to 99%). *L. casei* strain B9-1 and *L. plantarum* strain P35 were selected as the best strains for checking MMPs expression level. MMP1, MMP2, MMP3, and MMP9 were down-regulated significantly in B9-1 with high anti-collagenase and anti-elastase activity but any MMPs did not show significant changes in P35 with low anti-collagenase and anti-elastase activity.

Conclusion: Recent studies have showed that *L. rhamnosus* GG and *L. reuteri* lysates promoted the re-epithelialization of keratinocyte monolayers but the study demonstrated that the *L. plantarum* cell free supernatant promoted re-epithelialization in keratinocyte cultures. It was hypothesized that *L. plantarum* produces a specific substance that stimulates keratinocyte migration and proliferation in a scratch assay. In our study lactobacilli EPS showed high anti-collagenase, anti-elastase activity and fibroblast migration in scratch assay that is necessary for promoting wound healing. In conclusion, Lactobacilli EPS could have wound healing potential for using in wound dressing

Key Words: Lactobacillus, Exopolysaccharide, Anti-Collagenase, Anti-Elastase, Scratch

Effect of Transforming Growth Factor- β 1 (TGF- β 1) on Bovine Nasal Cartilage Against the Tissue Degradation Induced by Interleukin1 α (IL - 1 α) in Explant Culture

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Background: Osteoarthritis (OA) is the most common form of arthritis, involving cartilage, synovium and bone. An imbalance between the activities of these anabolic and catabolic factors leads to cartilage degradation resulting in OA. The aim of this study to investigate role of growth factors TGF- β 1 in Repair of Bovine Nasal culture (BNC) Suffering OA and phenotype of chondrocyte. spacial effect of TGF- β 1 on cartilage chondrocyte morphology for collagen and proteoglycan production.

Methods: BNC explants were cultured in DMEM with IL-1 α (10 ng/ml), TGF- β 1(10 ng/ml) and culture for 14 days. investigate At days 3, 7 and 14 the media in absent and present TGF- β 1. We used Masson's Trichrome stain to visualize collagen distribution and synthesis, and Safranin O and Alician blue to highlight the proteoglycan content. The viability and number of chondrocyte was evaluated by trypan blue staining.

Results: the stimulation of BNC with IL-1 α show model of cartilage detracton like OA cartilage. In most chondrocytes were transformed into fibroblast-like morphology with pyknotic nuclei at day 14 and proteoglycan and collagen in extracellular

matrix (ECM) was destructed. The data of the current study show that TGF- β 1 could preserve cartilage from apoptotic and degenerating of chondrocyte morphology and collagen, proteoglycan in BNC suffering OA.

Conclusion: We suggest that TGF- β 1 is an important factor for chondrocyte morphology and this way controlled ECM production. We show that a parallel relationship between chondrocyte morphology and collagen and proteoglycan production. TGF- β 1 is a good choice for treatment of OA.

Key Words: Chondrocytes, Interleukin-1 (IL-1), Transforming Growth Factor- β (TGF- β), Bovine

A New Paradigm in Photobiomodulation of Brain: Review

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Background: Photobiomodulation (PBM) also known as low level laser therapy (LLLT) which prevention of cell death, promote regeneration and healing. In recent years PBM use as new scientific approach for treating traumatic brain injury (TBI), neurodegeneration, neurotrauma, stroke, mood and memory disorders. The mechanism of action involves photon absorption by cytochrome c oxidase a key mitochondrial enzyme and primary photoacceptor of light in the red to near-infrared region and triggers numerous signaling pathways.

Methods: By reviewing numerous related studies in the field, articles obtained from PubMed database.

Results: Reports of different animal studies on the effects of LLLT for TBI indicated that PBM had triggered increased rates of

neurogenesis, synaptogenesis and significant increase in brain-derived neurotrophic factor (BDNF) levels. Also, cognitive functioning improved. In animal model of Alzheimer diseases (AD) reduction in Amyloid beta ($A\beta$) plaques and inflammatory markers observed. As well in clinical studies of AD, Permanent reduction in dementia and cognitive recovery observed through improvement of cerebral microcirculation and patients showed significant improvements. Dopaminergic cells in the substantia nigra pars compacta (SNc) were protected from toxicity and decreased expression of hyper phosphorylated tau, reducing tau-caused oxidative stress subsequent cellular degeneration after PBM therapy in mice models of Parkinson diseases (PD). PBM through reduction of oxidative stress, inflammation, hypoxia and raise blood flow have beneficial effects on brain strokes.

Conclusion: The beneficial effects of LLLT on different brain conditions in in-vitro, in-vivo and some human studies proved.

Key Words: Photobiomodulation, Brain, Neurodegeneration, Neurotrauma, Stroke

Effect of Liposomal Animal and Herbal Lecithins on Wound Healing and In Vitro and In vivo Anti - Oxidant Activity

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Background: The use of lecithin in wound

healing due to its structural role in the cell membrane, its antioxidant properties, modulation of inflammatory responses and, on the other hand, its anti-inflammatory role in the process of wound healing, which are essential for the process of wound healing, are logical along with the properties of the transfer of the drug.

Methods: In vivo; Experimental groups: Formulation animal and herbal lecithins, Positive control group: phenytoin cream, Control group: did not receive any treatment (Subgroups: day 4, 7, 14). Wounds were covered with 0.5 ml gel like lecithins and phenytoin cream for once daily treatment. In macroscopic study sizes of lesions were measured. Samples were taken from the wound and adjacent skin. Staining with H&E and masson's trichrome. In vitro; NO₂, SOD, CAT was analyzed by ELISSA. Staining with H&E and masson's trichrome. DPPH radical scavenging activity assay. ABTS radical scavenging activity. Data were analyzed by one-way ANOVA test (P <0.05).

Results: Animal and herbal lecithins increase recovery percentage, ultimately accelerate wound healing process. Increase fibroblasts, macrophage, and neutrophils in the first four days in the treatment groups compared to the control and positive control groups. Collagen and blood vessels in the treatment groups were significantly increased. High level of total radical scavenging activity was detected by low concentration (2000µg) that increases with increase formulation concentration.

Conclusion: These formulation animal and herbal lecithins accelerate wound healing process.

Key Words: Wound Healing, Animal and Herbal Lecithins, Anti-Oxidant Activity, Phenytoin, Rat

Preparation and In vitro Evaluation of an Oral Colon Specific Formulation of Aqueous Extract of Malva Sylvestris for Treatment of Inflammatory Bowel Disease (IBD)

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Ulcerative Colitis (UC) is one of the common types of Inflammatory Bowel Disease (IBD) which mostly affects the distal colon and rectum. Many new cases of IBD are diagnosed each year and the current drug choices for this disease present many adverse effects.

The Common Mallow is a well-known medicinal plant that presents anti-inflammatory effects and shows regulation of immune system. In a previous study, this plant showed anti-inflammatory effect in animal model of Ulcerative Colitis. This research aims at preparation and in vitro evaluation of an oral colon specific formulation of aqueous extract of Malva sylvestris for treatment of Ulcerative Colitis treatment.

Aqueous extract of this plant which was standardized based on poly phenolic compounds was used to prepare colon specific tablet formulations.

Tablets were divided into two groups. In first group, release controlling polymer such as ethyl cellulose, hydroxyl propyl cellulose and hydroxyl propyl methyl cellulose were used and the tablets were prepared by wet granulation and direct compression methods. In the second group, after direct compression of the core, cellulose acetate phthalate solution (10%) and Eudragite S100 (1, 2%) were used as coating materials. Hardness,

weigh variation, content uniformity and release tests were performed on tablets.

Hardness, weight variation and content uniformity of the tablets were in the acceptable range recommended by references. Disintegration time of tablets of the first group was not in optimum level. Release behavior of CAP coated tablets for 2 hours in HCl 0.1 N and 2 hours in pH 7.4 showed 92.49% release which was not suitable. Tablets coated with Eudragit 1% solution did not provide regular release profile and showed highly variable drug release during study period.

Tablets coated with Eudragit 2% solution exhibited 7.3% release after 2 hours, 42.33% after 6 hours and 96.21% after 10 hours.

In conclusion, tablets prepared by direct compression method and coated with Eudragit 2% solution, showed the most suitable results for clinical trials in ulcerative colitis cases.

Key Words: Ulcerative Colitis, Malva Sylvestris, Aqueous Extract, Colon Specific Formulation, Eudragit S100

Soy Protein Isolate Based Film for Wound Dressing Applications

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Naturally derived materials are becoming widely used in the biomedical field. Soy protein has advantages over various types of natural proteins employed for biomedical applications

due to its low price, non-animal origin and relatively long storage time and stability. In this study, Soy protein isolate/ poly (vinyl alcohol)/ glycerin based films were prepared by solvent casting method and characterized for wound dressing applications. Two types of thin and viscous simulated exudate solution were used to evaluate the water absorption of films. The value of water absorption after 48h for films was about 69% and 102.5% in thin and viscous simulated exudate solution, respectively. Contact angle analysis was carried out to survey the hydrophilicity of samples. Results showed that films were hydrophilic by having an angle of 44° before cross-linking and 73° after cross-linking with Glutaraldehyde/ acetone solution. Water vapor transmission rate of films were 266.7 gr/m² day. Cell studies showed proper cell attachment with no cytotoxicity. The results suggest soy protein isolate as a promising natural polymer for wound dressing applications.

Key Words: Soy Protein Isolate, Wound Dressing, Cross-Linking

Aloe Vera Efficacy on Wound Healing: A Systematic Review

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Back ground: Although using Aloe Vera is an ancient and traditional way for improving the wound healing process, clinical and molecular evidence still remained unclear. Up to now, several studies have assessed the efficacy of Aloe Vera on wound healing.

Method: systematic review on in vitro and in vivo studies including animal studies and clinical trials was conducted to determine the Aloe Vera molecular interactions in damaged tissues and its effectiveness in clinic. We electronically searched related studies in PubMed, Cochrane Library and Scopus from 1918 till September

2017. Only Papers discussing on healing activity of Aloe Vera, Aloe-derived products and a combination of Aloe Vera and other dressings as a treatment of acute wounds specifically caused by lesions (in animal studies) or in post-surgery patients were included. There were no restrictions on any language of publication. Reviewer extracted data on study characteristics, patient characteristics, Gross morphology of the intervention, Frequency and duration and outcome measure. 41 studies were included in this review.

Result : In vitro studies showed that Aloe Vera boosted the time and quality of wound healing by stimulating MMP 2,3 and 9, vascular endothelial growth factor, transforming growth factor and even total collagen activity. in vivo studies demonstrated a significant difference in wound healing between control groups and aloe treated ones .

Conclusion: Cumulative evidence on in vivo and in vitro studies ends to confirm that Aloe Vera might be an effective intervention used in wound healing. Further, trials with adequate information should be conducted to determine the effectiveness of Aloe Vera or its products.

Key words: Aloe Vera, wound, wound healing

The Effect of Sesame Oil and Cucurbita on Healing Wounds Caused by Third-Degree Burn in Male Balb/c Mice

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Background and object: Burn and injuries related to it are among serious problems facing today society. There is much evidence based on therapeutic properties of honey. Therefore in this study, we observe the effect of the combination of sesame oil and cucurbita on locally healing wounds caused by the third- degree burn.

Material and Methods: In this experimental study, 24 adult BALB/c mice randomly divided into experimental group1 (treated with sesame 40%), experimental group 2(treated with sesame 30%), experimental group3 (treated with pumpkin 40%), experimental group 4 (treated with pumpkin (30%), experimental group 5 (treated by combination of all material), experimental group 6 (control group treated with Eucerin). In general anesthesia and sterile conditions, a second-degree burn was generated on the back of each mouse. Topical treatment of burn was conducted once a day for 6 weeks and after the treatment, mice were anesthetized by ether and then killed and a sample of wound bed was provided and fixed in formalin. The practical histologic process was performed on them. The samples were stained with Mallory trichomes method and microscopic observations were performed on them. A Part of the sample was frozen to extract protein and performing MDA test and measuring total antioxidant in future.

Findings: A complete tightening of the wound and less scar was observed in the macroscopic observation of burn wound surface after treatment in the group treated with sesame and pumpkin (treatment group 5) compared to control group and other groups. In the microscopic assessment, a significant increase ($p < 0.05$) was observed in the total thickness of skin, keratinocyte layer, the epidermis and hypodermis, number and diameter of the hair follicles in the experimental group compared to other three group. A significant decrease ($p < 0.01$) in MDA amount in the experimental group versus control group reflects a reduction of lipid peroxidation level in this group.

Results: results show that the combination of sesame and pumpkin with different percentage accelerates the healing burn wound in balb/c

mice, while using the above-mentioned matters individually have fewer effects on improvement compared to the combination form.

Key Words: Sesame, Pumpkin, Male BALB/c Mice, Third-Degree Burn

The Significant Effects of Propolis on Wound Healing by Using of PCL/PEG Nanofibers

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Background: Wound healing is a complex biophysiological phenomenon. The repair process is to replace the missing cellular structures and tissue layers and had four main phases. There are several factors that can delay or accelerate this trend. For example, propolis as a natural compound (resin) produced by honeybees was found to have antibacterial effects and regenerative properties. The acidity index of this resin prevents bacterial replication and activities. This natural drug increases metabolism and accelerate skin wound healing. PCL/PEG copolymer nanofibers are suitable for biodegradable and targeted drug delivery and targeting. They control the release of the drugs and act topically. We tested the effects of PCL/PEG nanofibers loaded with propolis on human fibroblasts in vitro.

Material and Methods: PCL/PEG nanocouple were loaded with different amounts of IP electrostatically. Then the morphology of these nanofibers were scanned by electron microscopic investigation. Cell viability performed by MTT assay were evaluated after a certain amount of time, after human fibroblasts were cultured in DMEM media and then seeding onto the scaffolding.

Results: The results of the electron microscopic investigation revealed that nanofiber scaffolds including 3D structures were suitable for 3D cell growth and proliferation. The other advantage of PCL/PEG is being anti-toxic and biodegradable. The results of the MTT test showed that viability of human fibroblasts increases with increasing the concentration of propolis and the duration of incubation.

Conclusion: In the present study the positive effects of increasing the incubation time and the concentration of propolis in nanofiber scaffolds were evident on fibroblast cells, which showed the restorative properties of propolis and its role as a stimulant of fibroblastic growth. The study also demonstrated the high efficiency of PCL/PEG/EEP scaffolds. However, more extensive in vivo research is needed in this field, as long as it can be tested directly on human beings.

Key Words: Wound Healing, Propolis, Fibroblast, Nanofiber.

Evaluation of the Effectiveness of Topical Mentha Piperita Essence in Wound Healing: An Animal Study

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Background: Wound healing is one of the important medical concerns for both the patient and the doctor. Different studies tried to find useful substances to improve the quality and speed of wound healing. In this study, we aimed to evaluate the effect of topical Mentha piperita essence on healing of skin wounds.

Material and Methods: We made square shaped wounds in sterile condition, on the back

of the neck of 20 Wistar rats. Afterwards, they were randomly divided in 1 control group and 3 experimental groups. In the first experimental group, we applied *Mentha piperita* essence and Vaseline. Second group only received *Mentha piperita* essence, and third group only received Vaseline. After 14 days, the rats were sacrificed for histological studies. Histological samples were obtained in 4, 7 and 14 days. Samples were stained with trichrome and Hematoxylin and eosin (H&E) and were explored for fibroblasts, epithelial cells, inflammatory cells and vessels.

Results: Our results show that after 14 days, group 1 who received *Mentha* and Vaseline had 99.73% of wound healing with the mean wound size of 0.006 cm². While wound healing in the control group was only 52%, in second group with *Mentha* was 74.58% and in third group with Vaseline was 67.02%. (P<0.05)

Conclusion: This study indicated that applying *Mentha piperita* essence with Vaseline to wound area has great effect on wound healing.

Key Words: *Mentha Piperita*, Eound Healing, Tat, Vaseline

Electrospun Biodegradable Polymeric Nanofibers Containing Herbal Extracts Used for Burn Wound Dressings

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Background: Burn is one of the major causes of death, and finding ways to treat it has been an huge challenge for researchers. A variety of reports have revealed the excellent performance of polymeric wound dressings containing herbal or chemical medicines. Some of their prominent features are the

healing of the wound, absorption of exudates, elimination of dead spots, contributing to the formation of new tissue and faster treatment of ulcers as well as the gradually release of the drugs. In this study, it has been reviewed the effect of chitosan nanofibrous dressings containing Fucoïdan also poly(ϵ -caprolactone) and polystyrene hybrid nanofibers consisting of chamomile extract on the burn wound treatment. In addition, the indispensable role of growth factors such as VEGF and KGF, chemical drugs like silver sulfadiazine and herbal extracts including Rosemary, calendula officinalis and honey for the healing of wounds has been considered.

Methods: Due to the importance of polymeric nanofibrous dressings in the rapid healing of wounds, we encouraged to review the applications of electrospun nanofibres based on some biocompatible polymers containing herbal extracts for treatment of burn wounds. Afterward, the feasibility study of producing these promising materials is studied by using Comfar software to evaluate the final cost and amount of investment for the finished product. It has been believed that electrospinning technique is the most common method for the production of nanofibers as wound dressings because of its unique properties such as simplicity, morphology control and cost-effective as well as versatility.

Results and Conclusion: By following up the literature, it has been found that wound dressings based on the electrospun natural polymeric nanofibers including chitosan, and synthesized ones including poly(ϵ -caprolactone) and polystyrene containing herbal extracts were the unprecedented materials that showed an excellent performance in the treatment of burn wounds. Amid the herbal medicines, honey, aloe vera and kiwi fruit were recommended for the more rapid treatment of burn wounds compared to chemical drugs without adverse side effects. On the other hand, the price of a type of chitosan nanofibrous dressings

containing kiwi extract was estimated from 150000 to 250000 Rials during 6 years of exploitation by means of Camfar software in which doing this project has a big profit without financial disadvantage.

Key Words: Nanofibers, Natural Polymers, Synthetic Polymers, Burn Wounds, Herbal Medicines, Comfar Software

Effect of Static Magnetic Field on Cell Activities in an In-vitro Spinal Cord Injury Model

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Background: Spinal cord injury affects millions of people around the world with long lasting effects that stays for the whole life of the patients. The goal of biophysical researches on the spinal cord injury at cell and molecular levels is to improve repair strategies with minimum side effects. Application of Static magnetic field (SMF), as a remote, non-invasive, and cheap physiotherapeutic method can be considered as one of the promising approaches aiming to induce cell migration to the injury site, reestablish functional environment, initiate nerve regeneration and reach ultimate restoration of the lost activities.

Material and Methods: The model proposed here is based on the analysis of activities of whole constituent cells of newborn rat's spinal cord in co-culture in a time-laps manner that was conducted by Juli Inverted Microscope (Fargene Pouyesh Comp) in the presence and absence of SMF. The activity of cells was studied in a 200-400µm wide scratch to mimic

a mechanical injury. The growth of cells across wound area was arranged to be monitored in the absence and presence of 10-300mT SMF and its toxicity assayed by MTT test.

Results: Exposure to SMF caused significant effected on the activity, growth, division, migration, and morphology of various types of the cells appeared in culture in different manner. Application of SMF significantly increased the speed of wound repair in the presence of SMF. The growth rate increased, migration accelerated and most of the cells stretched and oriented perpendicular to the direction of magnetic field. The number of leaving cells from explants greatly increased when they were exposed to SMF.

Conclusion: Our preliminary biophysical study showed effectiveness of SMF on the growth, orientation and migration of neurons and supporting cells in spinal cord and indicated the potential of magneto-therapy for the treatment of the damaged spinal cord.

Key Words: Biophysics, Spinal Cord Injury (SCI), Static Magnetic Field (SMF), Regeneration, Co-Culture, Nerve Cells, Rat

Effect of Ga - As Laser on the Serum Vascular Endothelial Growth Factor and Hypoxia-Inducible Factor - 1 Expression in Diabetic Foot Ulcers

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Background and Objectives: Diabetic foot ulcer as one of the most common complications of diabetes mellitus (DM), due to angiogenesis deficiency especially in hypoxic conditions, is resisted conventional therapeutic methods of wound healing. This study was conducted to evaluate the efficacy of Low Level Laser Therapy with Ga-As laser, 904 nm on the serum Vascular Endothelial Growth Factor (VEGF) and Hypoxia-inducible factor-1(HIF-1 α) as a two angiogenic factors in type 2 diabetic patients.

Material and Methods: 27 patients with Type 2 diabetes mellitus having chronic and Wagner Grade II ischemic foot ulcers were randomly divided into two groups: Ga-As laser (No=15) and placebo (No=12). In laser therapy group, (Ga-As, 2 j/cm², 90mW) was applied and in placebo group laser probe was set like to laser group, but power was off. Conventional treatment after laser therapy was done as same for two groups, three times in week and continued for twelve sessions. , HIF-1 α , VEGF in blood serum in 1st session before and in 12th session after therapy was measured.

Results: In 1st session every HIF-1 α and VEGF in blood serum show not significant difference between two groups (P=0.2,P=0.7 respectively), In 12th sessions, serum VEGF factor in placebo group was significantly upper than laser therapy group(91.12 \pm 20.77, 220.48 \pm 19.53, respectively) (P=0.04) and HIF-1 α in blood serum show not significant difference between two groups(P=0.9).

Conclusion: It seems, Ga-As laser can effect on blood serum angiogenesis factors of chronic diabetic wound.

Key Words: Ga-As Laser, Diabetic Foot Ulcer, VEGF, HIF-1 α

Stabilizing the Chondroitinase ABC I: New Strategy for Improving the Repairing of

Spinal Cord Injuries

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Glycosaminoglycan chains are responsible for the most of the inhibition of axon regrowth in spinal cord injury. One of the important enzymes for curing spinal cord injuries is Chondroitinase ABC I (cABC I) that cleaves glycosaminoglycan chains and so facilitates axon regeneration. Enzyme's instability is a limiting factor for its applications. There are several methods for increasing the stability and activity of enzymes. In this study, effect of mannitol on activity and stability of cABC I has been investigated. Results show kinetics parameters and stability of enzyme are improved in the presence of mannitol. This study could be a new perspective to cure spinal cord injuries.

