

MOHAMMAD ESFANDIYARI

Doctor of Pharmacy (PharmD) Candidate

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RESEARCH PROFILE

Final-year PharmD candidate (expected graduation 2026) at Tehran Medical Sciences, Islamic Azad University, with a research focus on human dermal fibroblast (HDF) biology, extracellular matrix signaling, and the cellular mechanisms of skin aging and regeneration. PharmD thesis integrates wet-lab cell culture and molecular assays (MTT viability, qPCR) with a self-directed bioinformatics and network pharmacology analysis. Author or co-author of 4 peer-reviewed/in-press journal articles, 2 manuscripts under review, and 8 international conference presentations. Co-author of 3 Persian-language scientific books on dermal fibroblast biology, biochemistry laboratory methods, and cosmetic manufacturing management. Long-term research goal: Driven to pursue PhD-level research integrating advanced computational frameworks and AI-assisted drug discovery with wet-lab molecular biology to target complex cellular mechanisms of aging and tissue regeneration.

RESEARCH INTERESTS

My future research trajectory lies at the intersection of computational biology, artificial intelligence, and regenerative medicine. I am deeply interested in leveraging AI-driven predictive modeling, machine learning, and network pharmacology to accelerate targeted drug discovery and decipher complex cellular dynamics. My goal is to develop hybrid workflows that integrate AI-assisted screening platforms with wet-lab molecular assays (such as qPCR and viability modeling) to optimize cell-based therapies and novel therapeutics.

EDUCATION

Doctor of Pharmacy (PharmD) — in progress, expected 2026 | Tehran Medical Sciences, Islamic Azad University, Tehran, Iran
2020 – 2026

- Final-year PharmD candidate; degree formally conferred upon completion of thesis defense.
- Cumulative GPA:** 16.10 / 20 (Iranian university grading scale, where 20 is the maximum attainable grade).
- Doctoral Thesis:** *"Synergistic Effect Study of Magnesium Ascorbyl Phosphate (MAP) on the Quality of Polydeoxyribonucleotide (PDRN) Effects on Human Dermal Fibroblast (HDF) Proliferation and Vitality."*
- Thesis Duration:** approximately 1 year. Independently conducted experimental design, cell culture, MTT viability assays, data analysis, and manuscript preparation; qPCR for *COL1A1* and *MKI67* was performed with the technical assistance of the laboratory manager, under the overall supervision of Dr. Hamid Reza Ahmadi Ashtiani.
- Thesis Design:** four-group *in vitro* comparison (control, MAP, PDRN, MAP+PDRN combination) in primary human dermal fibroblasts; outcome measures included cell viability/proliferation (MTT) and gene expression (*COL1A1*, *MKI67* by qPCR). Single-agent (MAP, PDRN) findings are published; combination-group results are in preparation, supported by a bioinformatics/network-pharmacology enrichment analysis.
- Resulting publications:** Esfandiyari M. et al., "Divergent Regulation of Proliferation and *COL1A1* Expression by PDRN and Magnesium Ascorbyl Phosphate in Human Dermal Fibroblasts," *Journal of Dermatology and Cosmetic*, 2026 (In Press) — first author.

- **TOEFL iBT** — scheduled for October 2026 (target: 90 overall).
- **Current level:** High Intermediate (self-assessed and through coursework/publication record in English); currently attending structured English preparation classes to strengthen test readiness ahead of the formal examination.

PUBLICATIONS

Peer-Reviewed Journal Articles (Published / In Press)

1. **Esfandiyari M**, Ahmadi Ashtiani HR, Rastegar H, Hedayati M. Divergent Regulation of Proliferation and COL1A1 Expression by PDRN and Magnesium Ascorbyl Phosphate in Human Dermal Fibroblasts. *Journal of Dermatology and Cosmetic*. 2026. In Press.
First author. Designed and executed all experimental work (cell culture, MTT, qPCR with technical laboratory support), performed data analysis, wrote the manuscript; and submission. This article reports the single-compound findings from my PharmD thesis.
2. Akaberi SM, **Esfandiyari M**, Ahmadi Ashtiani HR. Mechanistic Review of Topical Therapies Targeting Dermal Fibroblasts in Skin Aging and Rejuvenation. *Journal of Cosmetic Dermatology*. 2026; 25:e70987. <https://doi.org/10.1111/jocd.70987>.
Contribution: Second author. Contributed to literature curation, mechanistic-section drafting (fibroblast signaling pathways), and submission.
3. **Esfandiyari M**, Ahmadi Ashtiani HR. Topical vitamin C and its derivatives in cosmetic science: stability, efficacy, and formulation strategies. *J Skin Stem Cell*. 2025;12(4):e163798. <https://doi.org/10.5812/jssc-163798>.
Contribution: First author. Led literature synthesis, manuscript drafting, and submission.
4. Vahdat Khajeh Pasha A, **Esfandiyari M**, Parnian A, Mahboubi-Rabbani M, Bayanati M. Immunoinformatics-based multi-epitope vaccine targeting *Helicobacter pylori*. *Cancer Reports*. 2026;9:e70441. <https://doi.org/10.1002/cnr2.70441>.
Contribution: Second and corresponding author. Contributed to epitope-prediction analysis and manuscript review; first author led the immunoinformatics pipeline and overall study design.

