

Mehdi Khanmohammadi

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Personal information

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Educations

- **Post-doctoral Fellow position in Tissue Engineering Research Group**, Department of Tissue Engineering and Applied Cell Sciences, School of Advanced Technologies in Medicine, Tehran University of Medical Sciences, Tehran, Iran (Nov 2017-October 2019)
Supervisor: Prof. Jafar Ai
- **Doctor of Philosophy in Engineering**, Tissue Engineering (Certificate Evaluated by Ministry of Health and Medical Education, IRAN (Program taught in English)(Graduation 2017/6)
Department of Materials Engineering Science, Graduate School of Engineering Science, Osaka University, Osaka, Japan

Thesis theme: Development of natural polysaccharide hydrogels via enzyme-mediated cross-linking as novel substrata in tissue engineering

Supervisor: Prof. Masahito Taya and Shinji Sakai

- **Master of Chemical engineering**, Chemical Engineering, Sahand University of Technology, Iran: 2009 ~ 2011, Class: GPA: 17.07 out of 20
Supervisor: Dr. Ali Baradar Khoshfetrat
- **Bachelor of Chemical engineering**, Islamic Azad University, Iran: 2005 ~ 2009
Class: GPA: 17.22 out of 20

Research experiences

- Post-doctoral in Tehran Medical Science University (Nov. 2017 – Oct. 2019)

Current research activity

- Large-scale Cardiac Tissue Engineering Using Microfluidic Technique and Biomimetic Hydrogel Construct (Supported by **NIMAD Foundation 95,000,000 Tomans**, In Tehran University of Medical Sciences , Role: Investigator)
- Application of biocompatible enzymatic hydrogels and endometrium stem cells for repair of peripheral nerve tissue in rat (Supported by **Presidency of National Elites Foundation, 25,000,000 Tomans**, In Tehran University of Medical Sciences, Role: Investigator)
- Collaboration research in Sharif University of Technology, Iran and Osaka university, Japan “Production of hyaluronic acid based hydrogel microcapsule in regeneration of microfracture bone” (Sharif University of Technology, Role: Co-worker, 2018-Continue)
- Collaboration research in Rasol Akram Hospital, Iran “Fabrication of PVA-Gelatin hydrogel microfiber in cartilage tissue fabrication” (Role: Co-worker, 2019-Continue)

Scholarships, internship and membership of professional bodies

- Monbukagakusho (MEXT) **Scholarship** for PhD course in Osaka University, 2015~ 2017.
- Japan Student Services Organization (JASSO) **Scholarship** for PhD course in Osaka University, 2014~ 2015.
- Research foundation support by **Iran National Science Foundation (INSF)** (No. 88001434) during MSc course in Sahand University of Technology, 2009-2011.
- Member of Iran National Elites Foundation.
- Best oral presentation in First International Tissue Engineering and Regenerative Medicine, Tehran, 18-20 July 2018
- Summer internship at Tehran Oil Refinery. July 2008~September 2008.
- Internship at Proteomics Research Center, Razi Vaccine & Serum Research Institute, Karaj, Iran, July 2010 ~August 2010.
- Student member (# 014797) of Society for Biotechnology, Japan (SBJ).

Awards

- Selected among 15% talented PhD students in Osaka University for Monbukagakusho (MEXT) Scholarship for PhD course in Osaka University
- Best Oral Presentation Iranian Tissue Engineering and Regenerative Medicine (ITERM), July 2018, Tehran, Iran
- Forth Ranking in MSc course in Sahand University of Technology, 2009-2011.
- Graduation in BSc of chemical Engineering within 7 semester

Technical skills

- Expert in Microfluidic system
- Modular tissue fabrication
- Mechanical design (AutoCAD design)
- Analytical techniques - HPLC, GC/MS, TEM, FTIR/IR, NMR, Flow cytometry, Confocal microscopy, and analysis of cell culture system.
- Expert in experimental design and analytical methods
- Bioreactor
- Animal models Spinal cord injury, Sciatic tissue injury, Full-thickness excisional wound
- Ability and willingness to work in interdisciplinary projects
- Interest team player, willing to learn and good communication and interpersonal skills

