

## In the name of God



### Personal Information:

Name and Surname: Forough Shams

Date of Birth: 27/04/ 1988

Marital status: Married

Place of Birth: Tehran

Nationality: Iranian

Tel: (+98)21-88666149

09125611136

Email: [forough.shams@sbmu.ac.ir](mailto:forough.shams@sbmu.ac.ir)

[froogh.shams@yahoo.com](mailto:froogh.shams@yahoo.com)

### Employment history:

**Assistant Professor, Regenerative Medicine Institute, School of Advanced Technologies in Medicine Shahid Beheshti University of Medical Sciences, Tehran, Iran**

*Since April 2023*

### Education:

**Ph.D.:** Molecular Medicine, School of Advanced Technologies in Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran (2015-2021)

Thesis: Targeted integration of the *VEGF* gene in dermal fibroblast cells using the CRISPR-Cas9 system and evaluation of angiogenesis potential of manipulated cells in the mice model of third-grade skin wound with polyurethane-cellulose acetate (PU-CA) scaffold

Supervisors: Dr. Azam Rahimpour, Dr. Hamideh Moravvej, and Dr. Bahram Kazemi

**M.Sc.:** Medical Microbiology, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran (2011-2014)

Thesis: Molecular basis of plasmid-mediated quinolone resistance (PMQR) in *Escherichia coli* and *Klebsiella* clinical isolates, their relation with integrase genes and genome typing of PMQR isolates by ERIC- PCR

Supervisors: Dr. Alka Hasani

### **Achievements and Awards:**

- The top student with 1st rank in Master Degree, 2014
- Member of the Gifted & Exceptional Talented Center of Tabriz University of Medical Sciences

### **Practical Skills:**

#### **1. Laboratory skills**

- Primary and lined cell culture
- Isolation, cultivation, and differentiation of Primary stem cells
- Gene transfection and single-cell colony selection
- Application of CRISPR-Cas genome editing system for mammalian/ primary / cell line engineering (Knock-In/Out)
- Molecular methods of RT-PCR, Real-time PCR, RFLP, ARMS, tetra ARMS, and ERIC-PCR
- Plasmid & DNA/RNA extraction & purification, and Cloning
- Troubleshooting of cloning, PCR and Real-time PCR techniques in the laboratory
- Professional design and utilizing primers and probes for PCR and real-time PCR
- Recombinant protein expression
- SDS PAGE & western blot
- ELISA assay & MTT assay
- Exosome extraction
- Transwell invasion assay
- Cancer stem cell
- Synthesis of nanoparticles
- Scaffold characterization

#### **2. Computer Skills**

- ✓ Expert in the Endnote
- ✓ Gene Runner & Oligo7
- ✓ Gene expression software such as REST

- ✓ Snap Gene
- ✓ CRISPOR
- ✓ Designing gRNA
- ✓ Designing Primer
- ✓ Cytoscape
- ✓ FlowJo software programs
- ✓ Microsoft Office Applications (Word, Excel, Powerpoint)
- ✓ Statistical analysis software (SPSS, GraphPad Prism, R, and Excel)

## Scientific Interests:

- ✓ CRISPR/Cas genome editing system for mammalian/stem cell line engineering
- ✓ Stem cell therapy
- ✓ Gene targeting system
- ✓ Design new gene transfer vectors for gene therapy
- ✓ Tissue engineering