Manuscripts Under Review / Submitted

1. **Esfandiyari M**, Vahdat Khajeh Pasha A, Ahmadi Ashtiani HR. Network Pharmacology and Molecular Docking Reveal Complementary Target Modules Underlying Collagen Suppression by Combined Polydeoxyribonucleotides and Magnesium Ascorbyl Phosphate. Under Review.
Contribution: First author. Designed and executed all wet-lab work (cell culture, MTT, qPCR); performed network pharmacology, molecular docking, and network proximity analyses; developed the Python-based computational pipeline; wrote the manuscript and led submission.
2. **Esfandiyari M**, Vahdat Khajeh Pasha A, Ahmadi Ashtiani HR. Molecular Mechanisms and Clinical Applications of Caffeine in Skin and Hair Rejuvenation. Under Review.
Contribution: First author. Led conceptualization, literature review, manuscript writing, graphical design of scientific figures, and submission.
3. Vahdat Khajeh Pasha A, **Esfandiyari M**, Mirhassani RS, Abdolghaffari AH. Immunoinformatics-Based Multi-Epitope Vaccine Targeting Herpes Simplex Virus-1 (HSV-1). Under Review.
Contribution: Second author. Contributed to bioinformatics analysis and manuscript review; first author led study design and primary analysis.

Published Books

1. Ahmadi Ashtiani HR, **Esfandiyari M**, Azadbakht A. *Dermal Fibroblasts: From Basic Science to Clinical Applications*. Dr. Ahmadi Publications; 2025. ISBN: 978-622-93030-5-4. (Persian)
Contribution: Second author. Co-authored core chapters on fibroblast biology and translational/clinical applications; the senior (first) author originated the book concept and served as editor and corresponding author.

In Press Books

1. Ahmadi Ashtiani HR, **Esfandiyari M**, Rastegar H, et al. Cosmetic Manufacturing: Establishment, Management and Development. In Press, 2026. (Persian; reference textbook)

Contribution: Second author. Authored more than half of the book's content, coordinated and reviewed contributions from co-authors, prepared the final manuscript for submission, and managed the administrative process and documentation required for publication over a two-year project.

2. Ahmadi Ashtiani HR, Ashtari F, **Esfandiyari M**, Pourahmadi A. Basic Biochemistry Laboratory. In Press, 2026. (Persian)

Contribution: Third author. Provided editorial review and feedback on chapters authored by co-authors, and managed the administrative process and documentation required for publication.

INDEPENDENT RESEARCH & COMPUTATIONAL PROJECTS

Network Pharmacology Pipeline for MAP–PDRN Synergy in Human Dermal Fibroblasts | Self-directed project. 2026

- Designed and implemented a modular, object-oriented Python pipeline to identify candidate synergistic hub genes shared between the predicted target sets of magnesium ascorbyl phosphate (MAP) and PDRN (modelled via its adenosine moiety) and HDF/skin-aging-associated genes, using strict three-way set intersection ($A \cap B \cap C$).
- Architected with five decoupled classes following Single Responsibility and defensive-programming principles (data loading/validation, set algebra, Venn-diagram visualization, STRING-ready export, and pipeline orchestration), with full type hints, structured logging, and a command-line interface.
- Generated publication-quality, proportional three-set Venn diagrams (300 DPI) and exported the resulting hub gene list as a STRING-database-ready CSV file for downstream protein-protein interaction network analysis.
- Built using Python (Pandas, Matplotlib, matplotlib-venn); target data sourced from SwissTargetPrediction outputs, with downstream enrichment analysis performed via Enrichr.
- Code repository: <https://github.com/dresfandiyari/Network-Pharmacology-Intersection>
- DOI: [10.5281/zenodo.20776694](https://doi.org/10.5281/zenodo.20776694)