Key Words: Chondroitinase ABC I, Spinal Cord Injuries, Stability, Activity

Application of Light Sensitive Opsin Proteins in Neuroscience

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Introduction: Optogenetics combines optical and genetic methods to control the neural activities or other cellular functions rapidly and reversibly. Using genetic methods, specific cells or anatomical

pathways can be sensitized to light through exogenous expression of microbial light activated opsin proteins. Using optical methods, opsin expressing cells can be rapidly and reversibly controlled by pulses of light from specific wavelength.

Methods: First of all, Optogenetics requires light-sensitive proteins, which can be naturally occurring or they can be chemically modified to become photosensitive. Secondly these light-sensitive proteins can be delivered to the target cells by transfection, viral transduction or the creation of transgenic animal lines. In third step, illumination can be temporally controlled using an ultra-fast shutter, fast switching of an LED or one-photon laser scanning microscopy. For in vivo applications, light sources coupled to optical fibers or miniaturized LEDs have been widely used. Finally the induced effect by illumination of the photosensitive protein needs to be measured in cells, tissue or organisms by electrodes, fluorescence-based biosensors or behavioural testing.

Discussion and Conclusion: This method represents millisecond-timescale control of neuronal spiking, as well as control of excitatory and inhibitory synaptic transmission. This technology makes it possible the use of light to alter neural processing at the level of single spikes and synaptic events, yielding a widely applicable tool for neuroscientists and biomedical engineers.

Keywords: Opsin, Brain, Optogenetic, Light Sensitive Protein, Neuromodulation, Euroscience

Static Magnetic Field Guides the Cell Migration of NIH3t3 Cells to Improve Wound Healing

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Background: The application of alternative therapies such as external static magnetic field (SMF) has been considered as a mean to manipulate the cellular activities and to correct defective mechanisms. Application of SMF as a non-invasive and inexpensive modality to repair tissues due to its deep penetration capability into tissue and organs seems efficient alternative therapy to improve wound healing in normal and diabetic conditions.

Material and Methods: Here, the migration and activities of NIH 3T3 embryonic mouse fibroblast cells with 90% confluency was recorded in a time-lapse manner by Juli Inverted Microscope (Fargene Pouyesh Comp.). The repair of a linear 200-400 μ m wide scratch was studied as a wound model in real time, recorded at every 5 minutes for up to 72 hours, using ImageJ software. The growth, division, migration rate, velocity, direction, and orientation of the cells at the scratch area studied in the presence and absence of parallel and perpendicular 10-100mT SMF. The cytotoxicity of SMF was determined by MTT and lactate dehydrogenase (LDH) assays.

Results: The exposure of NIH3T3 cells to SMF was not toxic to cells and higher activities was monitored in the exposed cells. The morphology and circularity of cells changed as function of exposure to 10mT SMF. The exposed cells were highly elongated, oriented parallel to the field direction and migrated parallel to 80mT SMF direction at higher migration velocity.

Conclusion: The forces induced by SMF may propose the inimitable way to control orientation and motility of the cell, improving cell migration. The polarity, dynamics and structures of microtubule network might play critical role, thus, cytoskeleton might be considered as the cellular target against external SMF. The biophysical approach taken here led to promising results and revealed the effectiveness of magnetic field therapy as a non-invasive means to treat wounds at cellular and molecular levels.

Key Words: Biophysics, Static Magnetic Field, Cell Migration, NIH 3T3 Cells, Wound Healing

Effects of “High - Voltage Pulsed Electrical Stimulation Currents” on Repair of Pressure Sores in Subjects with Spinal Cord Injuries

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Background: Pressure sores are commonly produced in some specific parts of the body of patients who are bedridden for a long time. The wounds are usually infected and are hardly treated despite using lots of medicines and antibiotics by the patients with their own complications. Using electrotherapeutic agents, so-called electrogenesis, have already been used for tissue healing with aims of increasing protein synthesis, preventing bacterial growth, increasing local blood flow, facilitating epithelial cells migration into wound borders, all resulting in increased new tissue proliferation and flexibility. Studies recommend galvanic-based electrical currents for this reason to have the best effects; however, the best parameters have always been under debates. The current study aimed to find the effects of high-voltage pulsed (HVP) electrical stimulation current on treating Pressure sores in subjects with spinal cord injuries.

Material Methods: 24 patients with spinal cord injury with Pressure sores grade II, III and IV around the pelvic area were randomly allocated into two experimental and control groups (n=12 in each group). The experimental group was treated by the HVP electrical stimulation current plus a routine nursing care protocol. The control group was also treated by the same method but with the placebo HVP tool (the main power and timer were on with no output current). Before using electrical stimulation, the wounds were washed by the

0.9% normal saline and debrided (if needed) and were covered by suitable wet size sterile gauze. The negative electrode was placed on the wet gauze and the positive electrode was placed around 20 cm away from the negative electrode more distally on his/her thigh. A HVP electrical stimulation current with 100 Hz alternative current (5 seconds on, 5 seconds off with a 2 seconds ramp) with the intensity between 150-200 voltages (with no visible contraction) was applied for the patients. In control group, subjects received everything exactly similar to the experimental group. However, the timer and power light were on with no output the treatment time was 20 minutes in each session, once a day and lasted for 12 consecutive days for both groups. The wounds were photographed at day one and day six and day twelve. A computerized program was used for calculating wound surfaces and compared between two groups before and after the treatment.

Results: The results showed a 60.9% reduction of wound area in the experimental and 18% in the control groups. The results indicated a significant difference between 2 groups for experimental group (P=0/006) that showed the efficacy of HVP electrical stimulation in treatment of Pressure sores in subjects with spinal cord injury.

Conclusion: This randomized controlled trial (RCT) study confirmed very positive effects of the HVPC electrical stimulation on the repair of pressure sores resistant to the routine medical approaches in SCI subjects. It also showed to be very safe with no complications in these subjects

Key Words: Electrotherapy, High-Voltage Pulsed (UVP) Electrical Stimulation Current, Pressure Sore, Spinal Cord Injury, Wound Healing

Nanocarbons as Drug Delivery Components in Wound Healing

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Drug delivery is an intriguing field of research that has captured the interest of researchers because delivering a medicine to its site of therapeutic action is one of the main limitations of pharmaceutical and biotechnology industries. In simple terms, drug delivery can be defined as the process of releasing a bioactive agent at a specific rate and at a specific site but in the current scenario, targeted drug delivery is a bottleneck that must be overcome to exploit thousands of new therapeutics that are limited by a safe and effective drug-delivery system. In the last 30 years numerous nanoscale and microscale systems have been developed in order to find efficient carrier systems for drugs, antigens and genes that will facilitate their transport into specific tissues, cell populations and intracellular compartments by minimizing deleterious side effects. Very recently, studies reported that CNT hold potential to becoming a viable component of delivery systems. These studies have shown the translocation of SWNT and MWNT loaded with peptides, proteins, nucleic acids and drugs into mammalian cells. Generally, nanocarriers interact with the cell membranes and enter into the cells by endocytosis. For targeted delivery to the nucleus, it is important that the drug carrier escapes endosomal compartment and release drug load in cytosolic compartments. Graphene functionalization has been successfully utilized to develop stimuli-responsive nanocarriers that release drugs in the cytosol. Nanotechnology today offers the means to overcome the dimensional barrier of currently used

therapies for wounds and ulcers, to reach a dysfunctional molecular target and exert the therapeutic action straight at the origin of the chronic condition. Although numerous encouraging results using CNTs in biomedicine have been published in the past several years, much more work is still needed before CNTs can enter the clinic.

Key Words: Nanocarbons, Drug Delivery, Graphene, Wound Healing, Nanotechnology

Smart Biomedical Hydrogel Nanocomposite Wound Dressings for Drug Delivery and Wound Healing Based on Polyvinyl Alcohol / Nano Graphene Oxide and Nano Poly (Dopamine)

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Background: This study involves the synthesis of Nano poly(dopamine)- treated graphene oxide/ poly (vinyl alcohol) (“dG-O/PVA”) nanocomposite hydrogels which were made to be applied as wound dressings for healing wounds along with delivering medicine in the next step of the research. Results illustrates significant improvements in rheological and mechanical properties at 0.75 wt% dG-O loading of the PVA along with providing significant properties that makes it very suitable to be applied as a drug carrier and release different types of drugs in the next step of this research.

Material and Methods: Materials. Polyvinyl alcohol (99.9%, Sigma-Aldrich), Graphite (SP-1, Bay Carbon), KMnO₄ (99.0%, Sigma-Aldrich),

H₂O₂, Dopamine hydrochloride (99.0%, Sigma), Tris-HCl (99.99%, Baker) were received without further purification. Fabrication of PVA-dGO nanocomposite hydrogel. The fabrication procedure for the dGO/PVA nanocomposite hydrogel (G-O loading = 0.75 wt%) was as follows: A certain amount of PVA was dissolved in distilled water at 80°C for 8 hours. The G-O suspension (2mg/ml) and nano poly (dopamine) suspension then were gradually poured into the PVA solution and sonicated for 30 min. Finally, this homogeneous solution poured into a petri dish and kept at room temperature for destruction of bubbles.

Results: The results indicate that there has been a significant improvement in rheological and mechanical properties including tensile modulus, ultimate tensile strength, and strain to failure by 32, 90, 79%, respectively, at 0.75 t% dG-O loading.

Conclusion: PVA hydrogel nanocomposite filled with PD modified G-O was produced. Simultaneous significant improvement in mechanical and rheological properties along with biocompatibility, Lack of reaction with biological tissues and ability to carry and release medicine was observed. The next step is loading different kinds of medicine starting with Rifampicin in the dressings for wound healing.

Key Words: Wound Dressing, Hydrogel, Graphene Oxide, Polydopamine, Polyvinyl Alcohol, Tissue Engineering

Electrospun Nanofiber Mats for Wound Healing

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Background: Burns are wounds produced by various kinds of agents that cause cutaneous

injury and destruction of underlying tissue. Human skin can tolerate temperatures up to 42-44 °C but above these temperatures happen the more severe the tissue destruction. Below 45 °C, resulting changes are reversible but >45 °C, protein damage exceeds the capacity of the cell to repair. The goals of wound dressing include protection, removal of exudates, and inhibition microorganisms, and improved skin appearance. Nanofiber mats can be directly spun as a conformal coating onto practically any surface, thus, a good option for cavity wounds. This review explores the recent strategies employed to tailor electrospun nanofiber mats towards accelerating the wound healing process.

Methods: Electrospinning enables the fabrication of scaffolds, which can be easily altered in situ during the electrospinning process or post-fabrication to be suitable for a specific biomedical application. The rate at which drug(s) are released from a mat can be controlled through polymer selection, which dictates the degradation rate of the mat or via the placement of the drug within. Porous nanofiber mats readily produced by the electrospinning process offer a promising solution to the management of wounds. In-vivo burn-wound healing potential, skin deposition ability and histological study were evaluated using rats.

Results and Conclusion: The continued development of antimicrobial resistance, globalization, and industrialization reinforces the need to engineer alternate treatments, which can successfully heal chronic wounds. Scaffolds composed of electrospun nanofibers have demonstrated an impressive versatility. Matrix chemistry, surface functionality, and mat degradation rate can be tuned in conjunction to govern the interactions that occur at the interface between the materials' surface and biology. With the addition of more randomized controlled trials (RCTs) in clinical settings, tailored electrospun nanofiber mats

can offer a broad impact to the nanomedicine community.

Key Words: Nanofibers, Scaffold, Wound Dressing, Healing Process

Aloe Vera Incorporated Chitosan Wound Dressings Containing PVA Nanofibers with Improved Cellular and Mechanical Behavior

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Background: Chitosan is a biopolymer commonly used because of its antibacterial and hemostatic properties for wound healing applications. In spite of non-cytotoxicity of this polymer it cannot induce cell proliferation. In addition the production process of Chitosan is costly. Aloe Vera is another natural polymer used for ages in inflammation cures. In this work the incorporation of these two biopolymers fulfills each one's defects resulting in an antibacterial cell-compatible wound dressing. Finally the mechanical properties was improved by electrospun poly (vinyl alcohol) (PVA) nanofibers offering elasticity to the final product.

Material and Methods: Prepared aloe extract was added to a 6% w/w Chitosan solution in different weight ratios (1:1, 1:2, 1:3) and coated through film applicator. PVA nanofibers prepared using electrospinning technic (9% w/v, 28 kv, 0.8 ml/min, 25 cm) was laid on the surface of the films and leaved to dry at room temperature. Dry samples were peeled off the substrate and packed for cell viability and tensile tests.

Results: A significant improvement in cellular behavior was observed in MTT test results showing a better spreading of cells on the surface by the enhancement of Aloe Vera in films. A

significant decrease in the Yang modulus and an increase in strain at yield and break point was observed in tensile results which means a soft wound dressing with good elasticity was obtained through the application of PVA nanofibers.

Conclusion: A problem associated with Chitosan wound dressings is the final price and limited spreading of cells on their surface. Aloe Vera-containing Chitosan films were prepared using film applying method to induce cell proliferation and reduce the final product costs by using a cost-effective available material in nearly half of the formulation. Finally the mechanical properties of the films were improved using electrospun PVA nanofibers to meet the desired properties for wound dressing applications.

Key Words: Aloe Vera, Chitosan, Poly (Vinyl Alcohol), Nanofibers, Wound Dressing

Design and Construction of Scaffolding PCL-GO-VEGF to Accelerate the Healing Process of Diabetic Wound

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Background: Diabetic wounds are one of the prevalent chronic leisure that implies most expensive cost per patient (1). Diabetic wounds restricted with ischemia and edema, inhibit the delivery of oxygen and nutrients to the tissues.

Also the excess proteases and MMPs in wound area, by breaking down growth factors that are essential for local angiogenesis lead to poor healing (2). VEGF is one of the most important angiogenic growth factors which stimulate multiple phases of wound healing (3). Significant efforts have been made to develop new drug delivery systems for improvement diabetic chronic wound treatment (4). In This work we show that, hydrolyzing and immobilizing of recombinant protein VEGF on PCL-GO

nanofiber may accelerate healing of diabetic wounds in rat.

Material and Methods: The nanofiber surface hydrolyzed with NaOH 5 M and NaOH 0.25 M and chlorine acetic acid 0.125 M. Recombinant VEGF protein purified from E.coli PET 32a and specificity confirmed by ELISA. Then doses for electrorisity in polycarbolactone and toxicity of graphene oxide in concentration of (17, 35, 70, 100 and 125 µg/ml) determined with MTT test on huvec cells. MTT test and DAPI staining was performed on huvec cells cultured on PCL-GO scaffold. Finally, PCL, PCL-GO, PCL-GO-VEGF scaffolds used for healing diabetic wound rat.

Results and Discussion: In this study, the chemical modification of the nanofiber surface resulted in increased protein immobilization. Also, the amount of 100 µg/ml graphene oxide for electrorisity in PCL determined with MTT assay. MTT test and DAPI staining of huvec cells cultured in PCL-GO scaffold confirmed viability of the cells. The animal study result indicated that synergistic effect of GO-VEGF had been significantly decrease inflammation during wound healing whereas, the PCL-GO compound had little effect on wound healing.

The Effect of Formulation Containing Vitamin D in a Rat Model of Glucocorticoid-Induced - Osteoporosis (GIOP) and Its Effect on RANK / RANKL / OPG

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Background: Glucocorticoid use is the most common cause of osteoporosis due to drugs. Considering that no study has been done on this formulation, the purpose of this study is to evaluate the effect of this formulation containing vitamin D on GIOP.

Material and Methods: In this study, 48 male rats were divided into 6 groups and treated for 3 weeks with one of the following: control, negative control (methyl prednisolone (MP) 10 mg / kg), formulations in three doses (60-40-20 mg) +MP 10 mg), positive control (alendronate 40 µg+MP 10 mg). Alendronate was injected subcutaneously and MP, formulations were administered by oral gavage every days a week. At the end of the study, the femur and tibia of the animal were isolated and used to measure bone strength with the bending test, examination of RANK / RANKL / OPG expressions and pathological examinations. Calcium, phosphorus, osteocalcin, RANKL, OPG were also measured as bone marrow parameters. Finally, the data were analyzed by one-way ANOVA (P <0.05).

Results: the data analysis showed that the formulation had a high recovery effect in osteoporosis, so that at a dose of (60 mg) this formulation had the highest level of improvement. This formulation increasing the levels of osteocalcin and thickness and volume cortical and trabecular. In addition, the formulation effect on reducing the expression of the RANKL and increasing OPG and it has played an important role in bone turnover and the activation of the chain of production of osteoblast thus inhibits the activity of glucocorticoids (They increase expression of the RANKL).

Conclusion: The findings of this study showed that this formulation could be effective as a preventive agent for GIOP alone or instead of alendronate.

Key Words: Formulation, Vitamin D, Osteoporosis, Glucocorticoid, Alendronate, Rat

L929 Mouse Fibroblast Cell Adhesion and Proliferation on Chitosan - Gelatin - Bioglass Nanofibrous Scaffolds as an In vitro Model of Wound Healing

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Background: The physicochemical characteristics of an engineered tissue substitute play a main role in tissue repair and regeneration. Scaffolds are one of the main components in tissue engineering, and electrospinning technique is one of the most promising methods for scaffold fabrication to mimic the 3 dimensional microenvironment. Wound healing process is affected by extracellular matrix and fibroblast cells in the epidermis and dermis. This study aimed to assess the effect of the chitosan- gelatin- bioglass nanofibrous scaffolds on L929 fibroblast cells behavior.

Material and Methods: Chitosan- gelatin nanofibrous scaffold (30:70 (w/w)) with various contents of bioactive glass nanopowders (0.5, 1.5, and 3 (w/w/w)) were fabricated and evaluated. The morphology of chitosan- gelatin- bioglass nanofibrous scaffolds were studied by scanning electron microscopy (SEM). MTT assay and DAPI staining were performed to investigate cell activity on nanofibrous samples.

Results: SEM images and DAPI staining of cultured fibroblast cells on chitosan- gelatin- bioglass nanofibrous scaffolds showed the better attachment of L929 fibroblast cells on the nanofibrous scaffolds with 1.5% bioactive glass nanopowders content. The results of MTT analysis showed that the most suitable ratio for fibroblast cells proliferation was chitosan- gelatin (30:70 (w/w)) to 1.5% bioactive glass nanopowders.

Conclusion: The chitosan- gelatin- bioglass

nanofibrous scaffold in our investigation was shown to have a good effect on cellular adhesion and proliferation. So, chitosan- gelatin- bioglass nanofibrous scaffolds would be a promising sample to regenerate extracellular matrix needed in wound healing process.

Key Words: Chitosan, Gelatin, Bioglass Nanofibrous Scaffolds, Fibroblast Cell, Wound Healing, Cellular Adhesion and Proliferation.

Design and Fabrication of Hierarchically Porous Composite Scaffold for Bone Regeneration

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Treatment of critical-size bone defects caused by sport injuries, accidents, trauma, infection, and osteoporosis remains a major clinical challenge. In order to repair or regenerate large bone defects, bioactive three-dimensional scaffolds play a key role due to their multilevel porous structure, high surface area, enhanced mass transport and diffusion. Many studies reported that macropore diameters greater than 500 μm can lead to vascularized bone tissue. In this study, a hierarchically porous composite scaffold was prepared. Hierarchically porous silk fibroin- Nano bioactive glass composite was fabricated with controlled architecture and interconnected structure with macro and micro pores by combining an indirect three-dimensional printing and freeze-drying method. Furthermore, the antibacterial activities of scaffold were investigated using *E. coli* and *S. aureus* microorganisms. The results demonstrated that the hierarchical structure in this scaffold was composed of two

levels of pores on the order of 500-600 μm and 10-50 μm with a porosity of 90.5%. The prepared silk fibroin-bioactive glass scaffold has antibacterial activities and zones of clearance were obvious around the scaffolds in the agar plate. Also, the scaffold's mechanical properties, was investigated. It was found that the presence of nanoparticles in the scaffold increased the compressive strength of silk fibroin scaffold significantly.

Key Words: Bone Tissue Engineering, Hierarchically Scaffold, Silk Fibroin

Sustained Release of Stromal Cell - Derived Factor 1 - α from Nanofibrous Collagen - Coated Decellularized Human Dermal Matrix Hybrid Scaffolds for Regeneration of Full -Thickness Skin Wounds

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This study describes the use of biomimetic hybrid scaffolds which can continuously deliver stromal cell derived factor-1 alpha (SDF-1 α). We tested the hypothesis that the sustained delivery of SDF-1 α could encourage the engraftment of CXCR4 positive cells at the injury site and enhance wound regeneration in a diabetic rat model. The biomimetic hybrid scaffold consisted of SDF-1 α bound collagen nanofibers in a decellularized dermal matrix. The prepared hybrid scaffolds were evaluated for chemokine entrapment and in vitro release, scanning electron microscopy (SEM), and cell adhesion capability. The SDF-1 α /collagen interaction was studied by thermal gravimetric analysis (TGA) and docking methods. The efficiency of the SDF-1 α loaded scaffolds for wound regeneration was evaluated by histological and immunohistochemical examinations post-surgery. The SEM micrographs showed that the cells were proliferated, expanded and attached to the scaffolds. The scaffolds showed a high entrapment efficiency, good loading and sustained delivery of the SDF-1 α over the course of action. Full thickness excisional wounds treated with SDF-1 α -loaded scaffolds demonstrated significantly higher wound closure rates, good re-epithelization, and granulation tissue formation as well as low collagen deposition. Furthermore, immunofluorescence analysis showed that CXCR4 expression and vascular density in the SDF-1 α treated groups were significantly higher than the other groups at one week post-implantation. The proposed SDF-1 α -loaded biomimetic hybrid scaffolds could perfectly fill a niche neglected by current wound treatment strategies. This pre-clinical study demonstrates a proof-of-concept and encourages clinical evaluation.

Key Words: Tissue Engineering, Scaffold, Sustained Release, Stromal Cell Derived Factor-1 Alpha, CXCL12

Evaluation the Mesenchymal Stem Cells Cultured on Nanofibrous Scaffolds for Skin Tissue Engineering and Wound Healing

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Background: Electrospun nanofibrous scaffolds have great potential for many biomedical applications. In this study, chitosan-based dressings and biopolymeric materials along with mesenchymal stem cells were used to improve the wound without the use of antibiotics and nanoparticles. This type of dressings moisture necessary for wound healing provide treatment to accelerate, the loss of their own dead tissue wound accelerate, reduce pain, and the wound against infection and harmful bacteria support.