Patent

Coaxial microfluidic double orifice composed standard commercial needles (IRAN- registered patent)

Peer-reviewed Publication

1. Sakai, S., **Khanmohammadi, M.**, Khoshfetrat, A. B., and Taya, M., 2014. Horseradish peroxidase-catalyzed formation of hydrogels from chitosan and poly (vinyl alcohol) derivatives both possessing phenolic hydroxyl groups. *Carbohydrate Polymer*, 111, 404-409. (Full paper) **IF: 6.23**
2. **Khanmohammadi***, M. Dastjerdi, M. B., Ai, A., Ahmadi, A., Goodarzi, A., Rahimi, A. and Ai, J., 2018, Horseradish peroxidase-catalyzed hydrogelation for biomedical applications, Review paper, *Biomaterials Science* 6, 1286-1298 (Full paper) **IF: 5.92**
3. **Khanmohammadi, M.**, Nemati, S., Ai, J., and Khademi, F., 2019. Multipotency expression of human adipose stem cells in filament-like alginate and gelatin derivative hydrogel fabricated through visible light-initiated crosslinking, *Materials Science and Engineering: C*. 103, 109808 (Full paper) **IF: 5.49**
4. **Khanmohammadi, M.**, Khoshfetrat, A. B., Eskandarnezhad, S., Sani, N. F., and Ebrahimi. S., 2014. Sequential optimization strategy for hyaluronic acid extraction from eggshell and its partial characterization, *Journal of Industrial and Engineering Chemistry*, 20, 4371-4376. (Full paper) **IF:**

5.336

5. **Khanmohammadi, M.**, Sakai, S., and Taya, M., 2016. Impact of an immobilization of low molecular weight hyaluronic acid within gelatin-based hydrogel through enzymatic reaction on behavior of enclosed endothelial cells, *International Journal of Biological Macromolecules*, 97, 308-316 (Full paper) **IF: 4.93**

6. Khoshfetrat, A. B., **Khanmohammadi, M.**, Sakai, S., and Taya, M., 2016. Enzymatically-gellable chitosan derivatives for hepatic tissue engineering: Effect of galactose and phenolic hydroxyl incorporations, *International Journal of Biological Macromolecules*, 92:892-899 (Full paper) **IF: 4.93**

7. **Khanmohammadi, M.**, Sakai, S., and Taya, M., 2017. Fabrication of a single and bundled filament-like tissues using biodegradable hyaluronic acid-based hollow hydrogel fibers, *International Journal of Biological Macromolecules*. 104, 204-212 (Full paper) **IF: 4.93**

8. Zahiri, M., **Khanmohammadi, M.**, Goodarzi, A., Ababzadeh, S., Farahani, M. S., Mohandesnezhad, S., Bahrami, N., and Ai, J., (1/11/2019) **Accepted**, Encapsulation of curcumin loaded chitosan nanoparticle within poly (ϵ -caprolactone) and gelatin fiber mat for wound healing and layered dermal reconstitution, *International Journal of Biological Macromolecules* (Full paper) **IF: 4.93**

9. **Khanmohammadi, M.**, Sakai, S., Ashida, T., and Taya, M., 2016. Production of hyaluronic acid based cell-enclosing microparticles and microcapsules via enzymatic reaction using a microfluidic system, *Journal of Applied Polymer Science*. DOI: 10.1002/APP.43107 (Full paper) **IF: 2.2**

10. Tomita, K., Sakai, S., **Khanmohammadi, M.**, Yamochi, T., Hashimoto, S., Anzai, M., Morimoto, Y., Taya, M., and Hosoi, Y., 2016. Cryopreservation of a small number of human sperm using enzymatically fabricated, hollow hyaluronan microcapsules handled by conventional ICSI procedures. *Journal of Assisted Reproduction and Genetics*, DOI 10.1007/s10815-016-0656. (Full paper) **IF: 2.8**