## Publications:

1. **Shams F**, Pourjabbar, B, Hashemi, N, Farahmandian, N, Golchin, A, Nuoroozi, G, & Rahimpour A. Current progress in engineered and nano-engineered mesenchymal stem cells for cancer: From mechanisms to therapy. *Biomedicine & Pharmacotherapy*. 2023; doi.org/10.1016/j.biopha.2023.115505.
2. Hashemi N, Tabatabaee SH, **Shams F**, Rahimpour A, Kazemi B, Rajabibazl M, Ranjbari J. Overexpression of SIRT6 alleviates apoptosis and enhances cell viability and monoclonal antibody expression in CHO-K1 cells. *Mol Biol Rep*. 2023; doi.org/10.1007/s11033-023-08483-5.
3. Saghafi Y, Baharifar H, Najmuddin N, Asefnejad A, Maleki H, Sajjadi-Jazi SM, Bonkdar A, **Shams F**, Khoshnevisan K. Bromelain- and Silver Nanoparticle-Loaded Polycaprolactone/Chitosan Nanofibrous Dressings for Skin Wound Healing. *Gels*. 2023; doi.org/10.3390/gels9080672.
4. **Shams F**, Moravvej H, Hosseinzadeh S, Bayat H, Kazemi B, Bandehpour M, Rostami E, Rahimpour A, Moosavian HR. Overexpression of *VEGF* in dermal fibroblast cells accelerates the angiogenesis and wound healing function: *in vitro* and *in vivo* studies. *Sci Rep*. Nov 2022; doi: 10.1038/s41598-022-23304-8.

5. **Shams F**, Bayat H, Mohammadian O, Mahboudi S, Vahidnezhad H, Soosanabadi M, Rahimpour A. Advance Trends in Targeting Homology-Directed Repair for Accurate Gene Editing: An Inclusive Review of Small molecules and Modified CRISPR-Cas9 systems. *Bioict*. 2022; doi: 10.34172/bi.2022.23871.
6. Jeibouei Sh, **Shams F**, Mohebichamkhorami F, Sanooghi D, Faal B, Akbari ME, Zali H. Biological and clinical review of IORT-induced wound fluid in breast cancer patients. *Front Oncol*. 2022; doi: org/10.3389/fonc.2022.980513.
7. Pourjabbar B, **Shams F**, Moghadam M, Ahani-Nahayati M, Azari A, Sefat F, Heidari Keshel S. Recent Emerging trend in Stem Cell Therapy Risk Factors. *Curr Stem Cell Res Ther*. 2022; doi:10.2174/1574888X18666221223104859.
8. Golchin A, **Shams F**\*, Basiri A, Ranjbarvan P, Kiani S, Sarkhosh-Inanlou R, Ardeshtirylajimi A, Gholizadeh-Ghaleh Aziz S, Sadigh S, Rasmi Y. Combination therapy of stem cell derived exosomes and biomaterials for wound healing. *Stem Cell Rev Rep*. 2022; doi: 10.1007/s12015-021-10309-5.
9. Niknam Z, Hosseinzadeh F, **Shams F**, Fath-Bayati L, Nuoroozi G, Mohammadi Amirabad L, Ghafouri-Fard S, Zali H, Rasmi Y. Recent Advances and Challenges in Graphene-Based Nanocomposite Scaffolds for Tissue Engineering Application. *J Biomed Mater Res A*. 2022; doi: 10.1002/jbm.a.37417.
10. **Shams F**, Golchin A, Azari A, Mohammadi Amirabad L, Zarein F, Khosravi A, Ardeshtirylajimi A. Nanotechnology-based products for cancer immunotherapy. *Mol Biol Rep*. 2022; 1-24. doi: 10.1007/s11033-021-06876-y.
11. Rahimpour A, Pourmaleki E, **Shams F**, Payandeh Z, Pourzardosht N, Didehdar M, Gholami M. The effect of Ccnblip1 insulator on monoclonal antibody expression in Chinese hamster ovary cells. *Mol Biol Rep*. 2022; doi: 10.1007/s11033-022-07182-x.
12. Hosseinzadeh S, **Shams F**, Fattahi R, Nuoroozi G, Rostami E, Shahghasempour L, Salehi-Nik N, Bohlouli M, Khojasteh A, Ghasemi N, Peiravi H. Surface coating of polyurethane films with gelatin, aspirin and heparin to increase the hemocompatibility of artificial vascular grafts. *Adv Pharm Bull*. 2022; doi: 10.34172/apb.2023.013.
13. Jeibouei S, Hojat A, Mostafavi E, Aref A, Kalbasi A, Niazi V, Ajoudanian M, Mohammadi F, Saadati F, Javadi SM, **Shams F**, Moghaddam M, Karami F, Sharifi K, Moradian F, Akbari

ME, Zali H. Radiobiological effects of wound fluid on breast cancer cell lines and human-derived tumor spheroids in 2D and microfluidic culture. *Sci Rep.* 2022; doi.org/10.1038/s41598-022-11023-z.