Material and Methods: In the present study, we fabricated and characterized chitosan/polyvinyl alcohol (Chi/PVA/Elastin) nanofibrous scaffolds through electrospinning. Cross-linking was performed using chemically with 5 % glutaraldehyde vapor. The morphology and chemical banding of the electrospun nanofibers before and after cross-linking were evaluated using scanning electron microscopy (SEM) and Attenuated Total Reflectance-Fourier Transform InfraRed (ATR-FTIR) spectroscopy. Then biocompatibility of the fibers was investigated by multiplication of mesenchymal stem cells.

Results and Discussion: SEM micrographs and FTIR spectra showed that the cross-linking process was accomplished successfully. With the biocompatibility and non-toxicity of chitosan and PVA, it is expected that this electrospun nanofibrous scaffold could be an excellent candidate for biomedical applications. In vitro tests showed good cell proliferation and growth in the 3D scaffold.

Study of Ischemia in Heart Injury Caused by Physical and Psychological Stress in Female Rats

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Background: Heart has its own intrinsic nervous system described as “small brain”, and the most powerful electromagnetic generator in the body. Tissue wound and injuries would affect the heart electromagnetic pulsations through altering molecular vibrations and electromagnetic properties of the tissue. Any variation in the heart rhythm caused by injury would change the rhythm of other fluctuating systems in the body. It indicates the crucial role of the heart in severity of injuries and also healing them. In this study, we aimed to investigate the comparative effects of two different factors (psychological and physical) on making cardiac mitochondrial dysfunction and reduced regional blood flow (ischemia) as a kind of heart injury.

Material and Methods: The animals were divided into three groups (n = 7); control, physical stress, and psychological stress. For induction of chronic stress, the animals were exposed to the stressors in 5 successive days (10 min daily) by utilizing a two-communication box. After verifying stress induction by plasma corticosterone measurement, to assess the effects of stress on cardiac mitochondrial dysfunction and ischemia, Single Photon Emission Computed Tomography (SPECT) was performed.

Results: SPECT images analysis for radiotracer uptake quantification demonstrates significant myocardial perfusion defect in psychological

stress.

Conclusion: Animals with chronic psychological stress exerted much intense heart injury caused by stronger destructive biological events (cardiac mitochondrial dysfunction and ischemia) in comparison with those of physical stress. Consequently, it can be concluded that psychotherapy might have an effective potential for tissue repair in various injuries.

Key Words: Heart Injury, Ischemia, Psychological Stress, Physical Stress, Single Photon Emission Computed Tomography

Design and Fabrication of Fibrin Scaffold for Corneal Regeneration

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Background: The cornea is a transparent avascular connective tissue that consists of 5 recognized layers, 3 cellular (epithelium, stroma, endothelium) and 2 interface (Bowman membrane, Descemet membrane). Cornea acts as the primary infectious and structural barrier of the eye. When the erosion process of these cells occur, where natural and quick restoration is expected, corneal disorders begin. In addition, the corneal surface can be severely damaged as a result of Keratoconjunctivitis sicca, recurrent corneal erosion, Post laser in-situ keratomileusis (LASIK) ocular surface syndrome (OSS), dormant corneal ulcer, etc.

Cell therapy is one of the most important methods in tissue engineering and scaffolds which carry the cells are a great issue. Aiming to develop a hybrid scaffold for cell entrapment and delivery, in this study we will optimize the fabrication and gelation conditions of fibrin gel, also optimizing the working parameters of electrospinning. We

successfully fabricated a fibrin hydrogel that is a porous media. To improve the mechanical properties, cell viabilities, infiltration, migration and resembling the extracellular matrix (ECM) of cornea, fibrin electrospinning scaffold will be fabricated. So, the final scaffold will be constructed by a combination of fibrin hydrogel and electrospinning methods.

Fibrin as a blood product is made of Fibrinogen and Thrombin. We successfully isolated the fibrinogen from human plasma by a cryoprecipitation method. Gelation of the fibrinogen was accomplished by mixing it with thrombin. Thrombin which is an activated blood-coagulation factor II got extracted from human plasma. The scaffold used in this study contains other biologically active plasma proteins such as fibronectin and factor XIII. Fibronectin significantly influences keratinocyte attachment and spreading. As this bioengineered product can be derived from patient's own plasma, it eliminates the inflammatory response. Also it is transportable, easy to handle and cost-effective to patients.

Results: After freeze-drying, the fibrin gel was characterized by scanning electron microscopy (SEM), revealing porous structure with 240-600 nm pore size. In addition, we characterized tensile strength of fibrin gel revealing 60.4 KPa.

Key Words: Tissue Engineering, Corneal Regeneration, Fibrin, Electrospinning, Gel

Preloaded 3-D Bio - Composite Scaffold Can Potentially Enhance Angiogenesis in Bone

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Background: The lack of a vasculature in tissue-engineered constructs is currently a major challenge in tissue regeneration and drug delivery aims. The objective of this study was to develop a new nHA/Cs/Gel construct with angiogenic

potential. In the first step, a combination of particle leaching and freeze drying methods was used to create nHA/Cs/Gel scaffold. Morphological characterization of scaffolds by SEM showed highly interconnected porous structures similar to cancellous bone with mean pore size ranging from 140 to 190 μm . nHA crystals were dispersed homogeneously in the polymer matrix according to the EDX and TEM microscopy images. FT-IR and XRD disclosed that chemical interactions were formed between nHA, Cs and Gel and crystallinity of each material decreased with blending. In the second step, HUVEC and WJ-MSC were seeded on scaffolds. The constructs were cultured up to 21 days and cell morphology and localization, microcapillary-like structures formation, and gene expression were assessed. SEM results showed that two types of cells in mono and co-culture could attach and interact with each other on the surface of the scaffold. Histological results revealed formation of cellular aggregates on the nHA/Cs/Gel. Other results demonstrated that HUVEC+WJ-MSC co-culture on nHA/Cs/Gel had much higher angiogenic gene expression than monocultures. Immunostaining of PECAM1 (CD31) showed microcapillary-like structures on nHA/Cs/Gel in coculture at 21 days. In conclusion, the novel nHA/Cs/Gel-microvasculature construct is promising for a wide range of tissue engineering and drug delivery applications with enhanced angiogenic capabilities.

Key Words: Drug Delivery, Angiogenesis, Co-Culture, Wharton's Jelly Mesenchymal Stem Cells, Scaffold

The Effect of Platelet Rich Plasma Dressing on Depth of Diabetic Foot Ulcers: A Randomized Controlled Clinical Trial

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Background: Some of the studies confirmed the effectiveness of platelet rich plasma (PRP) in the treatment of diabetic foot ulcers (DFU). However, these studies had small sample size and used different methods such as PRP gel or PRP injections. The results are also controversial.

Objectives: This study aimed to investigate the effect of PRP dressing on the depth of DFUs.

Material and Methods: A randomized controlled clinical trial was conducted on 50 patients with DFUs referred to Kashan's Shahid Beheshti hospital. Patients were randomly allocated to control (n = 25) and experimental (n = 25) groups. Data collection instrument consisted of two checklists; one for gathering demographic information and the other one included questions about ulcer characteristics and its treatment. After surgical debridement, ulcers depth was measured. Then, the ulcers of the control group were irrigated with Saline and dressed with sterile gauzes. However, in the intervention group, ulcers were dressed with sterile gauzes impregnated with PRP. Depth of all ulcers was measured on the days 0, 7, 14 and 21 after debridement. Independent-samples t-test, Mann-Whitney U and repeated measures analysis of variance were used to analyze data.

Results: At baseline, the mean ulcer depth were 15.08 ± 10.43 and 19.08 ± 14.01 mm in the control and intervention groups, respectively ($P = 0.26$), which decreased to 13.03 ± 14.1 and 4.56 ± 5.76 after three weeks ($P = 0.04$).

Conclusions: PRP dressing could significantly decrease the depth of DFUs in a three-week period.

Key Words: PRP Dressing; Ulcer Healing; Diabetic Foot Ulcer; Platelet Rich Plasma (PRP)

Atmospheric Pressure Plasma: Novel Therapy for Diabetic Wound Healing

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Background: The aim of this study is to evaluate the efficacy and safety of non-thermal plasma irradiation for the induction of wound healing in diabetic neuropathic foot ulcers. Plasma Jet was employed for ionization of helium gas. The generation of ions and free radical in ambient temperature accompany with sterilization and chemical process will lead to wound healing and tissue repair.

Material and Methods: The plasma jet was used for generating the helium plasma in frequency of 6 kHz and 10 kV. Twenty patients with diabetic foot wounds for at least 3 months were included in this double-blind randomized clinical trial. Patients were randomized to receive placebo treatment or non-thermal plasma in addition to conventional therapy. Patients were followed for

4 weeks. The helium plasma group was exposed 5 minutes every other day for 9 session's. Ulcer size reduction and the number of patients with complete healing were compared between the non-thermal plasma therapy and placebo groups.

Results: After 2 weeks, the size of ulcers decreased significantly in the non-thermal plasma group ($p < 0.05$). The results showed that after 3 weeks of

the plasma treatment most of the diabetic wound patients were healed completely in compare to the control group. In addition, the bacterial lab tests in treated patients were negative. Moreover, the results confirm that the physical activity were improved in the treated group, No adverse events were reported in the plasma treated patients.

Conclusion: The results of this preliminary study showed that non-thermal plasma may be a promising option without adverse effects in the treatment of non-healing diabetic ulcers.

Key words: Plasma, Diabetes, Diabetic Ulcers

Effects of Electrical Stimulation on the Expression of Vascular Endothelial Growth Factor and Rate of Healing in Diabetic Foot Ulcer

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Background: Adjunctive treatment using electrical stimulation has recently been shown to promote healing in patients with diabetic foot ulcer. The aim of the present study was to evaluate the effect of low-intensity cathodal direct current (CDC) of electrical stimulation (ES) on the release of vascular endothelial growth factor (VEGF) and healing rate of diabetic foot ulcers.

Material and Methods: A total of 30 type 2 diabetic patients with ischemic foot ulcer were

included in the present randomized, single-blind, placebo controlled trial. Participants were randomly assigned to receive either low-intensity CDC at sensory threshold (ES group, n= 15) or placebo treatment (control group, n= 15) for 1 h/day, 3 days/week, for 4 weeks (12 sessions). After debridement during the first and twelfth treatment sessions, wound fluid was collected before and after ES application to determine the levels of VEGF. Wound surface area (WSA) was measured at the first, sixth, and twelfth sessions.

Results: After ES application at the first and twelfth sessions, wound-fluid levels of VEGF were significantly increased (+36.77 and +39.57 pg/mL, respectively) compared to the control group (+4.15 and +0.15 pg/mL, $P= 0.007$ and $P= 0.019$, respectively). Percentage decrease of WSA was significantly higher in the electrical stimulation group (59.4%) compared with that of the placebo group (27.07%) at the 12th session ($P=0.02$).

Conclusion: Application of low-intensity ES increases the expression of VEGF, which may lead to improved angiogenesis and accelerate wound closing in diabetic foot ulcers

Key Words: Electrical Stimulation, Diabetic Foot Ulcer, Wound Healing, VEGF

Intensive Care Unit Nurses' Perceived Barriers Towards Pressure Ulcer Prevention in Isfahan

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Background: Pressure ulcer (PU) prevention is one of the most important roles of nurses in intensive care units (ICUs). This study was conducted to identify intensive care registered nurses' perceived barriers towards PU prevention in Isfahan.

Material and Methods: This study employed a descriptive cross-sectional design. A convenience sample consisted of registered nurses working in trauma intensive care units affiliated by Isfahan Medical University participated in this study. Data were collected using the barriers to providing prevention of pressure ulcers questionnaire.

Results: The response rate was 100 % (n=95), although not all participants answered every question. The results showed that 88% were women. The mean age of participants was 33 years. The item 'heavy workload/staff shortage' perceived highest barrier towards pressure ulcer prevention (mean±standard deviation (SD): 3.42 ± 0.64). The item 'uncooperative patients' achieved the lowest perceived barriers score (mean ± SD: 2.71 ± 0.69). Nurses who had more nursing experience in an ICU setting perceived barriers more than those with less nursing experience in ICU setting. Those who had no previous exposure to PU prevention education perceived barriers more than those had previous exposure to PU prevention education.

Conclusion: Understanding intensive care registered nurses' perceptions of PU prevention barriers will enable nurse leaders to develop a variety of intensive teaching to disseminate information about these barriers.

Key Words: Isfahan, Barrier, Pressure Ulcer, Prevention, Survey

Relationship between Oxygenation Status with the Risk of Pressure Ulcers Development in Patients after Open Heart Surgery

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Background: Although healthcare agencies have made efforts to decrease the incidence

and prevalence of pressure ulcers in hospital settings in recent years, pressure ulcers remain a significant clinical problem across all hospital settings especially in intensive care units.

Aim: Present study conducted to examine relationship between oxygenation statuses with the risk of pressure ulcers development among patients who were under open heart surgery.

Methods: this is a cross sectional study that conducted in Qazvin. With using convenience sampling all the 82 eligible patients who were admitted to Boali cardiac surgery unit during march to may 2016 were invited to participate in this study. Patients' skins were assessed using pressure ulcer staging and Braden scale for sign of pressure ulcer development. Demographics questionnaire also was used. Data were analyzed using descriptive statistics, Pearson correlation test and independent t-test in SPSS 20.0 statistical software.

Results: most patients were men (56.1%). Most patients participating in the study were older (60.93 ± 10.52). Factors such as mean of CO₂ of arterial blood pressure in the fourth day ($P = 0.04$) and smoking ($P = 0.000$), age ($p = 0.000$) and length of ICU stay ($p = 0.002$) significantly affect the risk of pressure ulcers development. Risk of pressure ulcer development were not correlated with mean oxygen saturation, mean arterial oxygen pressure, the average oxygen content of the blood, the average fraction of inspired oxygen and temperature.

Conclusion: according to finding of present study patients in cardiac surgery intensive care units are at high risk of pressure ulcer developments. Factors such as decrease CO₂ of arterial blood pressure, increase age and length of ICU stay, smoking increase this risk. Health care provider should be aware and implement useful strategy for prevention of pressure ulcers.

Key Words: Oxygenation, Risk Factor, Incidence Pressure Ulcer, Cardiac Surgery

Poster Presentations

P1

Wound Healing Mechanisms in Skin Substitutes

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Background: Skin substitutes are heterogeneous group of wound coverage materials that aid in wound closure, replace and repair the functions of the skin, either temporarily or permanently, depending on the product characteristics. This kind of materials could be categorized in advanced wound therapies that have big share in market study. Market Growth, Future Prospects and Competitive Analysis in the field of advanced wound therapies estimated.

Material and Methods: Database included several articles that collected in different internet search engines like Google chrome, PubMed and Scopus.

Results: Different signaling molecules depending to characteristic of cell sources that used to prepare w studied. Main properties of each skin substitute, main signal molecules and signaling pathway that involved in wound repair in these products define. The market was valued at USD 14.6 Bn in 2015, and is expected to reach USD 19.8 Bn by 2022, expanding at a CAGR of 4.3% from 2016 to 2022. People in Asian-Pacific (except Korea and Japan) will be biggest group of consumer because of number of wound patients in the world.

Conclusion: In summary, optimization quality of signaling molecules, especially growth factors and cytokines, beside selection of proper source of cell that could be used for allograft in minimum time after injury instead of autologous graft, warranted to have market share in this field.

Key Words: Wound Healing, Skin Substitute, Skin Stem Cells, Market

P2

Review on Platelet Market in Regenerative Dermatology

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Background: Usage of platelet in different area of medicine is a new concept. In dermatology and cosmetic medicine, platelet has been used widely to treat acne, scarring, and alopecia (especially in women), different kinds of wounds and special disease such as EB. It is also effective for skin rejuvenation and tightening around the eyes. In this market study we reviewed Global Platelet Market in 3 segmentations: product type, application and end user. Also, we tried to define key player companies around the world based on market share.

Methods: Database included several articles and market studies that collected in different internet search engines like Google chrome, PubMed and Scopus

Results: The systems segmentation of product type is expected to account for the largest share of the global platelet aggregation products market in 2015. The system segment is expected to acquire the largest market share of global market in 2016, growing at a CAGR of 21.0% from 2015 to 2020. Increasing number of hospitals across developing countries and growing public-private investments for development and modernization of healthcare infrastructure are the key factor to fuel growth to end user segment. Geographically, North America dominated the global Plt products market in 2016 and accounted for 76.8% of the

market. Large incidence rate of various diseases (orthopedics diseases, cardiovascular diseases and obesity), increasing number of cosmetic surgeries, high awareness about Plt therapy and regulatory approvals (by the U.S. FDA) are some of the prominent factors that support the dominance of the region. By application, orthopedic surgeries accounted for the highest demand for platelet rich plasma (PRP) in Asia Pacific. Demand for PRP in the cosmetic surgeries is also expected to increase rapidly in the forthcoming years. Furthermore, the Asia Pacific market for PRP is also expected to significantly gain from the increasing use of platelet rich plasma as a substitute of dermal fillers.

Conclusion: In summary, regenerative medicine technologies in platelet application platform with multiple uses that address billion dollar market in Advanced wound care, Cosmetic and plastic surgery, Orthopedic or/and sport medicine and Cardiovascular surgery, Respectively. However, strong competition from local manufactures may affect the overall market growth of platelet application in the near future. Other factors expected to have the prominent impact on the growth of platelet applications are increasing patient awareness and affordability levels and regulatory harmonization.

Key Words: Platelet Market, Regenerative Medicine, Dermatology

P3

Stem Cell Transplantation for Wound Healing: As Promising in Future

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Chronic wounds continue to be a major challenge for the medical profession, and plastic surgeons are frequently called in to help in the management of such wounds.

It is easy to define a chronic wound, but finding a solution is a complicated matter. Conventional treatment of chronic wounds does not seem to work in several cases, so it is necessary to develop different strategies. Cell therapy constitutes a new alternative to classic methods of wound healing. Mesenchymal stem cells (MSCs) (also known as multi-potent mesenchymal stromal cells) possess the capacity for self-renewal and multi-lineage differentiation, and their ability to enhance cutaneous wound healing has been well characterized. Acting via paracrine interactions, MSCs accelerate wound closure, increase angiogenesis, promote resolution of wound inflammation, favorably regulate extracellular matrix remodeling, and encourage regeneration of skin with normal architecture and function. The potential of alternative methods to both introduce MSCs into wounds and increase migration of MSCs into wound areas has also been demonstrated. The novel studies that show promise for the continued development of MSC-based wound-healing therapies and provide direction for continued research in this field.

P4

Principles of Wound Management

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An understanding of the physiological barriers that impair wound healing is required to effectively

manage wounds and underpin the principles of chronic wound management: reduce the bacterial and necrotic burden, regulate moisture balance and protect the wound environment. Systematic reviews on wound treatments repeatedly highlighted the paucity of high-quality studies using clinically relevant end points to evaluate efficacy of wound therapies. Selection of the correct wound dressing is only part of the overall management of chronic wounds. Despite technological advances, dressings optimize local conditions in the wound bed rather than manage the underlying cause and are therefore only an adjunct to wound management. Negative pressure wound therapy (NPWT) has emerged as an alternative wound-healing modality to dressing that has transformed the practical management of complex wounds. A stepwise approach to use wound management treatments allows more expensive, advanced treatment modalities to be reserved for those patient with more complicated indolent wounds. Chronic wounds are difficult to heal and may persist for months or years or reoccur once healed due to underlying disease processes that can be difficult to manage. Treatment, therefore, requires a comprehensive approach involving the multidisciplinary team so that the underlying pathophysiology can be managed while promoting healing. Before a wound can begin to close, the barriers to healing must be eliminated where possible so that the local wound environment can support the delicate physiological process of tissue repair. This may require removal of non-viable tissue, control of bacterial burden, maintenance of moisture balance and provision of an environment to stimulate epithelialization. This approach is now referred to as wound bed preparation (WBP) and highlights the need to identify treatment aims based on assessment of the patient and their wound.

This article will provide a review of treatment modalities used to manage wounds and describe broad indications for use.

Key Words: Wound Dressing, Tissue, Chronic Wound, Epithelialization, Repair

P5

Type of Wound Dressing Influence on Wound Healing

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There are many factors that influence the choice of dressings and wound treatments. Personal experience and the influence of colleagues continue to be a dominant influence when choosing wound dressing. Many practitioners still rely on a small range of treatment approaches with which they have had good results in the past. Traditional knowledge and practice successfully pass down through generations of practitioners and can perpetuate poor practice and myths. Although aware of a growing evidence base in relation to wound management, some clinicians consider this to be irrelevant to clinical practice. The choice of dressing product for optimal wound management is not straightforward and should be based on a consideration of the patient and the local wound environment. There are many interrelated factors that influence the selection of wound dressing. Use of a framework such as the Wound Bed Preparation (WBP) model can help clinical decisions in relation to dressing choice as it helps priorities the aims of treatment and establish the primary function of dressing products.

In this review will provide a summary of generic dressing types and provide broad indications for use. A many of the dressing products reviewed have been established for a long time, there are comparatively few large, well-randomized studies

to support their use. In the many of study found insufficient evidence 'that any one dressing speed up healing of surgical wound healing.

By secondary intention more than another' as the published data consist of small, poor-quality studies and is consistent with other systematic review. The information provided about dressing use is not intended as a detailed guide. The reader is advised to follow local recommendations together with manufacture's guidelines for use of specific dressing products.

Key Words: Wound Dressing, Treatment, Wound Bed Preparation, Repair, Healing

P6

Effect of Cream Derived from Herbs on Repairing and Healing the Burns and Scalds by Gene Expression Specific to Skin in Mouse Model

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Background: Herbal cream containing extraction of plants was formulated by Avandfar company and tested for wound healing activities. For this study, wound was created on the albino rats placed in two groups: treated and control (n = 5) and the cream applied topically on the wounded area which was measured at intervals of 3 days until epithelialization and complete wound closure. Topical application of cream that has produced Gentamycin ointment (1 %)

served as the control. After 14 days, the biopsy is removed from all of the rats and the expression of TGFβ1 and fibronectin genes are evaluated by Real-Time PCR technique. The cream base on the extraction of plants caused a significantly (P < 0.05) higher rate of wound healing in rats by assessment of TGFβ1 and fibronectin genes by Real-Time PCR and reduced the epithelialization period compared to the blank cream treatment. We conclude that formulating extract as cream is effective in wound care and should be explored in harnessing the potentials of the plant in the treatment of topical diseases.

