

Shiva Hemmati

(CV)

Personal Information:

First name: Shiva

Last name: Hemmati

Born: August 23, 1977

Mailing address: Department of Pharmaceutical Biotechnology, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, 71345-1583, Iran.

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Academic Position:

•March 2018-Present: **Associate Professor**, Department of Pharmaceutical Biotechnology, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran.

•November 2012-February 2018: **Assistant Professor**, Department of Pharmaceutical Biotechnology, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran.

Education:

•March 2008-March 2011: **Postdoctoral Fellow**, Department of Biochemistry, Purdue University, West Lafayette, Indiana, USA.

•November 2003-November 2007: **Ph.D.** in Natural Sciences, Institute for developmental and molecular Biology of Plants, Heinrich-Heine University, Duesseldorf, Germany.

•1996-2003: Pharmacy Doctorate (**Pharm.D.**), School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran.

Activity:

- Head of the Department of Pharmaceutical Biotechnology, Shiraz University of Medical Sciences (2023-continued)
- Guest Associate Professor: UCSI University, Kuala Lumpur, Malaysia (2023- continued)
- Adjunct Lecturer: UCSI University, Kuala Lumpur, Malaysia (2021-2023)
- Member of the Ethics Committee in Research, Shiraz University of Medical Sciences (2019-continued)
- Associate Editor of Trends in Pharmaceutical Sciences (2017-2022)
- Vice Chancellor for Research, Shiraz School of Pharmacy (2012-2014)
- Vice Chancellor for Student Affairs, Shiraz School of Pharmacy (2011-2012)
- Member of Biotechnology Research Center, Shiraz University of Medical Sciences (2019-continued)

Teaching Assignments:

Bioinformatics; Protein Chemistry; Molecular Biology and Genetic Engineering (Ph.D. Program).

Pharmaceutical Biotechnology; Molecular Biology; Biologicals; Pharmaceutical Terminology, Pharmacognosy, Community Pharmacy Practice (Pharm. D. program)

Research Interests:

- Therapeutic peptide discovery using artificial intelligence
- Intracellular delivery of macromolecules using cell-penetrating peptides
- Defining druggable targets by systems biology

Publications:

Behzadipour Y, **Hemmati S***. Covalent conjugation and non-covalent complexation strategies for intracellular delivery of proteins using cell-penetrating peptides. *Biomedicine & Pharmacotherapy*. 2024 Jul 1;176:116910.

Hemmati S*, Saeidikia Z, Seradj H, Mohagheghzadeh A. Immunomodulatory Peptides as Vaccine Adjuvants and Antimicrobial Agents. *Pharmaceuticals*. 2024 Feb 2;17(2):201.

Moradbeygi F, Ghasemi Y, Farmani AR, **Hemmati S***. Glucarpidase (carboxypeptidase G2): Biotechnological production, clinical application as a methotrexate antidote, and placement in targeted cancer therapy. *Biomedicine & Pharmacotherapy*. 2023 Oct 1;166:115292.

Mohagheghzadeh A, Badr P, Mohagheghzadeh A, **Hemmati S***. *Hypericum perforatum* L. and the Underlying Molecular Mechanisms for Its Cholaretic, Cholagogue, and Regenerative Properties. *Pharmaceuticals*. 2023 Jun 15;16(6):887.

Hemmati S*, Rasekhi Kazerooni H. Polypharmacological Cell-Penetrating Peptides from Venomous Marine Animals Based on Immunomodulating, Antimicrobial, and Anticancer Properties. *Marine Drugs*. 2022 Dec 4;20(12):763.

Mosleh G, Zaeri M, **Hemmati S***, Mohagheghzadeh A. A comprehensive review on rhubarb astringent/laxative actions and the role of aquaporins as hub genes. *Phytochemistry Reviews*. 2022 Dec 4:1-22.

Ghoshoon MB, Raee MJ, Shabanpoor MR, Dehghani Z, Ebrahimi N, Berenjian A, Negahdaripour M, **Hemmati S**, Sadeghian I, Ghasemi Y. Whole cell immobilization of recombinant E. coli cells by calcium alginate beads; evaluation of plasmid stability and production of extracellular L-asparaginase. *Separation Science and Technology*. 2022 Nov 22;57(17):2836-42

Kazemi A, **Hemmati S**, Morowvat MH, Gholami A, Ghasemi Y. isolation and screening of alpha-galactosidase-producing probiotics with anti-flatulence potential. *Minerva Biotechnology & Biomolecular*. 2022 Sep 1;34(3).