Network Proximity & Module Separation Engine for Drug-Combination Prediction in Network Pharmacology | Self-directed project. 2026

- Designed and implemented a full-interactome network-proximity analysis CLI, applying the Menche/Guney/Cheng framework to classify two gene modules (e.g., predicted drug target sets) as topologically Overlapping, Complementary, Isolated, or Indeterminate on the complete human STRING interactome (~19,000 proteins).
- Implemented degree-preserving (binned) permutation testing to build a statistically rigorous null model, avoiding the hub-node bias of naive random sampling, and computed both average pairwise distance (module separation, S_{AB}) and closest distance (disease-module proximity) metrics.
- Architected as a dependency-light, fully type-hinted and documented command-line tool with three independent subcommands (separation, proximity, combine), producing a final classification with statistical rationale exported as JSON/CSV.
- Built using Python (NetworkX, NumPy, Pandas); designed for direct integration with SwissTargetPrediction/STRING-sourced target modules.
- Code repository: <https://github.com/dresfandiyari/Network-Pharmacology-Proximity>
- DOI: [10.5281/zenodo.21141660](https://doi.org/10.5281/zenodo.21141660)

Immunoinformatics-Based Multi-Epitope Vaccine Design Against *Helicobacter pylori* | Collaborative research project (published). 2025

- Contributed to the immunoinformatics/reverse-vaccinology workflow predicting CTL, HTL, and linear B-cell epitopes from flagellin B and urease B antigens, including in silico antigenicity, allergenicity, toxicity, and molecular-docking (HDOCK/TLR5) validation steps.

- Performed formal analysis, contributed to software-assisted data processing, and validated and reviewed the manuscript; published as Vahdat Khajeh Pasha A., Esfandiyari M. et al., Cancer Reports, 2026 (second author; see Publications).

Immunoinformatics-Based Multi-Epitope Vaccine Design Against Herpes Simplex Virus-1 (HSV-1) | Collaborative research project (under review). 2025

- Contributed to formal analysis, data curation, and investigation within an immunoinformatics pipeline predicting CTL, HTL, and linear B-cell epitopes from the HSV-1 envelope glycoprotein C (gC), including antigenicity/safety filtering and TLR2 docking validation.
- Wrote the original draft of the manuscript; submitted as Vahdat Khajeh Pasha A., Esfandiyari M. et al., Under Review, 2026 (second author; see Publications).

CONFERENCE PRESENTATIONS

1. **Esfandiyari M**, Ahmadi Ashtiani HR. Argan oil in cosmetic formulations: bioactivity and sustainability considerations. 10th International Conference on Agricultural Sciences, Medicinal Plants and Traditional Medicine, Georgia, March 2026. *[Oral Presentation]*
2. **Esfandiyari M**, Vahdat Khajeh Pasha A, Ahmadi Ashtiani HR. Artificial Intelligence (AI) in skin fibroblast research: revolutionizing drug and cosmetic development. International Conference on Medicine and Artificial Intelligence in Health Improvement, Germany, August 2025. *[Oral Presentation]*
3. **Esfandiyari M**, Ahmadi Ashtiani HR. Mechanistic insight into the role of Superoxide Dismutase in skin aging: a novel approach for cosmeceutical application. 8th International Congress on BioMedicine (ICB2024), November 2024. *[Oral & Poster Presentation]*
4. **Esfandiyari M**, Ahmadi Ashtiani HR. Anti-aging and dermatological benefits of grape seed oil: insights from traditional use to modern. 9th International Conference on Agricultural Sciences, Medicinal Plants and Traditional Medicine, Georgia, August 2025. *[Poster Presentation]*
5. **Esfandiyari M**, Vahdat Khajeh Pasha A, Ahmadi Ashtiani HR. A Comparative Mechanistic Review of Retinol in Anti-Aging Skincare. 12th International Conference on Applied Research in Basic Sciences, Engineering and Technology, Georgia, August 2025. *[Poster Presentation]*
6. Vahdat Khajeh Pasha A, **Esfandiyari M**, Mahboubi-Rabbani M. AUNP-12 peptide antagonist: mechanisms and applications in immune checkpoint blockade and cancer therapy. 6th Conference on Proteins and Peptides Science & Technology, Iran, November 2025. *[Poster Presentation]*
7. **Esfandiyari M**, Ahmadi Ashtiani HR. Anti-ageing effects of Rosa Canina (Rose Hip) extract in topical application: a biochemical and pharmacological evaluation. 7th International Conference on Agricultural Sciences, Medicinal Plants and Traditional Medicine, Georgia, September 2024. *[Poster Presentation]*
8. Ahmadi Ashtiani HR, Kaveh Bakhshayesh M, **Esfandiyari M**. Review and applications of Borage oil in specialized skin and hair products. 8th International Congress on BioMedicine (ICB2024), November 2024. *[Poster Presentation]*