Key Words: Herbal Cream, Wound Healing, Topical

P7

The Effect of Glucose Enzyme Cleaner Oxide on Secondary Infections in the Hospital of Leishmaniasis in the Mahdiah Hospital During the Years 1396

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Background: Leishmaniasis disease is one of the six major tropical diseases. The disease is one of the most important and liquids, the most parasitic diseases and the second native of Iran cannot be transmitted by arthropods after malaria. This review of the glucose enzyme cleaner for the destruction of the oxide-isolated bacteria of the wounds in the front of the leishmaniasis.

Methods: This descriptive cross-sectional study on bacteria isolated from secondary infection leishmaniasis scars in front of a patient 51 referred to Tehran during the year's 1396 mahdiah hospital. this study of oxide of glucose enzyme cleaner ml / Kg 10 time of 5.0, 25.0, 062.0, 031.0, 1250.0, 015.0, 007.0, 003.0 001.0, antibacterial effects, in order to help to determine the minimum inhibitory concentration techniques of bacterial growth

(Concentration Inhibitory Minimum (MIC)), and release the disc.

Results: The results of the study showed that the investigated bacteria isolated from wounds (Asher Shea I, Proteus, Pseudomonas and Staphylococcus epidermidis, Eriginosa Legaris and Corynebacterium Goose) towards glucose enzyme cleaner, oxide of a different time in a lot of sensitivity.

Conclusion: Laboratory of oxide in terms of glucose enzyme cleaner is also a positive and Gram-negative bacteria is a gram negative bacteria isolated from secondary infection leishmaniasis scars can be effective in front of such a positive and gram negative bacteria in the presence of a glyucose enzyme cleaner Oxide is relatively more sensitive.

Key Words: Leishmaniasis, Secondary Infections, Glucose Oxidase Enzymes, Endocardiac

P8

Effect of TGF- β on Wound Healing

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Background: When tissue loss disrupts normal architecture in higher vertebrate adult animals, the organ fails to regenerate. Instead, repair proceeds as a fibroproliferative response that develops into a fibrotic scar. Thus, the organ is patched rather than restored. Alterations in the normal healing processes produce even less desirable outcomes. For example, when injurious events persist or recur, inflammation

is perpetuated, extending tissue damage and repair.

While animal models are obviously not ideal substitutes for human studies, they have nonetheless demonstrated a strong rationale for clinical evaluation of TGF- β in treatment of patients with both acute and chronic wounds. The safety of topical application of TGF- β is demonstrated by pharmacokinetic studies that have shown that high-dose dermal application of TGF- β resulted in local at wound sites without systemic toxicity; chronic systemic administration, on the other hand, produced a spectrum of lesions in multiple target tissues, especially liver and kidney.

Clearly, these studies are only a beginning. The multiplicity of effects of TGF- β on cells involved in tissue repair and its proven effectiveness in a wide variety of animal models of tissue injury provide a compelling argument for its clinical application. Although most attention has been focused on use of TGF- β for healing of cutaneous wound, evidence is rapidly accumulating that it will also promote repair of injury to many different organs and tissues by both direct and indirect mechanism. Its clinical application is limited only by our ability to devise appropriate delivery modes and treatment schedules, be they local or systemic, single dose or repeated application; toxicity does not pose a problem for either topical application or for acute administration systemically. The clinical need for an agent that will promote healing is enormous, both for treatment of chronic, nonhealing wounds such as venous stasis, decubitus, or diabetic ulcers, and as a prophylactic treatment for surgical patients, especially those predicted to have impaired healing responses. As development of clinical applications of all TGF- β by several companies in the pharmaceutical industry proceeds, it is hoped that the enormous of this molecule will soon be realized.

Key Words: TGF- β , Repair, Tissue, Healing, Toxicity, Pharmaceutical, Proliferative

P9

Investigation the Effects of Cold Plasma as a New Approach on Wound Healing Process

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Background: Many people around the world suffer from chronic wounds, the main causes of which are diabetes, obesity, venous diseases, and spinal cord injuries. A pressure ulcer is among the common problems in complications of patients with spinal cord injuries, elderly, and hospitalized patients. The present study has assessed the cold plasma effects on pressure ulcer healing process as a noninvasive and safe treatment option.

Material and Methods: In this study, at first non-thermal plasma was produced by applying a high-voltage (5kv) and high-frequency (25 kHz), to helium gas and then plasma characterization was done to find the optimal power and temperature. Pressure wounds were induced by placing the skin gently between 2 circular magnets (10 mm diameter) on the dorsum of rats for 8 hours. The wounds were divided randomly into two groups: the first group as control and the second group under plasma treatment. Plasma exposer was received for 5 days, each day 3 times and every time 60s. On days 3,7,14 and 21 after wounding, the wounds were sampled and tensile strength test was performed on them. The process of wound healing was evaluated by measuring the wound area on different days of the healing period.

Results: Evaluation of wound area showed that the speed of wound healing process in the plasma treated wounds was significantly faster than the control ones. In addition, evidence from biomechanical studies indicates that in comparison

to control group the mechanical strength of treated tissue and tissue tolerance versus rupture was significantly increased in the experimental group.

Conclusion: The results of the current study in agreement with previous researches clearly indicate the positive effects of cold plasma in the acceleration of wound healing process through promoting contraction and increasing the mechanical strength of the tissue.

Key Words: Wound Healing, Pressure Ulcer, Cold Plasma, Tensile Strength

P10

The Efficacy of Novel TEBADERM Hydrogel Dressing on Wound Healing in Chronic Diabetic Foot Ulcers

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Background: Diabetic foot Ulcer is a life and limb-threatening complication of diabetes mellitus and affects approximately more than 10% of patients with DM during lifetime. Surgical debridement (if necessary) and daily moist wound care or similar moist dressing to provide a moist wound environment is critical in management of diabetic foot ulcers. Hydrogels are high-water content materials prepared from cross-linked synthetic and natural polymers. It is well-known that hydrogels can improve the healing of wounds by moisturizing the wound site. In this clinical trial, a hydrogel wound dressing (TEBADERM)

was used for moist wound care in patients with diabetic foot ulcer in comparison with standard moist wound care. Twenty-three patients with a chronic diabetic foot ulcer were included in this open labeled before after clinical trial. Patients received daily TEBADERM hydrogel dressing in addition to conventional therapy. Patients were followed for 12 weeks. Ulcer size reduction and the number of patients with complete healing were measured. Our findings showed that using TEBADERM hydrogel dressing daily could lead to considerable condition to improve healing rate of chronic diabetic foot. These promising preliminary findings are now to be evaluated with a randomized control trial.

P11

Comparing the Effects of Bentonite & Calendula on the Improvement of Infantile Diaper Dermatitis: A Randomized Controlled Trial

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Background: Infantile diaper dermatitis is a common, acute inflammatory reaction of the skin around diaper among infants. This study was undertaken to compare the effect of topical application of Bentonite and Calendula creams on the improvement of infantile diaper dermatitis.

Methods: This double blind randomized controlled trial was undertaken on 100 patients of infantile diaper dermatitis. The 100 participants were randomly assigned into two groups of 50 each, and were prescribed the coded medicine. The mothers were trained to apply the cream and

level of improvement was judged by observing the affected area on the first visit and then after three days of receiving treatment.

Results: The mean age of infants was 6.45 ± 5.53 months in Calendula group and 7.35 ± 6.28 months in Bentonite group. Overall, 88 per cent of lesions in the Bentonite group started improving in the first six hours while this rate was 54 per cent in Calendula group ($P < 0.001$). The risk ratio for the improvement in the first six hours was 2.99 folds in the Bentonite group. Also, lesions in 86 per cent infants in the Bentonite group and 52 per cent in the Calendula group were completely improved in the first three days after treatment ($P < 0.001$).

Key Words: Bentonite, Calendula, Diaper Dermatitis, Infants, Treatment

P12

Management of Neonatal Purpura Fulminans: Case Report

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Neonatal purpura fulminans (PF) is a hemorrhagic condition and rare, life threatening condition, caused by congenital or acquired deficiencies of protein C or S. The condition is often fatal unless there is early recognition of the clinical symptoms, prompt diagnosis, and judicious replacement therapy is initiated.

Features include tissue necrosis, small vessel thrombolysis and disseminated intravascular coagulation. Gram-negative organisms are the commonest cause of the acute infectious type, which is often associated with multi-organ failure. An idiopathic variety, however, is often confined to the skin.

One of the clinical presentations is that of acute disseminated intravascular coagulation and hemorrhagic skin necrosis. The management includes an acute phase of replacement therapy with fresh frozen plasma or protein C concentrate

and a maintenance therapy that includes anticoagulation with warfarin or low molecular weight heparin and new approach wound care. When the Doppler sonography was normal, wound debridement was performed by hydrocolloid gels.

The daily dressing was changed and the wound was clear from the proliferation in order to free from proliferation and was granulation. The various treatment plans to inflammation and proliferation and organ restoration was completed Remodeling was conducted over 54 days. This review focuses on the management of severe protein C deficiency.

Key Words: Protein C Deficiency, Purpura Fulminans, Neonate

P13

Adult Neural Stem Cells Reporative Potentials in Neural Tissue Repair

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Background: Given their capability to restore cells lost during the course of disease or injury, stem cells offer new views into possible therapies for degenerative diseases and their causes. Stem cells are a powerful tool for the future of regenerative medicine. These cells have the capacity to differentiate into any cell type, tissue or organ. Human body derived stem cells can be divided into three major classes: 1) embryonic stem cells 2) fetal stem cells and 3) adult stem cells. Adult neural stem cells (ANSCs) are a subtype of adult stem cells that give rise to unipotent cells of the residing tissue, neurons or glia, throughout differentiation process. Unfortunately, these cells are restricted to specialized regions in the brain such as sub ventricular zone, dentate gyrus and amygdala so their reparative potential is limited. Despite that ANSCs therapy represent an excellent option in regenerative medicine because

this approach benefits from the intrinsic ability of human's body to repair the lesions. It is important to be emphasized that in order to start clinical trials much remains to be known including the interaction of these cells with other cells and environment and also the effect of substances in the niche and etc. This review focuses on our current knowledge of the applications of ANSCs in neural tissue repair.

Methods: We have searched the PubMed databases comprehensively and accurately to find peer reviewed articles regarding ANSCs and their reparative potential in neural tissue injuries and also diseases. We investigated them carefully and selected the most notable and most recent of them. Also we put meeting abstracts under precise consideration to ensure that all references have been investigated.

Results: In this review we discussed and emphasized on the great opportunity of using ANSCs to repair brain tissue and a number of challenges ahead. We also pointed to novel therapeutic strategies that can be applied for neural tissue repair. At the end we discussed the opportunities provided by ANSCs in neural disorders and injuries treatment.

Conclusion: ANSCs are attracting attention of translational researchers aiming for tissue repair applications. There are several studies that used ANSCs to induce regeneration in the central nervous system that indicates the growing attention to this research area. Tissue repair using transplanted stem cells have a lot of risks that ANSCs application considerably reduces them. We envisage that the future successful neural tissue repair approaches will involve diverse arrangements of factors to target ANSCs and their niche, applied at special times, to get the maximum restoration. Nevertheless, there are several challenges in using these cells for neural tissue repair but we hope that efforts of this growing research community will completely solve all the problems and someday this therapeutic approach will take a great step in neural tissue repair.

Key Words: Adult Neural Stem Cells, Neural Tissue Repair, Stem Cell, Regenerative Medicine

P14

Management of Diabetic Foot Infection in a Teaching Hospital in Isfahan

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Background: Diabetic foot ulcer (DFU) is one of the complications of diabetes with an upward trend in occurrence in the past decade. The present study was implemented to determine how DFU is managed in the largest teaching hospital in Isfahan.

Methods: This prospective cross-sectional study was conducted from July 1 to December 15, 2016 in Al-Zahra Hospital, in Isfahan, Iran. The parameters such as demographic patient characteristics, type of methods used to evaluate the infected lesion, management of the infected wound, assessment of risk factors and patient's outcome were collected by a Doctor of Pharmacy Candidate: . Wound assessment was done using Wagner Classification and neurological assessment was performed using 10 gram monofilaments and a 128 Hertz tuning fork.

Results: The mean (SD) age of the 82 patients studied was 59.1 (10.8) years with the majority being male patients (56.1%). Most of the patient had grade 3 wound in Wagner Classification. Lesions mainly involved toes (46.3%). In the most lesions (42%), the ulcer with a mean size of 5-10 centimeters in diameter was observed. The most frequently prescribed combination of antibiotics were meropenem +teicoplanin (targocid®) (34.1%), and Piperacillin / tazobactam (Tazocin®) + teicoplanin (targocid®) (24.3%). Mean (SD) duration of

therapy was 14.95 ± 7.62 days. Amputation of foot had significant correlation with ulcer's size ($P= 0.001$). Twenty one patients (25.6%) underwent amputation.

Conclusion: Several pitfalls were detected in the management of diabetic foot ulcer. Educating the management team including the physicians on guideline based management of these wounds is warranted.

Key Words: Diabetes Mellitus, Diabetic Foot Ulcer, Foot Ulcer, Foot Infection, Microbiology, Diabetic Foot Management

P15

The Effect of *Lucilia Sericata* Larvae on the Diabetic Wound at the Bojnourd's Hekmat Center

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Background: Diabetes is the most common endocrine disorder in the world with more than 150 million patients. In Iran about 3 million people in the age range of 25 to 64 are experiencing the increase of the incidence of Diabetes about 7.7 percentage. Scarring on the foot is one of the complications of Diabetes which 15% of Diabetes usually develops this condition. Today there are several methods for treating Diabetes foot ulcer, but some patients are still forced to have amputations. Diabetes foot ulcer is still the major disability between patients. Despite the many advances made in diagnosing and treating Diabetes, the disease remains unresolved. The onset of Diabetes foot ulcers is due to neuropathy and vascular dysfunction. The probability of Diabetes patient to foot lesions (ulcer/gangrene) is estimated to be between 15_ 25 % for the entire lifetime of the patient with an annual incidence of 1_1.4% that more than 15% of these wounds will result in amputation of the

organ. The depth of the infection, the presence or absence of infection is among the first things that should be clarified when dealing with these patients. Antibiotic treatment and compliment try surgical treatment, wound covering methods and new dressing techniques are proposed. The use of larval care is the part of a larger branch of medicine named biotherapy in which creatures and organism are used as a direct therapeutic approach. Larval care or Maggot therapy is another method used in the treatment of chronic ulcers, including chronic ulcers in Diabetes patient. Dead tissues wounds, spastic and ganglia wounds are good alternative to larva therapy. The first scientist flic study on the use of larvae for a wound as the last method of defense has been used after months of antibiotic and surgical treatment without any achievement.

Material and Methods: The present study is research study of Diabetes foot ulcers patients. Regarding the fact that foot ulcers are one of the most important complications of Diabetes, 20 patients with food ulcer referring to the center were classified according to Wagner's criteria. Patient's information's are inserted by the nurse. In addition to the type of ulcer, other questions include demographic characteristic (age, sex, and weight), smoking and alcohol, duration of Diabetes, history of ulcers and treatments (outpatient treatment, debridement in the operating room and amputation) have been recorded in the patients' cases. The classification of the patients included 9 patients with superficial ulcer, 4 patients with deep intestinal abscess and involved with osteomyelitis 3 of them with localized gangrene on the toes, 4 patients with severe gangrene at the sole of the foot. Because with the bone problem. The infections wound cannot be cured, patients with osteomyelitis are referred to a specialist. Patients involved with localized gang rent on the toes are prohibited to use the larval treatment. These patients were debrided in several steps using bistoury. Then, the patients wound was dressed with the help

of honey dressing and the cautions were taught to the patients. In the meantime, a patient was infected with severe infection on the sole of foot, medial plantar and tibia of the foot, which was wounded at a depth of 3 mm and a length of 15 mm was dressed with *Lucilia Silicate's* larvae from Tehran Medical University, jihad. The patient did not have any other disease, including heart and blood pressure. The flies used in larval treatment were from the optional of the Califordeh family and *Lucilia Silicate* genus. The larvae were transferred to the next using sterile containers. We placed active larvae with pence on the patient's infective wound to feed infections tissues and cause infectious or necrotic tissue erosion; larvae are between 1-3 mm long. Approximately, 10 larvae are placed per square centimeter and the wound was dressed with a net to allow sufficient oxygen reach the larvae. Then, an absorbents pad was placed above the net to absorb discharge and dead liquid tissue. The patient was trained to replace the dressing every 12 hours, if necessary. The larvae were removed after 3 day. This was easily accomplished by removing dressing and wound washed with sterile salt solution. Regarding this dressing up to 3 steps for the patient. In general, the use of larvae can kill 10_15 g of dead cells per day. Larvae destroy dead tissue with gastric acid secretion and swallowing tissues and dissolved bacteria.

Results: Necrosis, wound and ganglia wounds are good options for larvae treatment. The effects of 3 stages of larvae dressing on the patient's wound showed that the length of the wound decreased from 15 mm to 4 mm, which during the last few days tried to treat the remaining wounds using a variety of modern dressings. Larvae have been increasing for the normal debridement of the wound necrosis tissue, as compared to previous when the patient was using a variety of other treatments, such as dressing or debride by the surgeons. Larvae made the recovery process fast and eliminated the source of infection from the necrosis of the wound during a shorter period.

Conclusion: One of the benefits of larvae is salivary secretions which disinfects the wound site. The total of these activities ultimately leads to an acceleration of wound healing. There is antibiotic, named Allantoin, in the larvae's salivary, which affects a wide range of bacteria, larvae also produce ammonia, which has a high microbial effect. Also, the pH of the wound reaches to 5.8_8. In this pH, colonization of the bacteria is difficult and wound healing is accelerated. The larvae also cause excessive blood flow to the wound, with their movements. That is like a massage for the wound. Larvae also release substances similar to interleukin 6 which accelerates wound healing and produces fibroblasts. In the present century, Maggot Therapy has been approved and used in many countries of the world. According to the Tehran University of Medical Science, Jihad, larvae treatment reduces the time of wound healing about 1.5 times. This new Therapy with reducing the time of the healing of infectious wounds also reduces the pain and suffering of infectious wounds.

Key Words: Larvae, History, Biosurgery, Infectious Wound, Maggot Therapy

P16

A Systematic Review on Effective Herbal Medicine on Episiotomy Wound Healing in Iran

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Background: Episiotomy is the most common perineal incision in midwifery to facilitate the

expulsion of the fetus. Similar to other wounds, episiotomy could lead to infections and delayed recovery. Despite routine episiotomy is questioned in specialized midwifery books for more than a decade, this method is still routinely performed in Iran. Complications after episiotomy include inflammation, edema, dehiscence and perineal pain. Since these complications affect the quality of life and relationships between the mother and baby, different studies have been conducted in order to expedite treatment of episiotomy wound healing. Herbs have a special place to promote the public health and improving wound healing. The aim of this study was to have a systematic review on the studies performed to improve in wound healing in Iran.

Material and Methods: searches were made via a number of electronic databases using defined search terms since 2008 to 2017. The related information was searched from databases of Iranmedex, Irandoc, Magiran, Google Scholar, SID, Pubmed, Scopus and Science Direct.

Results: Studies showed that several herbs were used to improve episiotomy wound healing such as Lavender, Aloe vera (because of its antiseptic effect), Olive oil (with its antiseptic and healing effects), Calendula persica, Honey, Oral bromelaine (Pineapple), Curcuma longa and Chamomile (because of its bisabolol). These herbal medicines have a significant effect on better and faster healing of episiotomy wound.

Conclusion: According to the results of this study, Lavender, Aloe vera, Curcuma longa and Olive oil are the most effective treatments for episiotomy wound. However, more accurate studies with higher sample are required for definite judgment about the effectiveness of these herbs.

Key Words: Episiotomy, Wound Healing, Herbal Medicine, Iran

P17

Wound and Tissue Repair Medications in Al-havi fi- Al- Tibb, by Razi

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Background: Wound healing and tissue repair is one of the problems for physicians and nurses involved in patients with ulcers and also for patients who suffer from recurrent or acute wounds. Razi, writer of Al-havi fi- Al- Tibb which is one of the largest references in Traditional Persian Medicine, is the pioneer in dermatology. In this study, we aimed to describe the medication mentioned by Razi that is useful for wound healing and tissue repair.

Material and Methods: In this study, we reviewed Al-havi fi- Al- Tibb, volume 6, by Noor Software, with the key words of “ghorheh”, “ghorouh” and “kheraajaat” which mean wound and ulcer in Arabic language. Then, the names of the medication mentioned with therapeutic effect on wound healing were extracted, record and analyzed.

Results: According to Al-havi fi- Al- Tibb, up to 210 out of 911 medications are mentioned for repair of tissue and wound healing. All of these medications are astringent called “ghabez” and dryer “mojaffef” which accelerate healing of the wound. Most of them are hot temperament and the others are cold. In otherwise, most of these medications are dry temperament, according to wetness. Overall, 26 out of 210 medications are mineral, human or animal product and the others are herbal medicine. Some of the effects of these medications in wound healing and tissue repairing

were demonstrated in recent clinical trials with strong evidence.

Conclusion: Natural products can be a useful source for accelerating the wound healing and tissue repairing, especially in combination with modern medication. We suggest that clinical trials should be performed to reveal the efficacy of natural products in wound healing.