14. **Shams F**, Rahimpour A, Vahidnezhad H, Hosseinzadeh S, Moravvej H, Kazemi B, Rajabibazl M, Abdollahimajd F, Uitto J. The utility of dermal fibroblasts in treatment of skin disorders: A paradigm of recessive dystrophic epidermolysis bullosa. *Dermatol Ther.* 2021; 34(4): e15028.
  
15. **Shams F**, Moravvej H, Hosseinzadeh S, Kazemi B, Rajabibazl M, Rahimpour A. Evaluation of *in vitro* fibroblast migration by electrospun triple-layered PU-CA/gelatin.PRGF/PU-CA scaffold using an AAVS1 targeted EGFP reporter cell line. *Bioict.*2021; 11(5), dio: 10.34172/bi.2021.43.
  
16. Hatamie S, Malaie Balasi Z, Ahadian MM, Mortezaazadeh T, **Shams F**, Hosseinzadeh S. Hyperthermia of breast cancer tumor using graphene oxide-cobalt ferrite magnetic nanoparticles in mice. *J Drug Deliv Sci Technol.* 2021; 65:102680.
  
17. Mahboudi S, Moosavi-Nasab M, Kazemi B, Rahimpour A, Eskandari MH, Mohammadian O , **Shams F**. Utilization of the human gamma-satellite insulator for the enhancement of anti-PCSK9 monoclonal antibody expression in Chinese hamster ovary cells. *Mol Biol Rep.* 2021; 48(5), 4405–4412.
  
18. Golchin A, **Shams F**, Kangari P, Azari A, Hosseinzadeh S. Regenerative Medicine: Injectable Cell-Based Therapeutics and Approved Products. *Adv Exp Med Biol.* 2019; 1-21.
  
19. Golchin A, **Shams F**, Karami F. Advancing Mesenchymal stem cell therapy with CRISPR/Cas9 for clinical trial studies. *Adv Exp Med Biol.* 2019; 8: 89-100.
  
20. Hasani A, **Shams F\***, Pormohammad A, et al. Prevalence Of extended-spectrum  $\beta$ -lactamases and characterization of integron class 1 in extended spectrum  $\beta$  lactamase-producing *Klebsiella Pneumoniae* in Sina Hospital, Tabriz. 2012. *Med J Tabriz Uni Med Sciences Health Services.*2017; 39 (4) 29-35.