PROFESSIONAL & RESEARCH EXPERIENCE

Research & Development Assistant | Vesta Pharma Co. 2023 - 2026

- Contributed to R&D activities including scientific research, product evaluation, and technical documentation.
- Participated in the development and implementation of quality management systems (ISO 9001, 14001, 45001).
- Assisted in data interpretation, literature review, and preparation of scientific manuscripts.

Licensed Pharmacist (Part-Time) | Dr. Mahdavi Pharmacy. 2025 - 2026

- Licensed to practice after passing Iran's national pharmacist qualifying examination, prior to final thesis defense.
- Provided patient counseling, prescription dispensing, and medication therapy guidance in a community pharmacy setting.

Student Committee Chair | Cosmetic, Hygienic and Detergent Sciences and Technology Research Center, Tehran Medical Sciences, Islamic Azad University. 2025 – Present

- Lead the student committee, overseeing academic and research-related activities.
- Organize scientific seminars and educational events; support interdisciplinary research collaborations within the center.
- Coordinate student research projects and communication between faculty and student teams.

Student Committee Member | Cosmetic, Hygienic and Detergent Sciences and Technology Research Center, Tehran Medical Sciences, Islamic Azad University. 2023 – 2025

- Assisted in organizing seminars and academic workshops; contributed to student-faculty research coordination.

EDITORIAL & PEER REVIEW ACTIVITIES

- **Peer Reviewer, Journal of Public Health and Community Medicine (2026)**
Reviewed 1 manuscript for the journal (via eJManager Peer Review Tracking System).

TECHNICAL & RESEARCH SKILLS

- **Programming & Data Analysis:** Python (NumPy, Pandas, SciPy, scikit-learn), machine learning workflows, data preprocessing, model evaluation and optimization.
- **Bioinformatics & Immunoinformatics:** Network pharmacology (SwissTargetPrediction, STRING, Enrichr APIs), vaccine-design pipelines, epitope prediction (IEDB, VaxiJen, ToxinPred), sequence alignment (BLAST), antigenicity/allergenicity assessment, molecular docking basics.
- **Wet-Lab Techniques:** Primary human dermal fibroblast (HDF) culture, MTT cell-viability assay, RNA extraction, qPCR, bacterial culture and aseptic microbiological technique.
- **Software & Tools:** GraphPad Prism, Jupyter Notebook, Spyder, VS Code, EndNote, Zotero, PROSPERO registration workflow.
- **Literature & Review Methods:** PRISMA 2020 systematic review methodology, PubMed/Google Scholar literature mining, AI-assisted research tools (e.g., SciSpace).

CERTIFICATIONS

- **Bioinformatics Training: Drug Design** — BioinfCamp, June 2026
- **Machine Learning** — Maktabkhooneh, June 2026
- **Practical Guide to Building AI Agents with n8n** — Maktabkhooneh, May 2026
- **Python Programming** — Maktabkhooneh, March 2026
- **Bioinformatics Training: Vaccine Design** — BioinfCamp, September 2024

REFERENCES

Dr. Hamid Reza Ahmadi Ashtiani

Assistant Professor of Clinical Biochemistry; Head, Cosmetic, Hygienic and Detergent Sciences and Technology Research Center; Department of Biochemistry, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran.

Email: ahmadihr@iau.ac.ir

Relationship: Direct thesis supervisor and longtime research mentor. In addition to supervising my PharmD thesis, Dr. Ahmadi Ashtiani has overseen my work as an R&D Assistant at Vesta Pharma Co. (2023–2026), giving him direct, extended insight into my independent experimental design, laboratory execution, analytical work, and professional conduct across both academic and industry research settings.

Prof. Mehdi Hedayati

Professor of Biochemistry; Head, Cellular and Molecular Endocrine Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences; Visiting Scholar, Department of Biology, Trent University, Peterborough, ON, Canada.

Email: hedayati47@gmail.com | hedayati@sbmu.ac.ir

Relationship: Thesis advisor and co-author on the resulting publication; has direct, first-hand knowledge of my thesis research design, data analysis, and scientific writing.

If additional references are needed, I am happy to provide more upon request.