Key Words: Razi, Traditional Persian Medicine, Wound Healing, Tissue Repair

P18

The Effect of Correct Wound Debridement on Wound Healing process

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Background: Debridement is a widely utilized tool in wound bed preparation. It can assist in the removal of nonviable or infected tissue and excess wound moisture. It can also help stimulate a non-advancing wound edge. However, not all methods of debridement are the same. Each method has advantages and disadvantages that must be clearly understood. Failure to use the correct method for a given wound may lead to delays in wound healing, increase patient suffering, and unnecessarily increase the cost of care. This review article discusses the various methods of debridement, describes currently available debriding agents and evaluates the clinical data regarding their efficacy and safety

Material and Methods: This article is review study and information compiling has been done with the of Pub Med – sciences direct and Google scholar

Results: Necrotic tissue presents in two forms: eschar and slough. The component of necrotic tissue includes avascular tissue, fibrinous exudate, and bacteria: these substance support bacterial

growth and interfere with repair. Debridement is an essential component of wound bed preparation. A wound containing necrotic material remains in the inflammatory phase of wound healing and is at increased risk of infection. Debridement allows visualization of the wound base, reduces the chance for infection, reduces odor, and allows the wound healing process to continue. Many factors are considered when determining the best approach to debridement, including the type of necrotic material in the wound base. Wound containing slough will respond to autolysis, enzymatic debriding agents, maggot therapy, chemical debridement and conservative sharp wound debridement. Eschar can be removed by autolysis, enzyme application, sharp and surgical debridement. Debridement can play a vital role in wound bed preparation and the removal of barriers that impair wound healing. In accordance with the TIME principles, debridement can help remove nonviable issue, control inflammation or infection, decrease excess moisture, and stimulate a non-advancing wound edge. There are many types of debridement, each with a set of advantages and disadvantages that must be clearly understood by the healthcare team. Failure to use the correct debridement method for a given type of wound may lead to further delays in healing, increase patient suffering, and unnecessarily increase the cost of care. This review article discusses the various methods of debridement, describes currently available debriding agents, evaluates the cli+ skill level of involved clinicians. Debridement methods are often combined and modified as the wound conditions change. Continual accurate wound assessment during the debridement phases is essential to ensure an outcome consistent with the stated wound goals. Application and use the correct debridement methods for a given wound lead to accelerate in wound healing, increase patient comfort, and reduce the cost of care and pain.

Key Words: Debridement, Wound Healing, Necrotic Tissue, Debridement Methods

P19

Wound Epithelialization and Topical Vitamin C

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Background: Vitamin C is able to improve the protective mechanism of immune system, and wounds. Also, it is necessary to rehabilitate wounds and resistance against infection. Vitamin C is a drug applied from a long time ago to improve wounds via oral or venous methods, while topical effects have been still unknown. This study makes an attempt to define the effect of Topical Vitamin C on improving second-degree burns.

Methods: This clinical trial was conducted on 30 patients with second-degree burns admitted to the burn unit of Vasee Hospital of Sabzevar, Iran. Burn wound areas were divided into two parts, receiving routine treatment with sulfadiazine ointment and vitamin C in addition to sulfadiazine. After cleaning the wounds, dressings were replaced daily. Depth of burn wounds in each area was observed to be similar. Burn wounds were examined on days one, three, seven and 14 after the burn incidents using Bates-Jensen Wound Assessment Tool. Data analysis was performed in SPSS version 20 using repeated measures ANOVA.

Results: Analysis of variance with repeated measures showed that the mean of final score between two cure is statistically significant ($P=0/047$). In the other words, difference of the remission rate between two groups is statistically significant, and vitamin C has a significant impact on recovery score. About intragroup effect, the effect of time on mean of epithelialization is significant ($P=0/000$, $F=141/324$). The interaction impact of time- dressing kind suggested that epithelialization between two groups in 1st, 3rd, 7th,

14th days is significant (P= 0/005, F= 5/734).

Conclusion: Administration of vitamin C topically on second degree burn wounds is recommended.

Key Words: Vitamin C, Healing, Epithelialization, Burn Wound

P20

Prevalence and Antimicrobial Resistance of Methicillin - Resistant Staphylococcus Aureus in Diabetic Foot Infections

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Background: Diabetic foot ulcers are associated with increasing morbidity and mortality. Staphylococcus aureus (S. aureus) is one of the most important causative agents of the diabetic foot infection. Methicillin-resistant S. aureus (MRSA) has emerged as a serious and common problem in patients with diabetic foot ulcers.

Methods: In this study, 100 soap samples of diabetic foot ulcers were collected. S.aureus was identified by both biochemical (mannitol, DNase, coagulase) and genotypic tests (nuc). The polymerase chain reaction (PCR) was used to detect the mecA gene. The antimicrobial susceptibility for MRSA was performed by the disc diffusion method for disks; penicillin, mupirocin, tetracycline, erythromycin, ciprofloxacin, cotrimoxazole, rifampin, amikacin, gentamicin, Linezolid and chloramphenicol. Frequency of MDR isolates was also calculated.

Results: In selected Tehran hospitals from 2016 to 2017, 100 samples were collected. 38 S. aureus isolates were identified, among which 24 (63.1%) isolates were confirmed as MRSA by the PCR amplification of mecA gene .All MRSA were resistant to penicillin and all of them were

sensitive to mupirocin. The Resistance pattern among the isolates is as follows: tetracycline (79%), erythromycin (66%), ciprofloxacin (58%), cotrimoxazole (50%), rifampin (41%), amikacin (41%), gentamycin (37%), linezolid (25%) and chloramphenicol (12.5%). Seventy percent of MRSA isolates were MDR.

Conclusion: Since the prevalence of multidrug resistance is high among MRSA strains, diagnosis and treatment of diabetic foot infection should be regarded as a global health issue.

Key Words: Diabetic Foot Infections, Methicillin-Resistant Staphylococcus Aureus (MRSA), Antimicrobial Resistance, MDR

P21

New Methods and New Technologies in Healing Wound and Remedy with Laser and Wetting Wound Dressing

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Background: The preservation and integrity of skin in humans and animals to protect against water loss - Blood and counteract the entry of microorganisms is vital in order to improve and heal wounds in humans and animals evolved with a completely complex and advanced mechanism that include the following: inflammation-proliferation-remedy and restoration. Different laser systems are used to improve the process of wound healing and to prevent and treat hypertrophic and colloid scars. Using laser thermal energy in the early stages of the wound healing process causes major changes in the process of repair. The most important reason for the use of wounds is protection wound against purulence and prevention of infection, but its main purpose is to accelerate the remedy process. The purpose of this study is to review the new methods and new technologies for recovering and healing wounds using laser and wetting wound dressings.

Methods: This review study was conducted on the basis of a search of Magiran-Pubmd - SID databases and using clinical teaching keywords - new teaching methods and learning in nursing. A total of 30 articles were extracted which after studying Analysis of 19 related articles was selected.

Results: Wound healing has three major phases of premature inflammation, proliferation phase and restoration phase, which low-power lasers can be effective in most of these phases and activate wound healing. By comparing two new types of lasers with different wavelengths of 670 And 830 nm in skin restoration, concluded that both low-power lasers were effective but 670 nm lasers was more effective. The wound healing rate depends on many factors including: the size of the wound-blood storage site -the presence of outside materials and microorganisms-age- The health and nutrition status of the patient.

Conclusion: dressing wound is replacement of a lost skin epithelium and is a therapeutic factor. Creating a damp environment in the wound and thus optimizing and healing the wound by keeping the proper temperature are the goals of wet dressing, which makes these dressings superior to dry dressings. Diseases and skin abnormalities caused by genetic and environmental factors create unpleasant psychological and social reflections in the lives of affected people.

Key Words: Modern, Technology, Remedy, Healing, Wound, Laser, Dressing

P22

Combination Therapy of Gluteal Myxoidosarcoma

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Background: Prevention of lower limb amputation of a patient with gluteal myxoidliposarcoma with combined novel wound treatment

Using novel treatments (silver compounds.

NPWT.MOISTURE WOUND HEALING for 9 months on the wound caused by frequent resection of site of the tumor and radiotherapy of gluteal sarcoma, leading to extensive tissue and bone necrosis, due to the extent of The damaged area and the flap relups candidate for limb amputation . The patient's ulcer was completely recovered and the patient got rid of lower limb appendage.

Using novel wound healing methods and especially NPWT, amputation of patients with chronic ulcers can be prevented.

Key Words: Liposarcom, Novel Treatment, Amputation

P23

The Effects of Fundermol Ointment on Angiogenesis in Second Degree Burn Wounds Induced by Hot Water in Rat's Skin

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Background: Angiogenesis, growth and development of new blood vessels are a vital part of the wound healing phenomenon, leading to the re-establishment of blood circulation in the affected area. Angiogenesis in the affected tissue can limit the areas that are exposed to anemia and cell death, Thus can accelerate healing of the wound. The generation of new vessels and their development are one of the main factors for healing of the wound, so treatments that are able to stimulate and activate angiogenesis are also effective in accelerating the healing process of the wound.

Methods: Thirty rats from both sexes were burned by hot water in a way making second degree burn

wound on skin of their back (10% total body surface). Rats were divided in two groups: I) infected with *Pseudomonas aeruginosa* and II) were left without infection. Each group was further divided into: control, Fundermol and nitrofurazone and were treated for fifteen days while the ointments applied to wound topically. At the 15th day post burn all wounds were evaluated by histological methods to determine area densities of blood vessels and area-related numerical densities of blood vessels.

Results: In the present study, in non-infectious and infectious burn wounds, both regional density and numerical densities of blood vessels in treated group with Fundermol ointment were significantly ($p < .001$) higher when compared to the control and nitrofurazone groups on the 15th days after burn.

Discussion: The results of this study indicate that the generation and increase of the number of new vessels in the healing tissue treated with Fundermol ointment is more than the other two groups especially the effect of Fundermol ointment on the healing tissue is greater than the nitrofurazone which is used as a routine treatment in burn healing wounds; it is possible to expect that Fundermol ointment through the increase of blood flow to the affected area can accelerate the healing of the wound. Therefore, it may be suggested the usage of Fundermol ointment for wound healing in burns. Angiogenesis in infected specimens is less than non-infectious samples, which can be attributed to the effect of infection.

Key Words: Angiogenesis, Wound Healing, Infected Burn, Non-Infected Burn, Fundermol

P24

Effect of Red and Green Low Level Laser Therapy on the Skin Surgical Wound Healing

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Diabetic foot wound as one of the most important and prevalent effect of the diabetes afflicts people

suffering from diabetes to 15 percent in the patients' life. If it is left untreated properly, it can lead to Gangrene infection or even amputations. Knowing its importance the goal of this research is the study of the degree of patients' awareness suffering from diabetes of factors such as the danger, prevention and the treatment of diabetic foot wound and its relationship to the reducing of perceived stress.

The research method in this study was descriptive one, the sample in this study were all patients who referred to Hamyaran debate Charity clinic in Neyshabur in Mordad 1396 (August 2017). To collect data the researcher used a researcher-made questionnaire. Finally, after collecting the data, they were analyzed by SPSS 19 using statistical methods that were T independent and Pearson regression.

The results showed that the mean and the standard deviation of the danger, prevention and treatment are $2/57 \pm 1/1$ and $2/91 \pm 1/1$ which indicates an undesirable condition of the degree of the danger, prevention and the treatment of diabetic foot wound. Also the analysis showed that there is a positive significant relationship between the degree of awareness of the factors of danger ($r=0/23$ and $p=0/03$) and the degree of awareness of the prevention factors ($r=0/23$ and $p=0/03$) with the reduction of the perceived stress ($p < 0/05$). But the researcher could not find a significant relationship between the awareness of treatment factors and the perceived stress.

Key Words: Low-Potency Laser, Wound Healing, Treatment

P25

Nerve Regeneration with Aid of Nerve Guidance Conduit and Nanotechnology

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Background: Neuroregeneration is significant clinically, because it is a regenerative

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mechanism involving the damaged neuron that provides mechanical support for regeneration. The functional mechanism of neuroregeneration differs between the peripheral nervous system (PNS) and the central nervous system (CNS). Neuroregeneration in the peripheral nervous system (PNS) occurs to a significant degree. The PNS is capable of recovering from injury due to the presence of macrophages and also Schwann cells, which are responsible for myelination of axons. In the PNS, damaged axons can overcome large gaps to reconnect and promote recovery with help from guidance tubes and nerve grafts. Unlike peripheral nervous system injury, injury to the central nervous system is not followed by extensive regeneration.

In PNS damage, for which the current treatments are nerve autografts and allografts, surgeons may encounter problems such as a shortage of donor nerves, size inequality between the donor nerve and the recipient, neuronal formation, infectious diseases, immunological issues and indeed a complete recovery of functions of nervous tissue is not common. In the case of larger nerve gap (more than 20 mm), a clinical aim could be the application of sensory nerve autografts. An evaluation of clinical outcomes of autograft application showed that there was a vital need for engineered alternatives. Therefore, restoring the task of damaged PNS and CNS has always been a challenge for neurobiologists and neurologists. Ineffectiveness of current methods of treatment has compelled scientists to search for new treatment strategies for the injured nervous system.

Advancements in the field of tissue engineering have led to development of synthetic nerve conduits as an alternative for the nerve autograft technique, which is the current practice to bridge nerve defects with gaps larger than 30 mm.

Nerve guidance conduits is innovative strategies focusing on larger defects that

provide a conduit for sprouting axons directing growth and reducing growth inhibition from scar tissue. Nerve guidance channels must be readily formed into a conduit with the desired dimensions, sterilizable, tear resistant, and easy to handle and suture. Ideally, they would degrade over time with nerve regeneration, be pliable, semipermeable, maintain their shape, and have a smooth inner wall that mimics that of a real nerve.

This article briefly reviews different materials as an alternative to the nerve autograft to bridge peripheral nerve gaps in an attempt to assess their ability to support and enhance nerve regeneration and their prospective drawbacks, and also highlights the promising hope for nerve regeneration with the next generation of nerve conduits, which has been significantly enhanced with the tissue engineering approach, especially with the aid of nanotechnology in development of the three-dimensional scaffold. The goal is to determine potential alternatives for nerve regeneration and repair that are simply and directly applicable in clinical conditions.

Key Words: Neuroregeneration, Tissue Engineering, Nerve Defects, Nerve Conduits, Nerve Autograft, Nanotechnology

P26

Clonal Genealogies of Helicobacter Pylori CagA Gene in Iran and Their Association with Peptic Ulcer Diseases

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Background: *Helicobacter pylori* (*H. pylori*)

cagA gene plays an important role in the development of gastroduodenal diseases, such as chronic atrophic gastritis and peptic ulceration (PUs). The aim of this study was to investigate the clonal genealogies of *H. pylori* cagA gene in Iran and their association with PUs.

Material and Methods: We identified a new lineage in Iranian cagA gene by phylogenetic analyses (denoted cagA lineage II) that was different from the two Eastern and Western dynasties; and examined its relationship with PUs, in 170 *H. pylori* isolates recovered from different regions of Iran by PCR amplification followed by sequencing of the PCR products for confirmatory purposes.

Results and Discussion: The subjects included 116/170 with non-atrophic gastritis (NAG) and 54/170 with PUs. In general, cagA⁺ genotype could be determined in 120 (70.6%) strains. Statistical analysis showed that frequency of the cagA genotype in patients with PUs (87.0%) was higher than in those with NAG (62.9%) [OR (95% CI) = 3.955 (1.642-9.525); P = 0.001]. Of the 120 cagA⁺ strains, 38 (31.7%) showed cagA lineage II genotype (NAG: 23.3%, and PUs: 44.7%) and significantly correlated with an increased risk of PUs in infected individuals (p = 0.015). The results of simple logistic regression analysis confirmed the strength of the correlation this genotype with risk of PUs OR (95% CI) = 2.661 (1.207-5.867).

Conclusion: The increased level of nucleotide diversity in *H. pylori* cagA gene shows strong evolutionary dynamics, led to the emergence of a new clonal lineage in Iranian cagA gene (cagA lineage II) that was linked to PUs disease.

Key Words: *H. Pylori*, CagA Lineage II Genotype, Peptic Ulcer, Iran

P27

Anticancer Activity of Rosemary (*Rosmarinus Officinalis* . L) Against K562 Cells

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Background: In recent years, extensive attention has been focused on medicinal herbs to make derivative with fewer side effect and stronger therapeutic properties. Rosemary (*Rosmarinus officinalis*.L) plant from Lamiacea family is one of medical plants which used for many purposes such as reducing pain, antispasmodic in renal colic and dysmenorrhea, anti-rheumatic, , stimulating hair growth (hair tonics, hair lotion), and many other effects . Most pharmacological effects of rosemary is due to its constituents including carnosol, carnosic acid, and caffeic acid. Despite several studies, anticancer activity of Rosemary is remained unclear. In the present study, we investigated cytotoxicity of aqueous leaves extract of Rosemary against K562 cells by MTT assay and DNA fragmentation assay.

The anti-cancer effects of aqueous leaves extract of Rosemary were examined by assessing the proliferation of K562 cells in the presence of various concentrations of Rosemary extract for incubation times of 24, 48 and 72h. It was revealed that the maximum inhibitory effect of Rosemary extract on K562 cells was after 72h of incubation (IC₅₀ = 1 mg/ml). afterward, DNA from control and treated cells with aqueous leaves extract of rosemary extracted and analysed by agarose gel electrophoresis. The pattern of DNA on gel changed after treatment with rosemary. In conclusion, our results confirmed that Rosemary possesses favorable properties for the design of anticancer drug with high performance and minimal side effects even though we need more research such as purifying its effective substance in

order to clarify the exact mechanism of Rosemary.

Key Words: Rosemary, K562, Anticancer

P28

Honey, the Natural Wound Healer

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Two types of in vitro wound healing model include, cutaneous and corneal wound. All

Studies reported a positive effect of honey in wound healing .changes in the EMT markers in in vitro wound healing model was seen when subjected to honey. Honey regulates the process of EMT (epithelial mesenchymal transition) and has a positive impact .on wound healing

Antioxidant in stingless bee honey can break the chain of free radicals that cause a detrimental effect to the wounded area. Furthermore, the antimicrobial properties of

Stingless bee honey can overcome the bacterial contamination -and thus improve the healing rate. Moreover, the anti-inflammatory attribute in this honey can protect the tissue from highly toxic inflammatory mediators. The moisturizing properties of the honey can improve wound healing .by promoting angiogenesis and oxygen circulation.

P29

Alginate for Biomedical Applications

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Alginates are hydrocolloids, water-soluble biopolymers extracted from brown seaweed. Alginates are polysaccharides (carbohydrate

polymers) with building blocks comprised of two uronate sugars, the salts of maauronic and guluronic acid. The chemical composition of alginate varies in a way that assures consistency over a wide range of functionalities. When extracting from harvested material, the uronic acids are converted into the salt forms mannuronate (M) and guluronate (G) through a neutralization step. While G-blocks provide gel-forming capacity, MM and MG units provide flexibility to the uronic acid chains, with flexibility increasing in the order GG<MM<MG. Once formed, an alginate gel may be

considered part solid and part solution. Water and other molecules are physically trapped within the alginate matrix by capillary forces, yet remain free to migrate by diffusion, depending on size. This property makes alginate gels ideal for multiple applications, including cell immobilization and/or encapsulation. Another role is in wound treatment by gel network is rehydrated through the absorption of exudates from wound into alginate wound dressing. Also, in the treatment of anti-reflux diseases, alginates react in situ with acid and calcium carbonate, creating a protective, floating gel raft, due to the trapped bubbles of carbon dioxide. The internal setting method may be performed at neutral or acidic pH and acidity may be achieved through the addition of an acidifier, which will accelerate the solubility of the calcium salts. This method is commonly used for impression materials. Algal polysaccharides such as alginate have been considered for cartilage regeneration because of their sulfate groups, chemical affinity for mammalian glycosaminoglycans, and lack of interaction with cell integrins that help retain the rounded shape of cultured cells, enhancing chondrogenesis. Mesenchymal Stem Cells (MSCs) ability to secrete anti-inflammatory and immune-modulatory factors represents an attractive tool in the treatment of osteoarthritis. Alginate particles support MSCs viability and bioactivity. Nevertheless these particles obtained through a drop wise method had an average size of 1.5 ± 0.2 mm and were thus too large to be injected into joints. Preparation various hydrogel

formulations based on alginate and gelatin methacryloyl (GelMA) and have encapsulated gingival mesenchymal stem cells (GMSCs) and human bone marrow MSCs (hBMMSCs) within these fabricated hydrogels. Demonstrated that addition of the GelMA to alginate hydrogel reduces the elasticity of the hydrogel mixture. While presence of GelMA in an alginate-based scaffold significantly increased the viability of encapsulated MSCs. These findings may enable the design of new multifunctional scaffolds for spatial and temporal control over the fate and function of stem cells even post-transplantation.

P30

Aloe Vera: The Miracle of Ancient Herb in Tissue Repair

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An extensive review on Aloe vera was carried out, including its main uses, components (both nutrients and bioactives), biological activities, and applications. More than 75 active ingredients from inner gel have been Identified including vitamins, minerals, enzymes, sugars, Anthraquinones or phenolic compounds ,lignin, saponins , Sterols , amino acids ,and salicylic acid. Aloe possesses numerous activities including, anticancer, antioxidant, antimicrobial, anti-allergic, anti-inflammatory, immune modulatory, hepato protective, antiulcer and antidiabetic. Some of these activities are due to the presence of polysaccharides (acemamman; glucomannan). Aloe vera in dentistry is applied for Oral lichen planus, Oral sub mucous fibrosis, Recurrent aphthous stomatitis , Radiation induced oral mucositis, Gingivitis ,Periodontitis , Tooth gel(controlling bacteria that causes cavities), Alveolar osteitis, Denture Cleanser and Adhesive, Dental Implants, Storage of Gutta Percha Cones, Aloe Vera based scaffolds(because

of its biodegradability, biocompatibility, and low toxicity properties.) wound-healing effects of Aloe gel Different mechanisms have been proposed for the wound-healing effects of Aloe gel, which include keeping the wound moist, increasing epithelial cell migration, more rapid maturation of collagen, and reduction in inflammation, Glucomannan, a mannose-rich polysaccharide, and gibberellin, a growth hormone, interact with growth factor receptor on the fibroblast, thereby stimulating its activity and proliferation, which in turn increases collagen synthesis after topical and oral application , contains a glycoprotein with cell proliferating-promoting activity, increasing blood supply (angiogenesis), which increased oxygenation as a result as a part of tissue regeneration. The Aloe Vera gel polysaccharide acemannan was shown to activate macrophages, stimulated blood vessel formation in a chick chorioallantoic membrane (i.e., a vascular membrane derived from developing chicken eggs); cell proliferating-promoting activity stimulated the proliferation of artery endothelial cells in an in vitro assay and induced them to invade a collagen substrate.