11. Shafei, S., **Khanmohammadi, M.**, Heidari, R., Ghanbari, H., Nooshabadi, V. T., Farzamfar, S., Akbariqomi, M., Sanikhani, N. S., Absalan, M., and Tavoosidana, G., (29/10/2019). **Accepted**, Exosome loaded alginate hydrogel promotes tissue regeneration in full-thickness skin wounds: an in-vivo study, *Journal of Biomedical Materials Research Part A* (Full paper) **IF: 3.2**

- 12. Khanmohammadi, M., Sakai, S., and Taya, M., 2018. Characterization of encapsulated cells within hyaluronic acid and alginate microcapsules produced via horseradish peroxidase-catalyzed crosslinking, Journal of biomaterials science polymer edition, 11,1-14. (Full paper) IF: 2.12**
- 13. Goodarzi, A., Khanmohammadi, M., Azami, M., Amani, A., Barough, S. E., Bakhshaiesh, N. L., Ahmadi, A., and Ai, J., 2019. Alginate based hydrogel containing taurine loaded chitosan nano particles in biomedical application, Archives of Neuroscience, 30, 6 (2) e86349. (Full paper) IF: 0.78**
- 14. Bahrami, N., Bayat, M., Sadredin, M. A. J., Goodarzi, A., Farzin, A., Barough, S. E., Mohamadnia, A., Salehi, M., Khanmohammadi, M., and Ai, J., 2018. The ability of 3D alginate-polyvinyl alcohol cross-linked hybrid hydrogel to differentiate periodontal ligament stem cells into osteoblasts, Archives of Neuroscience, 6 (2); e85118 (Full paper) IF: 0.78**
- 15. Bahrami, N., Bayat, M., Ai, A., Khanmohammadi, M., Ai, J., Ahmadi, A., Salehi, M., Barough, S. E., Ghodarzi, A., Karimi, R., Mohamadnia, A., Rahimi, A., 2018. Differentiation of periodontal ligament stem cells into osteoblasts on hybrid Alginate/ Polyvinyl alcohol/ Hydroxyapatite nanofibrous scaffolds, Archives of Neuroscience, DOI: 10.5812/ans.74267) (Full paper) IF: 0.78**
- 16. Astaneh, M. E., Goodarzi, A., Khanmohammadi, M., Shokati, A., Ataollahi, M., Farahani, M. S., Mohandesnejad, S., and Ai, J., 2019. Spinal cord regeneration using gelatin/chitosan hydrogel for regenerating spinal cord tissue from traumatic injury, Macromolecular material and engineering (Full paper, Under review) IF: 2.78**
- 17. Ai, J. Khodayari, S., Goodarzi, A., Khanmohammadi, M., Khodayari, H., Farahani, M. S., Hadjighassem, M., 2019. High-Dose Atorvastatin Increases Mesenchymal Stem Cells Anti-Glioblastoma Multiforme Activity in Experimental Rat GBM Models, Molecular Pharmaceutics (Full paper, Under review) IF: 4.8**
- 18. Bordbar, S., Bakhshaiesh, N. L., Khanmohammadi, M., Sayahpour, F., Alini, M., Eslaminejad, M. B., 2019. Production and evaluation of decellularized extracellular matrix hydrogel for cartilage regeneration derived from knee cartilage, Journal of Biomedical Materials Research Part A (Full paper, Accepted) IF: 3.2**
- 19. Nooshabadi, V. T., Khanmohamadi, M., Valipour, E., Mahdipour, S., Barough, S. E., Malekshahi, Z. V., Banafshe, H. R., Shafei, S., Farzamfar, S., Ai, J., 2019. Impact of exosome**

loaded chitosan hydrogel for wound healing and layered dermal reconstitution in mice animal model, Journal of Biomedical Materials Research Part B (Full paper, **Under review**) **IF: 3.4**

20. Khanmohammadi, M., Zolfagharzadeh, V., Bagher, Z., Soltani, H., and Ai, J., 2019. Encapsulation in core-shell microcapsules through coaxial electrospinning system and horseradish peroxidase-catalyzed crosslinking, Biomedical Physics and Engineering Express, Cell (Full paper, **In press**) **IF: 1.2**