21. Pormohammad A, Hasani A, Aghazadeh M, Ahangarzadeh Rezaee M, Hasani A, Nahaei M.R, **Shams F**, Mohammadzadeh A. Prevalence of CTX-3 family gene among clinical isolates of *Escherichia coli* and *Klebsiella pneumoniae* from patients hospitalized in Sina Hospital, Tabriz. *Med J Tabriz Univ Med Sciences Health Services*. 2017; 39(2):25-31.
22. **Shams F**, Hasani A, Ahangarzadeh Rezaee M, et al. Carriage of Class 1 and 2 Integrons in Quinolone, Extended-Spectrum- $\beta$ -Lactamase-Producing and Multi Drug Resistant *E.coli* and *K.pneumoniae*: High Burden of Antibiotic Resistance. *Adv Pharm Bull*. 2015; 5(3):335–342.
23. **F Shams**, A Hasani, A Pormohammad, et al. qnrA implicated quinolone resistance in *Escherichia coli* and *Klebsiella pneumoniae* clinical isolates from a University Teaching Hospital. *Laife Sci J*. 2014; 11 (12s) 1032-1035.
24. **F Shams**, A Hasani, A Pormohammad. The first report of the qnr, aac (6')-Ib-cr and qepA genes in quinolone resistant *Escherichia coli* and *Klebsiella Pneumoniae* in Iran. *Iran J Public Health*. 2014;43(2) 99.
25. A Pormohammad, A Hasani, **F Shams**, M Aghazadeh, et al. Assessment of epsilometer test over molecular detection for quinolone resistance in *Escherichia coli* and *Klebsiella pneumoniae* clinical isolates: A predictable schedule on routine basis. *Life Sci J* 2014; 11(12s):1027-1031.
26. A Pormohammad, A Hasani, **F Shams**, MR Nahaie, et al. Prevalence of Ctx-3 (Ctx-M 3,15,22) Family Gene in Various *E.coli* and *Klebsiella Pneumoniae* Clinical Specimens in Tabriz. *Iran J Public Health*. 2014;43(2):91.

## Poster presentation:

1. Targeted integration of the fluorescent green protein (GFP) encoding gene in fibroblast cells using the CRISPR-Cas9 system in Safe harbor (13 th National and 5th International Biotechnology Congress 2023) **Oral Present**
2. Application of CRISPR/Cas9 system for gene editing in pain. (1<sup>st</sup> Seminar Neuroscience and Anesthesiology 2023) **Oral Present**
3. Lesion of inherited skin diseases and gene therapy. (1st International Iranian Tissue Engineering and Regenerative Medicine Congress (ITERM 2018))
4. Trastuzumab resistant mechanism in HER2-positive breast cancer. (2nd national conference on molecular medicine in diagnosis and treatment of diseases 2016)

5. Occurrence of CTX-M3 type Extended Spectrum Beta Lactamases among quinolone resistant *Escherichia coli* and *Klebsiella pneumoniae* in a tertiary care university hospital in Tabriz. (The 6th International Congress of Laboratory and Clinic 2014) **Oral Present**
6. The first report of the qnr, aac(6')-Ib-cr and qepA genes in quinolone resistant *Escherichia coli* and *Klebsiella pneumoniae* in Iran. (15th International Congress of Microbiology 2014)
7. Observation on integron carriage and incidence of TEM-1/ SHV-1 type beta- lactamase genes among clinical isolates of *Klebsiella pneumoniae* producing extended-spectrum  $\beta$ -lactamases. (15th International Iranian Congress of Microbiology 2014)
8. Prevalence of CTX (CTX-M 3,15,22) family genes in various in *E.coli* and *Klebsiella pneumonia* clinical specimens in Tabriz. (15th International Iranian Congress of Microbiology 2014)
9. Prevalence of class 1 integron and its concomitance with quinolone resistance and ESBL production among *Escherichia coli*: A porosoective study. (The 6th International Congress of Laboratory and Clinic 2014)
10. Comparison of disk diffusion and E-test for detection of quinolone resistance in *K.pneumoniae* and *E.coli*. (8th International Congress of Clinical Microbiology 2014)
11. What determines clinical nature of *Staphylococcus aureus*: Molecular analysis of the Accessory Gene Regulator (agr) Locus and enterotoxin genes. (14th International Iranian Congress of Microbiology 2014)
12. High prevalence of class 1 and 2 integron and its concomitance with Quinolone resistance and ESBL production among *Escherichia coli* and *Klebsiella pneumonia*. (14th International Iranian Congress of Microbiology 2013)
13. Comparison of disk diffusion and E-test for detection of quinolone resistance in *K.pneumoniae* and *E. coli*. (8th International Congress of Clinical Microbiology)

## Research projects:

1. Evaluation of *in vitro* migration of red fluorescent protein (RFP) expressing fibroblast cells co-cultured with adipose-derived mesenchymal stem cells on triple-layered polyacrylonitrile/human growth hormone-gelatin/polyacrylonitrile scaffold (As the main executor of the project).
2. Behavioral evaluation of TAU-induced Alzheimer's model mice under the influence of periodontal ligament stem cell secretion treated with Alzheimer's mouse brain homogenates in three-dimensional conditions
3. Investigating the effectiveness of vitamins on bone regeneration
4. Evaluation of the efficiency of lentiviral vector containing tDNA insulator sequence in GFP reporter gene expression in human fibroblast cell line.