P31

Antimicrobial β -defensin-3 Efficiently Enhances Infectious Wound Healing in Diabetic Pig Models

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Background: At least 15% of diabetic patients suffer from infectious wounds worldwide. The effectiveness of current treatments is limited as result of the emergence of bacteria superbugs. Human defense peptides(HDPs) are known for their wide range immunomodulatory and wound healing properties (e.g., attraction of immune cells to wounded area, increasing the cell proliferation and migration, as well as the stress fibers reorganization,

accelerating the angiogenesis, stimulation of collagen and granulation tissue production and neovascularization) and selective antimicrobial activities against resistant pathogens. Here, the effects of human β -defensin-3 (hBD-3) on wound healing are presented. For this, wounds created on the back of diabetic pigs. Microneedle with Ad-CMV-hBD-3 (adenovirus with inserted CMV driven-promoter hBD-3 gene) vectors on its tip was microseeded into the wounds. Then, wounds were infected with methicillin-sensitive *S. aureus* strain and biopsy specimen was taken on days 4 and 12. To investigate the peptide transgene expression level in wound fluid, the hBD-3 concentration was measured by ELISA. Analysis of the re-epithelialization was done by the slide scanning and epithelial tongues measurement. Also, wound contraction was determined by measuring the wound area. The results showed the amount of hBD-3 was in the highest level at day 4 with ten-fold reduction in the *S. aureus* growth. HBD-3-treated wounds showed $75 \pm 15\%$ re-epithelialization, and wound healing in epidermis enhanced by 25%. Based on these observations, promising applications for the wound healing in diabetic patients by HDPs are expected.

Key Words: Human β -Defensins, Diabetic Wounds, *S. Aureus*, Re-Epithelialization

P32

Effect of Artaderm Herbal Ointment Containing Alcoholic Extracts and Silver Sulfadiazine %1 Ointment on the Healing Process of Rat's Second Degree Burn

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Background: Standard topical antibiotics

are highly regarded to pain relief and wound healing in burns. Despite the therapeutic effects of synthetic drugs because of their side effects, using these drugs tend to decrease, and tendency to origin natural drugs has increased. Also, the widespread use of antimicrobial drug resistance in microorganisms is seeing. The destruction of epidermis and dermis, soft tissue and organs, burns will be causing deformity, deformity, disability and long-term mental health problems. The use of silver sulfadiazine 1% (Group sulfonamides) with broad-spectrum, antimicrobial dressing with silver sulfadiazine is very well, but due to a toxic effect on keratinocytes reconstruction of the dressing sticking to the wound during the healing process is delayed. Herbal Healing Ointment Artaderm the new drug containing alcoholic extracts, plus the ease of treatment, wound healing dressing accelerate in the process.

Material and Methods: In this study, after survey and selection of effective herbs organs, matching identification and verification to ensure the selection of unit Herbarium, Department of Medicinal Plants Research Center, Agriculture and natural resources and herbarium of Ardabil and Province Faculty of Pharmacy, Tabriz, extraction is done. The ARTADERM, herbal ointment Pharmaceuticals synthesis steps and processes, were done in green Drug Research and Development Institution. Synthetic drug therapy and healing effects ARTADERM and clinical, biological tests was performed. On 24 female rats, Wistar, weighting 200-220 g. To better study and availability of reliable empirical, evidence of these tests, were studied to compare to Silver sulfadiazine Ointment. Causing Second-degree burns damage on mice after general anesthesia with ketamine (40 mg/kg) and Xylazine (5 mg/kg) is done. After causing Second-degree burns damage on mice, and regaining consciousness, randomly assigned to one of three groups, the control group, the groups treated with herbal ointment ARTADERM and treated with silver sulfadiazine and were kept in clean cages. The treated group with drugs were dressing at certain hours to the once a day. Evaluation of healing,

the wound, with the wound area, on days 0-7-14 to 21, from all groups of mice, were studied with photography and AutoCAD software. Sampling biopsy (hematoxylin and eosin) on the way to the healthy tissue and the damaged tissue samples were taken and studied.

Results: Statistical comparison of the burn area of study groups on days 7-14 and 21 post-burn, showed that between the control group and other groups, there was significant difference ($P < 0.05$). While the best results for the treatment group ARTADERM. According to studies, pathology, quickly restored with remarkable Artaderm was a significant difference between the effects of the other drugs. After stained with H&E, the treated group by Artaderm herbal ointment is significant compared to other groups of cell repair.

Conclusion: In the end, according to the results medication Artaderm in terms of healing the wounds and the healing has successfully demonstrated its therapeutic effect, has strong healing properties that can be used as a drug burn along with other existing burn ointments.

Key Words: Medicinal Plants, Second Degree Burns, Silver Sulfadiazine Ointment 1%, Artaderm Ointment, Alcoholic Extracts, Rats

P33

Long Non - Coding RNA Expression Profile of Mesenchymal Stem Cell under Hypoxic Condition

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Background: Chorionic wound treatment is

a major therapeutic issue that needs further studies to elucidate molecular mechanism of healing. Mesenchymal stem cells (MSCs) are a suitable candidate for cell-based therapy of wounds because of their unique features including secretion of paracrine compounds, and low immunogenicity as well as low risk of tumorigenicity. Normally in human body, oxygen tension is between ranges of 1%-12%. However, oxygen tension of 21% is usually applied for ex vivo expansion of the MSCs in vitro. Interestingly, recent studies have shown that the hypoxic condition (0.1 % - 2 % oxygen) gives rise to a significant increase in proliferation and paracrine factors of the cells. In hypoxic condition, HIF (hypoxia inducible factor) regulates expression of protein-coding genes, miRNAs and lncRNAs. To date, studies have revealed that long non - coding RNAs (lncRNAs) from microvesicles are an important biological regulator in gene regulations that may regulate proliferation, apoptosis and stem cell pluripotency. Our hypothesis was that by preparing the hypoxic condition similar to the in vivo for in vitro culture, proliferation, survival and homogeneity of MSCs population will increase by involvement of lncRNAs. Therefore, our experiment has designed to investigate whether some lncRNAs as that participates in growth, survival and proliferation pathways, express in MSCs under hypoxic condition. MSCs were derived from lipoaspirate wastes of healthy women and then cultured under less than 2% oxygen tension in a CO₂ incubator. The real-time PCR data for expression analysis of six lncRNA candidates are under evaluation and will be presented in the Congress.

Key Words: lncRNAs, Cell-Based Therapy, Mesenchymal Stem Cells, Culture Condition, Hypoxia, Wound Healing

P34

Stem Cells in Chronic Wound Healing

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Background: Stem cells are unique cells that turn into other body cells such as skin, blood, and nerve cells. It is also effective in the reconstruction and repairs of various tissues of the body after injury and can be transplanted into the tissues of the intestines where most of their cells have been destroyed and replace the damaged cells and repair and fix defects in the tissue. Today, the use of these cells is increasing to repair damaged human tissues. Convincingly, there is now a widespread worldwide research on the use of stem cells for human health.

Methods: However, in 60% of cases, because of the complete closure of the wound, the scar and the high rate of recurrence, the ideal results are not obtained. Therefore, more effective treatment is needed. Stem cells provide promising conditions. Pre-clinical studies have shown that bone-and-bone tissue-derived mesenchymal stem cells have better advantages than other types of stem cells, which are defined by the multiple-potential differential potentials, and are moderating safety and safety features. In this overview, we emphasize some emerging therapies in the field of tissue regeneration and repair.

Result and Conclusion: Today, one of the uses of stem cells that have given a lot of attention is

the same treatment of various diseases. Because of human stem cells and usually without genetic changes, it can be used to repair damaged tissues, including the use of stem cells in tissue repair. It can be noted that burns and skin lesions, tooth restoration and implant repair using stem cells are indicated. Experts say that in the near future, fundamental research will have wider applications in medical science. Convincingly, there is now a widespread worldwide research on the use of stem cells for human health.

Key Words: Stem Cell, Chronic Wound, Healing, Mesenchymal

P35

The Study of the Degree of Patients' Awareness Suffering from Diabetes of Factors Such as the Danger, Prevention and the Treatment of Diabetic Foot Wound and Its Relationship to the Reducing of Perceived Stress

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Background: Diabetic foot wound as one of the most important and prevalent effects of the diabetes afflict people suffering from diabetes to 15 percent in the patients' life. If it is left untreated properly, it can lead to Gangrene infection or even amputations. Knowing its importance the goal of this research is the study of the degree of patients' awareness suffering from diabetes of factors such as the danger, prevention and the treatment of diabetic foot wound and its relationship to the reducing of perceived stress.

The research method in this study was descriptive one, the sample in this study were all patients who referred to Hamyaran diabet Charity clinic in Neyshabur in Mordad 1396 (August 2017). To collect data the researcher used a researcher-

made questionnaire. Finally, after collecting the data, they were analyzed by SPSS 19 using statistical methods that were T independent and person regression.

Results: The results showed that the mean and the standard deviation of the danger, prevention and treatment are $2/57 \pm 1/1$ and $2/91 \pm 1/1$ which indicates an undesirable condition of the degree of the danger, prevention and the treatment of diabetic foot wound. Also the analysis showed that there is a positive significant relationship between the degree of awareness of the factors of danger ($r=0/23$ and $p=0/03$) and the degree of awareness of the prevention factors ($r=0/23$ and $p=0/03$) with the reduction of the perceived stress ($p < 0/05$). But the researcher could not find a significant relationship between the awareness of treatment factors and the perceived stress.

Key Words: Diabetes, the Diabetic Foot Wound, the Perceived Stress

P36

Pharmacology in Tissue Repair and Wound Healing

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Background: The ulcer in humans begins with the mechanism of inflammation and then is restored. The rate of wound healing depends on the pharmacological and herbal ingredients. Chemical drugs, acetaminophen ... and herbal, alcoholic extract of green tea ... all contribute to wound healing. Acetaminophen is used to treat gastric ulcer in a rat, a Pain killer that can be used. Estrogen accelerates the healing of diabetic wounds. Mummies have beneficial effects on the healing of cutaneous ulcers in rabbits. Corticosteroids reduce inflammation by direct injections to the scar tissue. The green tea extract reduces the time for surgical wound healing. Honey is used for intravenous and chronic ulcers. Aloe Vera gel reduces pain and accelerates

healing of episiotomy ulcers. Henna plant reduces inflammation, bleeding, and stimulates collagen production, and faster contractions of the wound, angiogenesis and vascular dilation. The anti-inflammatory effects of Echinacea reduce the edema and subcutaneous bleeding and reduce the incidence of necrosis. Hydroalcoholic extract of Barberry on the improvement of skin ulcer in diabetic rats, due to the anti-diabetes and microbial properties, reduces the length of the wound in animals after 21 days. The "case" ointment, alcoholic extract of grape seed and alcoholic extract and Watery oak, accelerates the repair of diabetic wounds. Topical application of nettle extract, artemisia and alcoholic curcumin extract exacerbate wound healing in diabetic rats. Wound studies show that both chemical and plant drugs are necessary to achieve maximum recovery. In the future years, we will see progress in various fields of medicine, nanotechnology, and wound healing.

Key Words: Pharmacology, Chemical Drugs, Herbal Medicines, Repair, Tissue

P37

The Effects of Mirror Therapy on Phantom Limb Pain in Amputees: A Review Study

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Background: One of the common problems after limb amputation is Phantom limb pain (PLP) that occurs in at least 90% of limb amputees. Non-drug therapy includes sympathetic ganglion block, transformational epidural block, peripheral nerve block, transcutaneous electrical nerve stimulation (TENS), and mirror therapy, etc. In this study, we sought to review the Sufficiency of the mirror therapy in reduce phantom limb pain.

Methods: This article is a review of studies on effects of mirror therapy on phantom limb pain. The databases searched included SID, CIVILICA, SCIENCE DIRECT, GOOGLE SCHOLAR and PUBMED. The period of searches for the years

2007 to 20017 and the words that were searched include: mirror therapy, phantom limb pain and amputation. Finally, 9 articles were investigated in this period and in direct relation with this subject.

Results and Conclusion: According to studies mirror therapy reduced phantom limb pain in patients who had amputation limb. One of the studies was about mirror therapy in patient with bilateral thigh amputation that Pain intensity and number of attacks was reduced after mirror therapy. In one other study, mirror therapy has no significant effect on phantom limb pain but increased the ability to be aware of and to move the phantom limb. The main cause of this type of pain can be conflict between visual feedback and proprioceptive representations of the amputated limb. In studies, criteria for measuring Pain level, sensation, and limb awareness were include Visual Analogue Scale, The McGill Pain Questionnaire, The Total Pain Ranking Index Score, and verbal descriptions of changes in the phantom limb. Mirror therapy is one of treatments that causing illusions or imagery of movement of the amputated limb might alleviate phantom limb pain and can increases patients' self-efficacy and sense of control regarding their condition. This type of treatment is low-cost and effective.

Key Words: Mirror Therapy, Phantom Limb Pain, Amputation, Mirror Neurons

P38

Neonate Mouse Liver Condition Medium Differentiate Mesenchymal Stem Cells Derived from Amniotic Membrane Placenta into Hepatocyte - like Cells In-vitro

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Background: Mesenchymal stem cells derived from amniotic membranes placenta are multipotent cells which been isolated recently. These cells are able to differentiate in various specialized tissues. This study investigates the effect of mouse liver extract on mesenchymal stem cells derived from amniotic membrane placenta into hepatocyte-like cells in vitro.

Material and Methods: Mesenchymal stem cells from amniotic membrane placenta were separated by enzymatic digestion and were grown in appropriate culture conditions. Four groups were evaluated as follows: The first, second, third and fourth groups were treated with rat liver extract at concentrations 60 µg/ml, 30 µg/ml, and 18 µg/ml and 6 µg/ml, respectively. Mesenchymal stem cells not treated with mouse liver extract to be considered as a control group. After 16 days of culture were used periodic acid-Schiff test and immunocytochemistry to detect hepatocyte-like cells and the expression of albumin, respectively. The expression of albumin and cytokeratin 18 was measured using flow cytometry.

Results: Differentiated cells were observed under the distinction of the spindle to polygonal. Differentiated cells were positive for immunocytochemistry reaction. The expression of albumin, cytokeratin 18, and periodic acid-Schiff staining confirmed accumulation of glycogen particles in differentiated cells. The effective dose was 6 µg/ml for liver extract to induce differentiation.

Conclusion: Mesenchymal stem cells derived from amniotic membranes placenta

can differentiate into hepatocyte-like cells in the presence mouse liver extract, in vitro and transformed from spindle to polygonal with large nuclei.

Key Words: Mesenchymal Stem Cell, Amniotic Membranes, Hepatocyte-Like Cells, Liver Extract

P39

Inflammation, Angiogenesis and Reepithelialization Controlled by Transcriptional Factors

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Background: Wound healing is an evolutionarily conserved, intricate, and dynamic process, which is mainly divided into the following three major stages: inflammatory, cell proliferation, and tissue remodeling. In many biological processes including cell proliferation, migration and differentiation cell signaling and Transcriptional factors have a vital role. An abundance of evidence has also shown that transcriptional factors participate in the short- and long-term control of crucial gene expression and cell signal transduction that are involved in the healing process.

Methods: There are new technologies that allow the inducible expression of genes at the wound site through the use of transgenic approaches or overexpression via viruses or nonviral transfection. Identification of transcription factors of target genes in different cell types is a vital step in the functional characterization of transcriptional factors in wound healing.

Results and Conclusion: In vitro studies have identified several targets of transcription factors with a possible role in wound repair, and their function in the repair process has been elucidated in a few cases. The existence of a complex transcriptional network that regulates efficient

repair is suggested by first results considering the interaction of different transcriptional regulators at the wound site acquired recently. The aim of this review is summarizes our current knowledge on the function of different transcription factors in wound repair.

Key Words: Wound Healing, Transcription Factors, Inflammation, Angiogenesis, Reepithelialization

P 40

Stem Cells in Wound Healing and Regenerative Medicine

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Background: Stem cells have the ability to renew themselves endlessly and possess ability to differentiate into many cell types. Mesenchymal stem cells, or MSCs, are multipotent adult stem cells that have the capacity to proliferate and differentiate into mesodermal lineage cells such as osteoblasts, adipocytes, and chondrocytes. Chronic wounds are an ever growing problem, about 50% of severe skin wounds do not respond to current treatments. Regenerative medicine is a new and expanding field in biomedical research that focuses on the development of innovative therapies allowing the body to replace, restore and regenerate damaged or diseased cells, tissues and organs so it is an attempt to cure diseases for which modern medicine has yet not treatment available.

Methods: The retrieved studies were searched through the PubMed, Google Scholar, Scopus, databases. Different studies have been demonstrated that skin can be one of the attractive model organ for regenerative medicine, because of its easy accessibility, furthermore mesenchymal stem cells located in the dermis, hypodermis and

other sources have shown interesting plasticity, these cells are involved in studies to promote chronic wounds regeneration.

Results and Conclusion: Wound healing is a complex process that requires the coordinated interplay of ECM, growth factors, and cells. MSCs, in particular, play an important role in mediating each phase of the wound-healing process, including: inflammatory, proliferative, and remodeling. Several researches have shown that mesenchymal stem cells from different sources have played an important role in regeneration of skin tissue. The ability of MSCs to promote the transition from the inflammatory to the proliferative phase is particularly critical for treating chronic wounds. so stem cell therapy could be a promising therapeutic option for many diseases in which current medical treatments do not achieve satisfying results or cure.

Key Words: Mesenchymal Stem Cells, Wound Healing, Regenerative Medicine

P41

Effect of Hydroalcoholic Extract of Hypericum Scabrum on Wound Healing

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Background: Several plants are used in traditional medicine for treatment of human diseases such as wound. Wounds are the result of damages to the skin and other soft tissues. In traditional medicine, it has been reported that are species of Hypericum Scabrum (HS) has healing effect on peptic ulcer, depression and wound. The aim of this study is to appraise the effect of hydroalcoholic extract of HS on wound healing.

Material and Methods: in this study 24 male wistar rats weighting about 200±25gr. Animals were

anesthetized by mixture of ketamine and xylazine in ratio of 3 to 1. A wound was created on the back of rats by incision an area of 2×2 cm. The animals were divided into four equal groups, first group the wound treated and dressed with Phenytoin 1%, second group cream of hydroalcoholic extract of HS 10%, third group received Eucerin and fourth group was left untreated (control).14 days after incision, wound healing process was evaluated microscopically and macroscopically.

Results: The results showed wound healing process and reepithelialization in group 2 was more quickly than other groups and compared to group 3 and 4 there was significant difference.

Conclusion: In this study, cream of hydroalcoholic extract of HS is effective in wound healing and accelerated the treatment.

Key Words: Wound Healing, Hypericum Scabrum, Incision, Treatment

P42

Ethnomedicinal Plants: Effects of Verbascum and Falcaria Vulgaris in Wound Healing

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Background: In traditional human medicine, herbs have been used as immunostimulants for thousands of years. Side effects of chemical medicine lead people to use medicinal plants to cure the diseases. Medicinal plants are low-priced and can enhance the resistance to infections. One of the main usages of medicinal plants is to get rid of scars. Scars are marks created during the healing of damage to the skin or tissues in addition to the manifestation of the skin's healing process. Verbascum and Falcaria vulgaris (which is domestically known as "Paghazou" and Ghaziaghi in Persian) are

two plants that due to the residual effects of a drug, researchers sought to replace them with chemical drugs. As an alternative to antibiotics, Paghazou which grows abundantly in west of Iran in farmlands. Is used in this study to see its estimated effect on wound healing.

Methods: This research is based on searching keywords as Verbascum, Falcaria vulgaris, wound has been done.

Results and Conclusion: Combination of Verbascum and Falcaria vulgaris are the reasonable evident for wound healing. Verbascoside is the most common Phenylethanoid glycoside in Verbascum genus with a wide spectrum of biological activities including strong antioxidant activity and anti-inflammatory. So it can be used in second phase of wound healing or inflammation. In this research, Falcaria vulgaris showed strong effect on bacterial growth by using vulgaris which has a better effect on Gram positive-bacterial growth inhibition than Gram negative ones. The results show vulgaris has significant effect on wound healing and stimulates the immune system by increasing white blood cells (WBC). According to results, these two herbs can be used in wound healing which have displayed significant antinociceptive and anti-inflammatory activity.

Key Words: Wound Healing, Medicine, Verbascum, Falcaria Vulgaris, Inflammation

P43

Effect of PH on Chronic Wounds Healing

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Background: Wound healing is a complex, multifaceted process which is influenced by both

intrinsic and extrinsic factors. The pH of the wound can affect many factors including oxygen release, angiogenesis, protease activity, and bacterial toxicity. Chronic non-healing wounds have an elevated alkaline environment. Healing occurs more readily in an acid environment.

Methods: This paper will present a review of wound pH and the physiological effects on wound healing. Clinical assessment of the wound bed of chronic wounds like diabetic ulcer is predominantly based on subjective interpretation with little recourse to objective analysis. Monitoring surface pH may provide a method of ‘measuring’ the condition of the wound bed and ultimately aid in determining the wound’s response to treatment. To reach this purpose it was necessary to have systematic review based on relation between wound pH fluctuations and the healing processes in chronic wounds.

Results and Conclusion: Wound healing is a complex physiological process which is impaired in the chronic wound. Factors which influence wound healing include the pH environment. Both acute and chronic wounds move to a neutral and then acidic state as healing occurs. Studies have investigated that as the wound progresses towards healing, the pH moves to neutral and then becomes acidic, this changing in pH environment influences on protease activity and oxygen release to the tissues. In addition, lowering the pH to a more acidic environment reduces the toxicity of bacterial end products such as ammonia, enhancing the destruction of abnormal collagen in the ulcer bed, promotion of angiogenesis, increased macrophage and fibroblast activity and control of enzyme activity. In conclusion, monitoring pH may aid in objective assessment of the wound bed and evaluation of treatment progress and determining the wound’s response to treatment.

Key Words: Wound Surface PH, Hydrogen Ions, Chronic Wounds, Non-Healing Wounds, Measuring PH

P44

Effect of *Artemisia Absinthium* L. on Wound Healing

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Background: Wormwood (*Artemisia absinthium* L.) is a medicinal and aromatic bitter herb. It has traditionally been used as anthelmintic, choleric, antiseptic, balsamic, depurative, digestive and diuretic. A wound may be described as a disturbance of the normal anatomical relationship between body tissues and is generally accompanied by a break in the skin.

Methods: This review article was carried out by searching studies in PubMed, Google Scholar, Scencedirect, by using the search terms “*Artemisia absinthium* L.,” “wound,” “antioxidant activity,” “wormwood extract”. The search was completed through September 2016, and was limited to articles published in English. In this review, 49 articles that are associated with effects and wound effect of worm wood were found and of these, 29 articles were applied.