21. Bagheri, S. Bagher, Z., Alizadeh., R., Kamrava, S. K., Jalessi, M., Azar, M., Moghaddasi, M., and **Khanmohammadi, M***, 2019. Control of cellular adhesiveness in hyaluronic acid-based hydrogel through varying degrees of phenol moiety, crosslinking, International Journal of Biological Macromolecules. (Full paper, **Under revision**) **IF: 4.93**

22. Garakani, S. S[∞], **Khanmohammadi. M[∞]**, Atoufi, Z., Kamrava, S. K., Setayeshmehr, M. Alizadeh. R., Faghihi. F., Bagher. Z, Davachi, S. M., Abbaspourrad, A., Fabrication of Chitosan/Agarose Scaffolds Containing Extracellular Matrix for Tissue Engineering Applications, IJBIOMAC_2019_8468, International Journal of Biological Macromolecules. (Full paper) **IF: 4.93**

23. Goodarzi. A, Khodayari. S, **Khanmohammadi. M**, Khodayari. H, Ai. A, Mohandesnezhad. S, Sagharjoghi. M. F., Ebrahimi-Barough. S, Ai. J*, 2019, High-Dose Atorvastatin Increases Mesenchymal Stem Cells Anti-Glioblastoma Multifome Activity in Experimental Rat GBM Models, Biomedical science (**Submitted**)

24. Nooshabadi. V. T, **Khanmohamadi. M**, Banafshe. H. R, Shafei. S, Malekshahi. Z.V, Ebrahimi-Barough. S, Ai, J, Impact of exosome-loaded atorvastatin as an anti-glioblastoma carrier to induce apoptosis of U87 cancer cells in 3D culture model, Biomedical Materials

International conference

1. Mehdi Khanmohammadi, Ali Baradar Khoshfetrat, Shahla Eskandarnejad, Sirus Ebrahimi, “Hyaluronic acid production from eggshell (membrane): optimization of isolation condition” World congress meeting tissue engineering and regenerative medicine (Termis), 2012 Vienna, Austria (**Poster Presentation**)

2. **Mehdi Khanmohammadi**, Ali. Baradar Khoshfetrat, “Characterization of eggshell (membrane) derived biomaterials as potential scaffolds for cartilage tissue engineering” World congress meeting tissue engineering and regenerative medicine (Termis), 2012, Vienna, Austria (**Poster Presentation**)
3. Mahdi Khanmohammadi, **Ali Baradar Khoshfetrat**, Shahla Eskandarnezhad, Sirius Ebrahimi, Characterization of eggshell (membrane) derived biomaterials as potential scaffolds for cartilage tissue engineering, 64th Annual Meeting, The Society for Biotechnology (SBJ) and Japan 90 Anniversary Meeting , 2012, Kobe, Japan, (**Oral Presentation**)
4. **Mehdi Khanmohammadi**, Shinji Sakai, Masahito Taya “Characterization of cell-laden functionalized gelatin derivative hydrogels, 67th Annual Meeting, The Society for Biotechnology (SBJ), 2015, Kagoshima, Japan (**Poster Presentation**)
5. **Mehdi Khanmohammadi**, Shinji Sakai, Masahito Taya, “Enzymatic immobilization of low molecular weight hyaluronic acid in gelatinhydrogel: a strategy to promote endothelial cell migration” The 22nd Symposium of Young Asian Biological Engineers Community (YABEC), 2016, Miazaki, Japan(**Poster Presentation**)
7. Kazuhisa Tomita, Shinji Sakai, **Mehdi Khanmohammadi**, Cryopreservation of human sperm using hollow hyaluronan microcapsules handled by conventional ICSI procedures (**Oral Presentation, Excellence award at the 18 Japan IVF congress and Incentive award in 14 Japan Reproductive biology symposium**)
8. **Mehdi Khanmohammadi**, Jafar Ai , Production of cell-laden microcapsule with liquid core in a coaxial electrospray system through enzymatic crosslinking World congress meeting tissue engineering and regenerative medicine (Termis) , 2018, Kyoto, Japan (**Poster Presentation**)
9. **Mehdi Khanmohammadi**, Masahito Taya, Application of enzymatic reactions for hydrogel-based biomedical engineering, International congress meeting Iranian Tissue Engineering and Regenerative Medicine (ITERM), 2018, Tehran, Iran (**Oral Presentation**)
10. **Mehdi Khanmohammadi**, Masahito Taya, Multilayer microcapsule of hyaluronic acid derivative containing gelatin microparticle with enclosed cells, International congress meeting Iranian Tissue Engineering and Regenerative Medicine (ITERM), 2018, Tehran, Iran (**Oral Presentation**)
11. Mehdi Khanmohammadi, Shinji Sakai, Jafar Ai, Masahito Taya. Impact of polysaccharide based derivative hydrogel microcapsule membrane on encapsulated cells, International congress meeting Iranian Tissue Engineering and Regenerative Medicine (ITERM), 2018, Tehran, Iran (**Poster Presentation**)
12. **Mehdi Khanmohammadi**, Ali Mohammad Hassan Joshaghani, Jafar Ai, Mamalian cells bioprinted with hyaluronic acid-based bioink through microextrusion and visible light-initiated