5. Mesenchymal Stem Cells a new therapeutic paradigm in cancer tumors (As the main executor of the project).
6. *In vitro* evaluation of cytotoxic effects of Naringin and Nanonaringin on liver cancer cell line (As the main executor of the project).
7. Systematic review: gene editing by CRISPR system in animal studies of monogenic diseases.
8. Prediction of molecular mechanisms of docetaxel resistance in prostate cancer through the deciphering of regulatory network motifs and their functional analysis.
9. Prediction of the mechanism of lung cancer cells resistance to gefitinib through the extracting of regulatory network motifs and their functional analysis.
10. Prediction of Epidermolysis bullosa (EB) regulatory network through decoding motifs and functional analysis (As the main executor of the project).
11. Immune checkpoint inhibitor and CAR T cells for cancer immunotherapy (As the main executor of the project).
12. Evaluation of *in vitro* migration of red fluorescent protein (RFP) expressing fibroblast cells co-cultured with adipose-derived mesenchymal stem cells on triple-layered polyacrylonitrile/human growth hormone-gelatin/polyacrylonitrile scaffold (As the main executor of the project).
13. Evaluation of neuronal structural changes in the cellular model and in the hippocampus of male rats inoculated with *Cutibacterium acnes*.

### **Finished projects:**

1. Study gene mutation by MAMA PCR for ciprofloxacin and nalidixic acid resistance in clinical isolates of *E.coli* and *Klebsilla pneumonia* and their co- existence with ESBL genes coding for Amber class A serine enzymes (Tabriz University of Medical Sciences, Tabriz, Iran **2014**).
2. Molecular basis of plasmid mediated quinolone resistance (PMQR) in *Escherichia coli* and *Klebsiella* clinical isolates, their relation with integrase genes and genome typing of PMQR isolates by ERIC- PCR (Tabriz University of Medical Sciences, Tabriz, Iran **2014**).
3. Targeted integration of the GFP reporter gene to the genome of HDF dermal fibroblast cells using the CRISPR-Cas9 system (School of Advanced Technologies in Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran **2021**).



4. Evaluation of the effects of gamma satellite insulator sequence on expression of the Alirocumab monoclonal antibody in Chinese hamster ovary cells (Shahid Beheshti University of Medical Sciences, Tehran, Iran **2021**).
5. Mechanism and application of fibroblast cells in skin disorders; As a therapeutic agent (Student Research Committee, Shahid Beheshti University of Medical Sciences, Tehran, Iran **2021**).
6. Targeted integration of the *VEGF*<sub>165</sub> gene into the *AAVSI* locus in fibroblast and its expression analysis (Shahid Beheshti University of Medical Sciences, Tehran, Iran **2022**).

### **Teaching Experience:**

**Ph.D.**, at the Department of Tissue Engineering and Applied Cell Sciences, School of Advanced Technologies in Medicine, Shahid Beheshti University of Medical Sciences (SBMU), Tehran, Iran

### **Books:**

1. **Laboratory techniques in Microbiology & Biotechnology** (as translator 2014).
2. **Molecular medicine genomics to personalized healthcare** (as translator 2022).

### **Executive activities:**

1. Cooperating in organization of the second International Conference on Molecular Medicine in the diagnosis and treatment of diseases (2015).
2. Cooperating in organization of the 14th International Congress of Immunology and Allergy (2018).