Results and Conclusion: *A. absinthium* L. is external used in wound healing, sores and eczema and for internal treatment of abdominal pain and hemorrhoids. Production of reactive oxygen species (ROS) in excess is responsible for several diseases including skin disorders. Increasing the level of oxidative stress could delay the healing of skin injuries, such as burns, ulcers, wounds, eczema. Pharmacological agents having modulator effect in oxidative stress processes can be monitored at cellular level. Ethanolic

extracts of wormwood, rich in flavonoids and phenolic acids, showed a good free radical scavenging activity, assayed by electron spin resonance spectroscopy, and cytoprotective effect against oxidative damage in cells. Also, Phytochemical analysis showed the absence of alkaloids and anthraquinones but indicated the presence of glycosidic sugars and saponins, which showed the characteristic saponic properties in aqueous alcoholic extracts such as foaming, toxicity towards fish and hemolytic activity. These results provide scientific support for the traditional use of *A. absinthium* in treatment of skin disorders. It is also employed in combination with other herbs for treating wounds.

Key Words: *Artemisia Absinthium*, Wound, Antioxidant Activity, Wormwood Extract

P45

Synthesis of Interpenetrating Polyvinyl Alcohol (IPN-PVA) Hydrogels Modified by Fe₃O₄ Nanoparticles and Gamma Used in Regenerative Medicine

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Background: IPN hydrogels are double network polymers which benefit from a hybrid of both chemical and physical bindings. The chemical and physical bindings are responsible for high elasticity and ductility behavior of the hydrogels, respectively. They adsorb a huge amount of water which mimics the behavior of tissue and scaffold. Because of such properties, hydrogels are widely used in regenerative medicines such as wound dressings, scaffold for tissue regeneration, bone regeneration, cartilage regeneration and etc. The main concern about the use of hydrogel is their low

mechanical properties. The objective of this research is to improve the mechanical properties of hydrogels using Fe_3O_4 nanoparticles and gamma radiation. Experimental results suggest that gamma causes a chemical crosslinking while iron nanoparticles cause significant hydrogen bindings in PVA hydrogels.

Material and Methods: 1.32 gr of PVA is dissolved in 5 gr of deionized water for 2 hours at 90 degrees centigrade. Then, 0.029 gr of borax salt and 0.5 gr of nanoparticles dispersed in 2.68 gr of water. The second mixture is finally added to the PVA solution and mixed in an ultrasonic. PVA is a biocompatible and hydrophilic polymer with the ability to form an IPN. Fe_3O_4 is a biocompatible particle with a great magnetic property. Dopamine is used as an adhesive material. Borax salt forms an anchor between nanoparticles and hydrogels.

Results and Discussions: In this study, two sets of experiments were performed including a nanoparticles-modified and nanoparticles-dopamine modified nanoparticles. The first and second sets formed a physical and chemical binding respectively. The experimental results show that the hydrogels modified with dopamine show a better mechanical properties compared to the pure hydrogels and hydrogels modified with nanoparticles. This behavior is attributed to the stronger binding in IPN hydrogels.

Conclusion: We have shown that the dynamic mechanical properties of the polymers are improved by forming a double networking structure instead of a regular structure. This improvement is mainly due to the crosslinking of dopamine and also better connection of the nanoparticles to the scaffolds. We have presented a new model which can be used widely whenever a hydrogel with stronger mechanical properties are required, especially in regenerative studies.

Key Words: IPN Hydrogels, Iron Nanoparticles, Dopamine, Borax Salt

P46

Study of Proliferation and Cell Programmed Death of Bone Marrow Mesenchymal Stem Cells in Rat in Simulated Microgravity Condition

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Background: In recent years, biophysical forces increasingly were used as a novel culture methodology for cells manipulating and differentiation along with biochemical techniques. Microgravity, as a mechanical factor, has been demonstrated to stimulate the cell proliferation and differentiation. In this study, we investigated the impact of simulated microgravity condition generated by one-axis clinostat on cell proliferation and apoptosis rate of bone marrow mesenchymal stem cells (BMSCs) in rat.

Methods: After isolation and characterization of BMSCs from rat, they exposed to simulated microgravity condition for 3 days that generated by one-axis clinostat. After 3 days, control and microgravity samples were stained by PI and cell proliferation and apoptosis rate were investigated.

Results: We found that isolated cells were expressed mesenchymal markers. Also, our results showed that 3 days of simulated microgravity had no statistically significance effects on cell proliferation and apoptosis rate.

Conclusion: Previous studies have shown that simulated microgravity induced by random positioning machine altered cell proliferation and increased apoptosis rate. Based on our data, it seems that shear stress generated by one-axis clinostat is far less than the random positioning machine. Therefore, we suggest one-axis clinostat for cell differentiation studying and cell therapy

investigation in microgravity condition.

Key Words: Bone Marrow Mesenchymal Stem Cell, Simulated Microgravity, Clinostat, Rat

P47

Photodynamic Therapy for Basal Cell Carcinoma: Effective Response Rate

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Background: The most frequent type of non-melanoma skin cancer in human which increasing worldwide is basal cell carcinoma (BCC). For treatment of BCC various invasive and non-invasive methods have been investigated. Photodynamic therapy (PDT) well known as a non-invasive medical procedure which has maximum efficacy, good cosmetic outcomes and minimal scar formation. However, the response rate for it in clinical studies is varies widely.

Objective: This study aims to evaluate PDT cure rate and compare its efficacy with other conventional procedures, by reviewing numerous related studies in the field.

Methods: Articles which were related to human clinical trial searched in National Library of Medicine PubMed with using the terms basal cell carcinoma, photodynamic therapy, BCC, PDT, clinical trial and human study.

Results and Conclusion: Results from 34 related articles that obtained from PubMed database indicates the efficacy of PDT was between 50% to more than 90% after 3 months to 10 years follow up. At the interval of 6-84 months, recurrence rate of basal cell carcinoma it was between 4% to over 30% in different studies. Despite high efficacy of PDT in basal cell carcinoma treatment, it can be considered as an alternative method in special conditions compare to conventional methods.

Key Words: Clinical Trial, Photodynamic Therapy, Basal Cell Carcinoma

P48

Antimicrobial Peptides Amplifying Healing

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Background: AMPs perceived to act as multifunctional effector molecules. Amp's kill the pathogens directly, balance immune responses and interfere in wound healing, cell differentiation and reepithelization and interplay synergistic with the skin microflora. These show that Amps are vital in the process of maintaining an optimal and functional skin barrier. Immunomodulatory. Some AMPs that target the host immune system rather than the pathogen offer an excellent opportunity to minimize the risks of pathogen resistance to these compounds.

Methods: AMPs enhance wound closure in skin and other tissues through specific cell signaling pathways in epithelial cells. They are required for activating vessel regrowth during wound angiogenesis, which may implicate their role in chronic wounds resulting from poor vascularization. The main sources of antimicrobial peptides can be different such as plasma proteins, neutrophils, and keratinocytes. AMPs contribute to the regulation of extracellular matrix proteins and enzymes to favor matrix deposition during the remodeling phase of tissue repair.

Results and Conclusion: This review shows that, hemostasis, inflammation, proliferation, and tissue remodeling all together are different stage of the wound healing process. Antimicrobial peptides which play a pivotal role in antimicrobial defense at all these stages in wound healing, considering the

stage of wound healing the main sources of antimicrobial peptides can be different such as plasma proteins, neutrophils, and keratinocytes.

Key Words: Wound Healing, Antimicrobial Peptides, Immunomodulatory

P49

A Review of Effect of Hydradermabrasion Combined with Topical Negative Pressure Therapy in Treatment of Diabetic Foot

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Background: Ulceration of the foot in diabetes is common and disabling and cause substantial morbidity, impairs quality of life, engender high treatment costs and frequently leads to amputation of the leg. Unfortunately, treatment provided for foot ulcers is often inadequate resulting in avoidable complications and unnecessarily extended healing times.

Topical negative pressure (TNP) therapy is widely used in the treatment of acute wounds in vascular patients on the basis of proposed multifactorial benefits, and Hydradermabrasion is a relatively new procedure that combines crystal-free microdermabrasion with the pneumatic application of an antioxidant-based serum.

Methods: A comprehensive electronic search was done in clinical evidence databases for clinical trials, systematic reviews and health technology studies. The databases and search engines were PubMed, Scopus and Database of Abstracts of Reviews of Effects (DARE).

The search was done up to August 2017. Key references were manually searched to find relevant studies.

Results and Conclusion: The precise mechanism of action TNP Therapy facilitates improved wound healing include: fluid removal, blood flow changes, microdeformation, macrodeformation, and maintenance of wound hemostasis. There are also several secondary effects likely pathways that alter the biology of wound healing including angiogenesis, neurogenesis, granulation tissue formation, cellular proliferation, differentiation, and migration.

Hydradermabrasion effectively improved skin quality both clinically and histologically. After hydradermabrasion, skin polyphenolic antioxidant levels were increased. Significant increases in gene expression of the c-Jun component of activator protein-1, interleukin 1 β , and tumor necrosis factor- α , MMP-1, MMP-3, and MMP-9 were found with crystal abrasion combined with negative pressure. Many new dressing techniques has been introduced out of which one newer technique is negative pressure therapy/ dressing. hydradermabrasion combined with NPWH coverage facilitates wound healing, reduces the length of hospital stay, and improves esthetic and functional results in extensive diabetic foot ulcer. Further more research is needed in this area.

Key Words: Hydradermabrasion, Negative Pressure Therapy, Mechanism, Diabetic Foot

P50

The Importance of Education the Principles of Diabetic Foot Ulcer Prevention to Diabetic Patients

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Background: Diabetes is referred to as an

epidemic, a major health problem in the world and in Iran. Among the complications of diabetes mellitus, foot ulcers and amputations due to non-compliance with safety and preventive measures are increasing and require more attention. According to the studies, the application of educational strategies is the most important way to prevent foot ulcers in diabetic patients. In this article, we have tried to explain the importance of education the principles of diabetic foot ulcer prevention to diabetic patients.

Methods: The information in this article has been reviewed through a search of databases such as SID, PubMed, Google Scholar, and library resources released over the last ten years.

Results: Education is one of the most important ways of preventing, treating and controlling chronic diseases, including diabetes, and day to day it contributes more percent in care and recovery, so that education is not a part of treatment on the contrary is treatment. And the International Diabetes Federation believes that with proper education, can be reduced up to 80% of diabetes complications. The results of the studies have shown that improving the treatment status of the patients and education them reduces the amount of amputation by 40-50%. Nurses as the most important member of the health care team can play a vital role in preventing, timely diagnosing and educating the patient.

Conclusion: Education is the first necessary step in empowerment of diabetic patient and is one of the most important tasks of nurses in preventing and controlling diabetic foot ulcers. In this regard, nurses can provide information about the principles and methods of prevention and control of diabetic foot ulcer by providing a patient-centered environment and effective communication with patients, and can increase the level of health literacy and self-care of diabetic patients.

Key Words: Diabetic Foot Ulcer, Prevention, Education, Nurse.

P51

A Novel Biopolymer Based Formulation Containing Graphene Oxide Nanoparticles as a Potential Antimicrobial Wound Dressing System

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Background: Unique properties of biopolymers such as biocompatibility, biodegradability and non-toxicity, make them attractive materials to use as wound dressings substrates. Besides, biopolymers expressed desired mechanical properties which are required for wound dressings. Graphene Oxide (GO) is an oxidized form of graphene which is soluble in water and some polar solvents. This nano-material has good features to use in wound dressings such as excellent biocompatibility and good antibacterial activity.

Methods: Biopolymeric films containing Graphene Oxide were prepared by casting method and the antibacterial activity of films against *Staphylococcus saprophyticus* (gram+) *Pseudomonas aeruginosa* (gram-) was performed using culture turbidity. To examine the bacterial growth rate, the microorganisms were grown in Nutrient Broth in the presence of biopolymeric films and the bacterial growth inhibition was achieved by measuring the optical density (OD) of the cultures.

Results: Biopolymeric substrate containing 3% of plasticizer and 2 mg/ml of Graphene Oxide nanoparticles reveal good mechanical properties and desirable antibacterial effects on *Staphylococcus saprophyticus* and

Pseudomonas aeruginosa.

Conclusion: This study introduced a novel biopolymeric nano based formulation as antibacterial wound dressing system.

Key Words: Biopolymer, Graphene Oxide, Wound Dressing, Antibacterial Activity

P52

Aloe Vera Efficacy for Burn Healing: A Review

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Background: Many alternative therapies are used as first aid treatment for burns, despite limited evidence supporting their use. Although using Aloe Vera is a way for boosting the wound healing process, clinical evidence still remained unclear.

Methods: We conducted a systematic review on in vitro and vivo studies including controlled animal studies and randomized, double-blind clinical trials to determine the Aloe Vera efficacy in clinic. We electronically searched related studies in PubMed, Cochrane Library and Scopus from 1987 till September 2017. Only Papers discussing on healing activity of Aloe Vera, Aloe-derived products and a combination of Aloe Vera and other dressings as a treatment of acute wounds specifically caused by burn or in patients admitted to hospital were included. There were no restrictions on any language of publication. Reviewer extracted data on study characteristics, patient characteristics, and Gross morphology of the intervention, Frequency and duration and outcome measure.

Results: in vivo studies demonstrated a significant difference in burn wound healing between control groups and aloe treated ones. Due to the differences of products and outcome measures, there is paucity to draw a specific conclusion regarding the effect of Aloe Vera

for burn wound healing

Conclusion: Cumulative evidence on in vivo studies ends to support that Aloe Vera might be an effective intervention used in burn wound healing. Further, in vitro studies and trials with adequate information should be conducted to determine the effectiveness of Aloe Vera or its products.

Key Words: Aloe Vera, Wound, Wound Healing

P53

Using Maggot Debridement Therapy to Remove Main Bacteria Species from Diabetic Foot Ulcers in Tehran, Northern Iran

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Background: Diabetic foot ulcer is a major long time complication of diabetes mellitus. Diabetics have a 15% higher risk for amputation than the general population due to chronic ulcers from neuropathy, which inhibits nociception and the perception of pain. Thus patients may not initially notice small wounds

to legs and feet, and may therefore fail to prevent infection or repeated injury. **Aim:** This study was aimed at using medical maggot for removal of main bacteria pathogens in diabetic foot ulcers and as a method of bio surgery in Tehran, Northern Iran.

Material and Methods: A randomized case-control clinical trial method was used in this study. A total of fifty (50) clients with diabetic foot (Wagner's grade II or III) were randomly selected and recruited into the study from December 2015 to March 2016. Clients with severe infection requiring hospitalization, gangrene, systemic diseases such as collagen-vascular diseases and evidence of ischemia were excluded from the study. The clients were categorized into two groups, case and control. The maggot debridement therapy (MDT) was included into the routing treatment protocol of the wounds of those categorized as case group, whereas wounds of those categorized as control group were treated with routing healing protocol. Larvae of *Lucilia sericata* prepared and sterilized at the Department of Medical Entomology and Vector Control, School of Public Health, Tehran University of Medical Sciences was used as the MDT agent. The Maggots were applied directly on the wound at a dose of 5-7 maggots per 1 cm² of wound surface. The application of MDT on the wound was done at an interval of 48 hours. Thus leaving the larvae to be active in the wound environment for 48 hours. Wound swab microscopy, culture and sensitivity for bacteria isolation and identification were done before MDT and after washing the larvae out in both the case and control groups. Standard microbiological procedures including Coagulase, Catalase, DNAase, Phosphatase and Pigment tests were also used for confirmation and identification of bacteria.

Results: Data were analyzed statistically. The ratio of men to women in the case group was 3:2 and 2:6 for the control group. Average age in the case group was 59.4 and 61.9 for

control group respectively. Nine (9) and seven (7) wounds were infected with *S. aureus* and *P. aeruginosa* in the case and control group respectively. First application of MDT, reduced the number of infected cases in the case group to 5 (first use of larvae) while it remained constant in control group. After the second use of larval therapy in control group, there was only one case with infection but other test showed significant difference in comparison of control group ($p=0.004$). However there wasn't any reduction in the cases of control group during this period of treatment. The reduction in the cases which were infected with *S. aureus* in treatment group has been analyzed using McNemar test excluding the control group. Similarly the significant reduction cleared in first sampling, after 2 days ($p=0.031$), and after second sampling, after 4 days ($p=0.0$). McNemar test has been done to find the effects of MDT on removing of *P. aeruginosa* in treatment group without comparing with control group. The reduction of the infected cases with this bacteria didn't show significant difference after 2 days ($p=0.1$). But after 4 days, the second use of larvae, the reduction was significantly differed ($p=0.002$).

Conclusion: Several mechanisms have been mentioned for the antimicrobial activity and effectiveness of MDT, Which in turn depends on the quality of larvae. Results of the present study demonstrate the ability of MDT to remove main bacterial species either in infected cases with one organism *P. aeruginosa* or *S. aureus*, or in infection with both pathogens.

Key Words: Maggot Debridement Therapy, *Lucilia Sericata*, Chronic Wounds, *Pseudomonas Aeruginos*, *Staphylococcus Aureus*, Caliphoridae, Diabetic Foot Ulcer, Debridement, Healing, Disinfection

P54

The Effects of Electrical Stimulation on Repair of Bed Sores in Subjects with Spinal Cord Injuries

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Background: Due to unsatisfying results of drug treatments for healing bed sores, studies incline to concentrate on non-drug treatments such as electrotherapy. Also because of burning risk of direct currents (continuous/galvanic), selecting the best current is still under discussion. It seems that using a pulse electrical stimulation such as High-Voltage Pulsed Current (HVPC) can effects more in healing the resistant bed sores in spinal cord injury patients without any burning risk. The purpose of this study is to show the results of employing HVPC on treating of bed sores.

Material and Methods: 24 patients with spinal cord injury (SCI) with bed sores grade III and IV around the pelvic, were randomly allocated into two equally membered groups: experimental group (HVPC+ routine nurse care) and control groups (placebo HVPC+routine nursing care). Electrodes were connected according to protocol. Then, the current was increased gradually before observing the muscle contraction. In control group everything was exactly similar to the experimental group. However, the timer and power light was on, but no output. The treatment time was 20 minutes in each session, once a day and lasted for 12 consecutive days. The wounds were photographed at day 1(before starting the treatment) and day 6 and day 12(after the last treatment session) and the wound surfaces were calculated by AutoCAD Software.

Results: The results showed that after the treatment period, the wound area in experimental group was reduced by 60.9% and in control group

the reduction was 18%. That showed a significant 42.9% difference between the groups. (P=0.006)

Conclusion: The results confirmed a very positive effect of the HVPC electrical stimulation on the repair of bed sores resistant to the routine medical approaches in SCI subjects and also HVPC accelerated the healing process.

Key Words: Electrotherapy, High-Voltage Pulsed (UVP) Electrical Stimulation Current, Pressure Sore, Spinal Cord Injury, Wound Healing

P55

Atmospheric Pressure Plasma: Novel Therapy for Diabetics Wound Healing

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Background: The aim of this study is to evaluate the efficacy and safety of non-thermal plasma irradiation for the induction of wound healing in diabetic neuropathic foot ulcers. Plasma Jet was employed for ionization of helium gas. The generation of ions and free radical in ambient temperature accompany with sterilization and chemical process will lead to wound healing and tissue repair.

Material and Methods: The plasma jet was used for generating the helium plasma in frequency of 6 kHz and 10 kV. Twenty patients with diabetic foot wounds for at least 3 months were included

in this double-blind randomized clinical trial. Patients were randomized to receive placebo treatment or non-thermal plasma in addition to conventional therapy. Patients were followed for 4 weeks. The helium plasma groups were exposed 5 minutes every other day for 9 sessions. Ulcer size reduction and the number of patients with complete healing was compared between the non-thermal plasma therapy and placebo groups.

Results: After 2 weeks, the size of ulcers decreased significantly in the non-thermal plasma group ($p < 0.05$). The results showed that after 3 weeks of the plasma treatment most of the diabetic wound patients were healed completely in compare to the control group. In addition, the bacterial lab tests in treated patients were negative. Moreover, the results confirm that the physical activity were improved in the treated group, No adverse events were reported in the plasma treated patients.

Conclusion: The results of this preliminary study showed that non-thermal plasma may be a promising option without adverse effects in the treatment of non-healing diabetic ulcers.

Key Words: Plasma, Diabetes, Diabetic Ulcers

P56

Treatment of Non-Healing Sternum Wound after Open-Heart Surgery with Allogenic Platelet-Rich Plasma and Fibrin Glue-Preliminary Outcomes

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Background: Non-healing wound in the sternal region after coronary arteries bypass graft surgery is a serious complication. For healing a chronic wound, several novel approaches have been

proposed recently such as using bone marrow stem cells, platelets and fibrin glue (PFG); but a non-invasive method is highly desirable in the first approach for treatment. The current study was undertaken to evaluate the effect of the combination of PFG in one treatment.

Material and Methods: We report on the treatment of six patients with life-threatening chronic sternum wounds, which caused septicemia with multi-drug resistant pathogens. The ulcers were extensively debrided initially and were measured and photographed at weekly intervals. The combination of PFG was applied topically on the wound after every 2 days.

Results: The wounds were completely closed in five patients and significantly reduced in size in one. There was no evidence of local or systemic complications and any abnormal tissue formation, keloid or hypertrophic scarring.

Conclusions: Our study suggests, in the first approach, PFG can be used safely in order to heal a non-healing sternum wound following coronary artery bypass surgery.

Key Words: Chronic Wounds, Fibrin Glue, Platelet-Rich Plasma, Sternal Wound

P57

In-vivo Studies of Bioactive Glass Scaffolds

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Background: Bone defect is a common deformity caused by tumor, injury, and congenital malformation. Therefore, will be to develop a kind of bone substitute with excellent biologic and mechanical properties

for bone defect repair. Bioactive ceramics, in porous granular forms, have been widely investigated for healing bone defects. Bioactive glass (BG) is an attractive scaffold material. In addition to its rapid rate of bonding, which is advantageous for early stability, bioactive glasses stimulate osteoprogenitor cell function and possess controlled resorb ability and proven biocompatibility. Through a series of interfacial ion exchange reactions at the glass surface, a silica-rich gel layer forms upon which a calcium phosphate-rich (Ca-P) surface layer forms. With the subsequent adsorption of serum proteins on the Ca-P layer, cellular function is enhanced in vitro and in-vivo. Thus, as a carrier for osteogenic cells, bioactive glasses potentially possess unique properties. The glass particles were cytocompatible and could support the attachment of cells. All the synthesized glasses increased the expression level of osteogenesis and angiogenesis related genes in in vivo studies. The development of advanced bioactive glass based constructs exhibiting both osteogenic and angiogenic potential, i.e. the ability of bond tightly to the host tissue, being mineralized and vascularized, provides a valuable solution for the regeneration of osseous defects and hard and soft tissue interfaces.