crosslinking, International congress meeting Iranian Tissue Engineering and Regenerative Medicine (ITERM), 2018, Tehran, Iran (**Oral Presentation**)

13. Mehdi Khanmohammadi, Jafar Ai, Development of 3-Dimensional vascularized dense engineered tissue with vessel-like networks, 29th Annual Meeting for European Biomaterials Society, September 2018 Netherlands (**Poster Presentation**)

14. Mehdi Khanmohammadi, Jafar Ai, Cell-laden hyaluronic acid based derivative hydrogel fiber through competitive enzymatic reactions, 29th Annual Meeting for European Biomaterials Society, September 2018 Netherlands (**Poster Presentation**)

Academic Projects

- **PhD course student**, 2014 ~ present, Bioreaction engineering, Department of Materials
 - Conducting the research about engineering tissues through biocompatible hydrogel construct templates via enzymatic, ionic or photo-crosslinking reactions and microfluidic techniques
 - Development of Natural Polysaccharide Hydrogels via Enzyme-mediated Cross-linking as Novel Substrata in Tissue Engineering
- **Master course student**, 2008 ~ 2011, Tissue Engineering Research Center, Chemical engineering department
 - Conducting research regarding extraction of hyaluronic acid and collagen from economic resources. I attempted to modify and optimize the extraction and purification process of hyaluronic acid production.
 - Design of optimized condition for hyaluronic acid and collagen extraction from natural resources, 2009-2011
- **Bachelor student**, 2007 ~ 2008, Chemical engineering department
 - Conducted study regarding Two-Phase equilibrium: Isobaric (vapor-liquid) equilibrium for the binary systems with comparisons thermodynamic equations. Azad university, Iran
 - Heat Transfer: Numerical study of double-walled endothermic cylinders
 - Control process: Modeling of distillation tower in unsteady state condition, using Aspen dynamic, Azad university, Iran

List of references

1. Dr. Ali Baradar Khoshfetrat (Associate professor)-MSc supervisor

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2. Dr. Masahito Taya (Professor) PhD supervisor

- Bioreaction/Biochemical Materials Engineering Group, Graduate School of Engineering Science, Osaka University, Japan, Tel: +81-6-6850-6251

- Regional Director Osaka University North American Center for Academic Initiatives, Sanfransisco,USA, 2150 Shattuck Avenue, Suite 230, Berkeley, CA 94704, Tel. 415-296-8561

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3. Dr. Shinji Sakai (Professor) PhD supervisor

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4. Dr. Jafar Ai (Professor)-Postdoctoral supervisor

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Declaration: I do hereby declare that all the details given by me are true and accurate to the best of my knowledge.

Place: Tehran, Iran

Yours Sincerely

Date: 2019 **Mehdi Khanmohammadi**