Key Words: Bioactive Glass, In-vivo, Bone Tissue

P58

The Prevalence of Diabetic Retinopathy and Risk Factors in Iran: A Review Study

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Background: Today, diabetes is one of the most remarkable health and socio-economic problems in the world. Iran is ranked third in the world after Egypt and Pakistan. Diabetic

retinopathy is the most commonly diagnosed chronic ocular disease of diabetes. Some studies have categorized retinopathy as one of the first five causes of blindness. Different factors play a role in the development of diabetic retinopathy, which can be related to the course of the disease, serum cholesterol and triglyceride levels, type of blood glucose control, blood pressure, Proteinuria, level Creatinine and blood urea.

Considering the increasing prevalence of diabetes and its disabling complications worldwide and in Iran, this review-descriptive study was conducted to determine the prevalence and causes of diabetic retinopathy in Iran. It is hoped that with more knowledge of this issue and related factors, more systematic and better ways to control it could be presented.

Methods: This article is an overview study conducted using library resources and databases and web searches on the sites PUBMED, SID, CIVILICA, GOOGLE SCOLAR, SCOPUS from 2000 to 2016 and aims to produce a result. A general overview of what has been done so far

Results: According to studies carried out in Shahroud, Qom, Mashhad, Sari, Kashan, Yazd, Isfahan, Tehran, Kermanshah and Hamedan, the lowest prevalence rates for Shahroud were 29.3% and the most common ones were Hamedan, 52.22%.

Conclusion: By exploring the studies in different cities of Iran about the prevalence of retinopathy and its risk factors, the prevalence of retinopathy in Iran varied from 29.3 to 29.33%. With the early diagnosis of diabetes and the control of the accelerating factors of diabetic retinopathy and effective and timely diagnosis, the progression of the disease in this population can be reduced.

Key Words: Diabetic Retinopathy, Risk Factors, Diabetic

P59

A Combination of Flow cytometry and Monte Carlo Method in Wound Regeneration Gene Expression to Improve Wound Healing Results

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Background: Wound healing is a complex and dynamic biological process that involves the cooperation of multiple cell types. Suitable phenotypic conversion is essential for cell regeneration and through this conversion, gene expression and cell protein content are the key points. Cell analysis tools promise to further define the global picture of this complex progression of events and Cell cycle distribution.

Material and Methods: We considered different cell analyzing to find a suitable method which fulfil our desire of accessing this progression and we also searched of a computational algorithm to determine and generalize the result. Flow cytometry is a laser- or impedance-based, biophysical technology suspending cells in a stream of fluid and passing them through an electronic detection apparatus. A flow cytometer allows simultaneous multiparametric analysis of the physical and chemical characteristics of up to thousands of particles per second include Protein expression and total RNA content. Monte Carlo methods are a broad class of computational algorithms that rely on repeated random sampling to obtain numerical results. Their essential idea is using randomness to solve problems that might be deterministic in principle. **Results:** Different healing methods has been explained and employed to enhance wound healing in for adult mammals, including humans,

to move towards near fully regeneration in wound healing Although the sequence of events leading to wound repair has been described at the cellular and protein level, this process has yet to be studied while supporting methods are employed. Our study suggest using of flow cytometry and Monte Carlo method to assess how different healing methods affect gene expression and cell cycle and regeneration, and by that, plan some more reasonable and maybe more predictable results in clinical trials, which may lead to achieve the goal of near fully or even completely regeneration, as in some lower vertebrates, including fish (zebrafish), which possess the ability to perfectly regenerate skin, so that the regenerated skin almost indistinguishable from the original one.

Conclusion: Different combination of methods has been considered in wound healing which propose to act as complementary components, we hope that our method of healing assess will offer more suitable combination of these healing methods. Also comparing the results in monotherapy and combination healing therapy is reasonable

Key Words: Wound Healing, Flow cytometry, Monte Carlo, Method, Regeneration Gene

P60

Low-Level Laser Light in the Healing of Burning Wounds: A Comparison between Two Different Wavelengths (656 nm and 695 nm) with Scarheal Cream and a Placebo Group

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Background: Studies on the influence of low-power laser light on wound healing have shown inconsistent results, or, as in the case of burns, are very scarce. We have studied the effects of two different low-power diode laser lights on the healing of burns in rats.

Material and Methods: Forty rats were burned on both flanks and randomly allocated to one of three study groups. In group A, both wounds remained untreated; in groups B and C, one wound each was irradiated with 656 nm or 695 nm laser light with scarheal cream (1.5 J/cm²), whereas the other wound remained untreated. Diameter, redness, and edema of the wounds were examined daily.

Results: Between and within groups, diameter, redness, and edema of the wounds were similar throughout the entire observation period. Irradiation of the burns accelerates wound healing when compared with control wounds.

Conclusion: We conclude that Scarheal Cream with 695nm nor 656 nm low-power laser light produced any beneficial effects on the healing processes of burns in rats.

Key Words: Low Level Laser Light, Scarheal, Burning Wounds, Healing

P61

The Effect of Topical Halibut Spray on Healing of Diabetic Wounds on Human and Animal Models

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Background: Chronic ulcers are still a serious problem in patients referring to dermatologists and plastic surgeons. Diabetic is a common cause of delayed or damaged wound healing. 15% of diabetic patients suffer from lower limb ulcers. Low diabetic ulcers with high morbidity are associated with. Spray halibut with a high percentage of zinc is 33% and a derivative of vitamin A, which is derived from halibut fish and has a significant effect on proliferation and differentiation of the extracellular connective tissue proteins.. Reporting on its effect in this study, the aim of this study was to determine the effect of halibut spray on semen the wound was evaluated in animal models and human.

Methods: This study was a case-control study performed on 48 Wistar male rats. After diabetics, the animals were divided into two groups. In both groups, a full-thickness wound was created at the dorsal surface of the mouse. The case group was treated with halibut spray and in the control group with mupirocin and zinc oxide. Subsequently, both groups were examined on macroscopic and histological site on day 5, 10, and 15, and the data were analyzed by ANKVA And t were analyzed.

In human studies, patients with diabetic foot ulcers with severity of 1 to 3 Wagner were enrolled. After giving consent, patients under standard debridement were treated with antibiotics. Patients were randomly divided into two groups: halibut and common bandage (mupirocin, Jelly gas, zinc oxide) and washed and dressed in both groups.

Results: In macroscopic examination, animal wound healing in the group treated with halibut on the fifth and tenth day was associated with accelerated wound healing (P = 0.002 and P = 0.001, respectively), and on the fifteenth day of the complete effect and healing was found. In the histological study on the fifth day, there was a significant increase in budding tissue in the group and an increase in the thickness of the epidermis and collagen. In the study of human studies treated with halibut, the increase in the granulation of

the Patient sample treated was evident and the granulation tissue had increased the surface of the wound, while Excessive exudates are still high in the common dressings treated, and the onset of wound healing has not begun.

Conclusion: The initial phase of the study showed that the effect of halibut spray on the microscopic load and with the recovery of diabetic wounds was more than just the usual dressing, and further studies are needed for further investigation.

Key Words: Healing Wounds, Halibut, Diabetes Mellitus, Mice, Human Studies

P62

An Applied-Scientific Study of Wound-Healer Ointment Effects on (Diabetic, Burn, Bedsore) Wounds

Rahimpour-Heidarloo Rasoul

Background: The purpose of this study was to evaluate the effects of Wound-Healer ointment on histomorphometric changes in healing of diabetic, burn and bedsore wounds.

Material and Methods: In this paper, 20 male Wistar rats were divided into two groups (1 and 2). 3 cm wounds were created on the left side of the spine and the wound healing process was microscopically and macroscopically examined.

Results: The results of testing Wound-Healer ointment for determination of MIC, MBC, MFC and the diameter of the growth inhibition zone by microdilution broth method are as follows:

MIC for gram-negative bacteria (*Escherichia coli*) = 10000 µg/ml

MBC for gram-negative bacteria (*Escherichia coli*) = none

Diameter of growth inhibition zone = 14 ml (moderate)

MIC for strand fungi (*Aspergillus fumigatus*) = 20,000 µg/ml

MFC for strand fungi (*Aspergillus fumigatus*) = none

Diameter of growth inhibition zone = 11 ml (moderate)

MIC for yeast-like fungi (*Candida Albicans*) = 10,000 µg/ml

MFC for yeast-like fungi (*Candida Albicans*) = none

Diameter of growth inhibition zone = 14 mm (moderate)

Conclusion: The results of testing Wound-healer Ointment for the evaluation of its anti-inflammatory effects following the induction of inflammation with PHA (phytohemagglutinin) in rats' skin are as follows:

Sample: Wound-healer ointment

The result of the test was positive in 24 hours and inflammation was 80% reduced; it was very strong in comparison with the control group (glycerin). It also had a systemic effect: inflammation in the other side of the rats' body, which was left untreated, was 45% reduced.

The inflammation healed generally in 72 hours after the onset; while 60% of inflammation in the control group still existed.

According to physicochemical tests:

1. PH= 5%; Uncertainty= 22%; Results= 6.21; Method: Electric PH-Meter Reference; SOP: Standard No. 2288

2. Humidity; Uncertainty= 678%; Results= 0.04; Method: Ironing; SOP Reference LQS-W50515701

Key Words: Wound Healing, Wound-Healer Ointment, Rat, Diabetic Wound, Burn Wound, Bedsore

P63

A Randomized Comparative Trial between Titalyse and Silversulfadiazine in the Treatment of Residual Burn Wounds, Including Safety Analysis

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Background: To investigate and evaluate the clinical efficacy and safety of Titalyse with silversulfadiazine for external use on the management of the residual wounds post-burn.

Methods: One hundred and fifty five wounds of 100 burn patients were enrolled and divided into Titalyse group and silver sulfadiazine group in the multi-center randomized clinical trial. Titalyse was used as the treated group for those who have redness, swelling, and excessive secretion ("heavy" exudates) in the wound, Titalyse was changed once a day. When there is not much secretion in the wound, or redness and swelling were not obvious, the dressings were changed once every 3 days. Silver sulfadiazine was used as control group, which was treated under the usual clinical routine. Healing time was observed up to 20 days. Healing percentage on the 15th day after treatment was determined.

Results: Healing time was 10.40 ± 4.20 days after the application of Titalyse. This was significantly shorter than that of control wounds. The wounds of the trial group healed nearly 5.35 days earlier than the control ones. Healing percentage at 15 days in the trial wounds was 98.77%, which was higher than the control, but there was no significant difference between them. The bacterial clearance rate of the Titalyse group on the 6th and

12th day post-treatment was 19.67 and 29.67%, respectively, which was significantly higher than the control.

Conclusion: Titalyse promotes the healing process of residual wounds post-burn effectively. No adverse reaction of Titalyse was found during the study.

Key Words: Titalye, Residual wounds, Burn

P64

A Novel Biopolymer Based Formulation Containing Zinc Oxide Nanoparticles as a Potential Antibacterial Wound Dressing System

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Background: Wound healing still remains a challenging problem. There are various substances which increase the healing process of the wound. Metal oxide nanoparticles such as Zinc oxide (ZnO) nanoparticle can be considered as a chemical compound with a wide variety of potential applications in medicine. Zinc is normally required for various cellular and enzymatic activities besides playing a major role in wound healing, especially burns. It enhances the wound healing process by remaining at the site for an extended period of time. Zinc oxide nanoparticles possess antibacterial activity against both gram positive and gram negative bacteria. The size and concentration of nanoparticles also influence the wound healing process. Zn ions are released from ZnO and can promote wound healing by enhancing the keratinocyte migration. Furthermore, Biopolymers are non-toxic, biodegradable and biocompatible. These materials can be used as substrates of wound dressing due to their antimicrobial activities.

Methods: In this work Zinc oxide nanoparticles

were incorporated into the biopolymer solution. Biopolymer-Based Nanocomposite Films were prepared by casting method. The prepared films were characterized using X-ray diffraction pattern (XRD), Fourier Transform Infrared Spectroscopy (FTIR) and Scanning electron microscopy (SEM). In addition, water swelling and antibacterial effect of nanocomposite films on *Pseudomonas aeruginosa* and *Staphylococcus aureus* were evaluated.

Results: Biopolymer-Based Nanocomposite Film containing 3% of plasticizer and 3 mg/ml of Zinc Oxide nanoparticles demonstrated good mechanical and antibacterial properties; it could clearly inhibit *Staphylococcus aureus* and *Pseudomonas aeruginosa* growth. The results showed that *Staphylococcus aureus* was extremely sensitive to treatment with Biopolymer-Based Nanocomposite.

Conclusion: This study reports novel Biopolymer-Based Nanocomposite formulation as an antibacterial wound dressing system.

Key Words: Biocompatible Polymer, Nanoparticle, Wound Dressing, Bactericidal Effect

P65

Immobilization of Enzyme on Biopolymer Films for Wound Healing Applications

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The wound process is a complex of physiologic reactions induced by tissue damage. Necrotic tissues are removed using various pharmaceuticals, largely proteolytic enzymes, which are considered the most promising and biologically soft technique. Proteases have long been used in the therapy of the wound process.

In order to improve the use efficiency of neutral proteinase and decrease the cost of production, enzyme immobilization technology is applied. It

is an effective way to perform enzyme reuse and improve its stability. Biopolymers are ideal matrix for immobilization of enzymes. They can be used in the form of a gel, membrane, bead, or powder. Hydroxyl and amino groups present in some biopolymers favor the immobilization process by adsorption and covalent linkage.

In this report immobilization of one protease enzyme on biopolymer was investigated. The conditions for immobilization were optimized. The order of cross-linking was determined by the activity of immobilized enzyme. The characteristics of biopolymer films were examined by Fourier-transform infrared (FT-IR). The thermal stability and optimum temperature of immobilized preparation were further improved, which make it more attractive in the application aspect.

P66

Topical Administration of Mixed Aloe / Chitosan Gel Enhances Wound Healing Efficiently in Rat Full-Thickness Skin Wounds

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Background: Finding optimal treatment for skin wounds especially using natural substances has been of main focus in skin care and cosmetics. Aloe vera has been historically used in wound care and chitosan which is obtained from crustaceans, has a variety of biomedical applications. Accordingly, it seems that a mixture of aloe/chitosan may provide added benefits in wound healing. Therefore, the objective of the present study was to evaluate the effects of a mixture of aloe/chitosan gel in

comparison to each component alone, on the healing of excisional full-thickness wounds in rats.

Material and Methods: Round full-thickness wounds were made on the back of animal necks. Five experimental groups received either no treatment (group 1) or daily topical treatments with 1% CMC (group 2), aloe (group 3), chitosan (group 4) or mixed aloe/chitosan gels (group 5) for 14 days. Wound areas on days 3, 7 and 14 and histopathologic parameters on day 14 were measured for analysis.

Results: Means of wound areas showed a significant decreasing pattern in all groups through days 3 to 14 ($p < 0.001$). Topical treatment of wounds with aloe/chitosan significantly reduced wound areas compared to non- ($p = 0.019$) or 1% CMC-treated ($P = 0.021$) wounds. Histopathological analysis revealed more re-epithelialization, fibroblasts, collagen fibers and less polymorphonuclear leukocytes, new vessels and granulation tissue in wounds treated with aloe/chitosan in comparison to controls ($p < 0.05$).

Conclusions: Aloe/chitosan-treated wounds showed better healing profiles affirming the benefits of using natural bioactive substances in wound healing especially in combination therapy.

Key Words: Wound Healing, Aloe Vera, Chitosan, Rat

Chronic cases of the disease can be caused by various causes, including: traumatic, infectious diseases, systemic or autoimmune diseases such as bullous diseases and lichen planus, neoplastic, patient history, location of the lesions and other characteristics of the wounds, along with histopathologic findings and, if necessary, direct immuno-fluorescence and culture can help to properly diagnose the chronic wound causes. One of the important causes of chronic oral ulcers, which is often neglected from patients due to asymptomatic nature in most cases, is Squamous cell carcinoma. The ulcerative form of this disease is often destructive, therefore the diagnosis of SSC in chronic and prolonged ulcers should be in the mind of the therapist. The purpose of this review article is to investigate the causes of these ulcers, diagnosis and Therapeutic approaches.

p67

Chronic oral ulcers: diagnosis and management

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Oral ulcers are one of the most common causes of referral to dermatologists. One common classification is based on acute, chronic or recurrent cases of the disease.

Best Idea Challenges

in Wound Healing and Tissue Repair

Skin Hydrogel Production from Lactic Acid Bacteria Exopolysaccharides

Executor: **Mahdieh Shirzad**

Members: **Seyed Mohammad Hossein Modarresi, Elaheh Motavasseli**

Study on Nanoethosomal Gel Containing Silver Sulfadiazine and Curcumin for Healing Second - Degree Burns

Executor: **Seyede Hamideh Razavi**

Members: **Mohammad Hassan Darvishi, Abbas Bahador**

Kiwi - Loaded Wound Dressing Mat Based on Electrospun Nanofibrous Chitosan and Economical Feasibility Study by Comfar Software

Executor: **Atefeh Sadeghi Lari**

Members: **Payam Zahedi**

Application of MicroRNAs Regulating Hippo Signaling Pathway in Tissue / Wound Healing

Executor: **Dorsa Morshedi Rad**

The Effects of Azulene on TNF- α & IL-8 Factors During Ripairing Process of Skin Wound of BALB/c Mice

Executor: **Faezeh Vahdati**

Members: **Mohammad Afshar Ghouchani, Mohammad Mehdi Hassanzadeh Taheri, Mahmoud Zardast**

The Effect of Coumarin on TGF β 1 Factor During Repairing Process of Skin Wound of BALB/c Mice

Executor: **Maryam Honarmand**

Members: **Mohammad Afshar Ghouchani, Mohammad Mehdi Hassanzadeh Taheri, Mahmoud Zardast**

Investigating the Effect of Honey Nano Emulsion on the Wound Repair

Executor: **Syed Mehdi Agh**

Loading of Exosomes Derived from Mesenchymal Stem Cells with Ginseng Extract (Ginsenoside GRg3) to Repair Spinal Cord Injury

Executor: **Tahereh Jalilvand**

Members: **Hassan Namdar, Reza Salari Nia**

Synthesis of Color Changing Wound Dress for Early Detection of Infection

Executor: **Ghazaleh Shineh**

Transplantation of Mesenchymal Stem Cells Primed with TLR-3 and PolyIC Agonists or with TLR-4 and LPS for Tissue Repair

Executor: Niloufar Karami Chamgardani, Ali Mohammad Dehghani Firouzabadi

Design and Manufacture of Polycaprolactone, Chitosan, Polyvinyl Alcohol Nanofiber Wound Dressing Containing Zizyphus Spina - Christi Extracts for Wound Healing

Executor: Mahsa Jan Mohammadi

Members: Seyed Mohammad Sadegh Nourbakhsh

Design and Fabrication of Portable Cold Atmospheric Pressure Plasma Jet for Wound Healing and Skin Rejuvenation

Executor: Hamed Mahdi Kia

Members: Babak Shokri, Pegah Asadi, Shima Bab Salam

Investigating the Effects of pH-Sensitive Alginate Film as Carrier of Nanoparticles Containing Specific Ratios of Drug in the Rat Wound Healing

Executor: Seyedeh Raheleh Ahmadian

Natural & Herbal Ointment to Treat Burns

Executor: Seyedeh Simin Dakhilpour, Saeid Naseri

Repairing and Angiogenesis Effect of Resveratrol on Skin Wound Healing of BALB/c Mice

Executor: Asma Moghadam

Members: Mohammad Afshar Ghouchani, Mohammad Mehdi Hassanzadeh Taheri, Mahmoud Zardast

Tissue Repair by Applying Sound Vibration According to a Coherent Heart Rhythm on Heart

Executor: Monireh Sadat Mousavi

Members: Gholamhossein Riazi

Targeted Delivery of CRISPER/

Cas9 to Repair for Heart Tissue after Heart Infarction by Modified gRNA Using a Flexible Aptamer-PEGylated Liposome

Executor: Vahideh Asadollahi

Members: Fatemeh Sheikh Nezami, Shima Toghiani, Shima Rahmati

Resizable and High Strength Hexagonal Spandex Band Aid

Executor: Mehrdad Khorsandi

Evaluation the Effect of Chitosan / Zinc / Royal Jelly and Melilotus Nanocomposite on Wound Healing

Executor: Shima Rahmati

Members: Vahideh Asadollahi, Danial Khezri, Neda

Katorani, Rojin Ramezani, Farshad Yazdani

Smart Biomedical Hydrogel Nanocomposite Wound Dressings For Drug Delivery and Wound Healing Based on Polyvinyl Alcohol / Nano Graphene Oxide and Nano Polydopamine

Executor: **Elnaz Famkar**

Members: **Gholamreza Pircheraghi, Hossein Nazokdast**

Ring Dressing Heals for Fixing a Foreign Objects

Executor: **Fatemeh Paranj**

Designing and Fabrication of Chitosan -Tragacanth- Zinc Nanoparticle Based Sustained Release Nanocomposite Loaded by Medicinal Plant Extracts with Anti - Microbial Properties

Executor: **Mokhtar Nosrati**

Members: **Zahra Shakeran, Zinat Yazdi Niapour**

The Production of Wound Healing Cream from Cuttle Bone of Sepia

Executor: **Hoda Bazireh**

Members: **Homa Bazireh**

Providing a Model in Cell Dimensions and Equivalent Suture Function in Wound Healing to Increase the Repair Speed with Use The Property of P-Fimbriae in E.coli

Executor: **Saeid Rava**

Investigate the effects of local injection of stromal cell-derived factor bonded with hydrogel and in comparison with SDF-1 soaked dressing on diabetic wound healing in diabetic Rats model

Executor: **Siavash Kafian Attari**

Members: **Mohammad Fereydouni, Hossein Javdani, Ali Faraahi**