Ghanbarzadeh Z, **Hemmati S***, Mohagheghzadeh A. Humanizing plant-derived snakins and their encrypted antimicrobial peptides. *Biochimie*. 2022 Aug 1;199:92-111.

Behzadipour Y, **Hemmati S***. Viral Prefusion Targeting Using Entry Inhibitor Peptides: The Case of SARS-CoV-2 and Influenza A virus. *International Journal of Peptide Research and Therapeutics*. 2022 Jan;28(1):1-9.

Sadeghian I, **Hemmati S***. Characterization of a Stable Form of Carboxypeptidase G2 (Glucarpidase), a Potential Biobetter Variant, From *Acinetobacter* sp. 263903-1. *Molecular Biotechnology*. 2021 Dec;63(12):1155-68.

Behzadipour Y, Gholampour M, Pirhadi S, Seradj H, Khoshneviszadeh M, **Hemmati S***. Viral 3CL^{pro} as a Target for Antiviral Intervention Using Milk-Derived Bioactive Peptides. *International Journal of Peptide Research and Therapeutics*. 2021 Sep 16:1-4.

Behzadipour Y, Sadeghian I, Ghaffarian Bahraman A, **Hemmati S***. Introducing a delivery system for melanogenesis inhibition in melanoma B16F10 cells mediated by the conjugation of tyrosine ammonia-lyase and a TAT-penetrating peptide. *Biotechnology Progress*. 2021 Jan;37(1):e3071.

Karimian S, Kazemi F, Attaroshan M, Gholampour M, **Hemmati S**, Sakhteman A, Behzadipour Y, Kabiri M, Iraj A, Khoshneviszadeh M. Design, synthesis, and biological evaluation of symmetrical azine derivatives as novel tyrosinase inhibitors. *BMC chemistry*. 2021 Dec;15(1):1-1.

Ghoshoon MB, Raei MJ, Shabanpoor MR, Dehghani Z, Ebrahimi N, Berenjian A, Negahdaripour M, **Hemmati S**, Sadeghian I, Ghasemi Y. Whole cell immobilization of recombinant *E. coli* cells by calcium alginate beads; evaluation of plasmid stability and production of extracellular L-asparaginase. *Separation Science and Technology*. 2021 Sep 1:1-7.

Hemmati S*, Behzadipour Y, Haddad M. Decoding the proteome of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) for cell-penetrating peptides involved in pathogenesis or applicable as drug delivery vectors. *Infection, Genetics and Evolution*. 2020 Nov 1;85:104474.

Sadeghian I, Rezaie Z, Rahmatabadi SS, **Hemmati S***. Biochemical insights into a novel thermo/organo tolerant bilirubin oxidase from *Thermosediminibacter oceani* and its application in dye decolorization. *Process Biochemistry*, 2020, 88: 38-50

Behzadipour Y, **Hemmati S***. Considerations on the rational design of covalently conjugated cell-penetrating peptides (CPPs) for intracellular delivery of proteins: A Guide to CPP selection using glucarpidase as the model cargo molecule. *Molecules*, 2019, 24(23):4318

Owji H, **Hemmati S***, Heidari R, Hakimzadeh M. Effect of alumina (Al₂O₃) nanoparticles and macroparticles on *Trigonella foenum-graceum* L. *in vitro* cultures: assessment of growth parameters and oxidative stress-related responses. *3 Biotech*, 2019, 9(11):419

Rahmatabadi S, Sadeghian I, Ghasemi Y, Sakhteman A and **Hemmati S***. Identification and characterization of a sterically robust phenylalanine ammonia-lyase among 481 natural isoforms through association of *in silico* and *in vitro* studies. *Enzyme and Microbial Technology*, 2019, 122: 36-54

Sadeghian I, Khalvati B, Ghasemi Y and **Hemmati S***. TAT-mediated intracellular delivery of carboxypeptidase G2 protects against methotrexate-induced cell death in HepG2 cells. *Toxicology and Applied Pharmacology*, 2018, 346: 9-18

Owji H and **Hemmati S***. A comprehensive *in silico* characterization of bacterial signal peptides for the excretory production of *Anabaena variabilis* phenylalanine ammonia lyase in *Escherichia coli*. *3 Biotech*, 2018, 8(12), 488.

Owji H, Hajiebrahimi A, Seradj H and **Hemmati S***. Identification and functional prediction of stress responsive AP2/ERF transcription factors in *Brassica napus* by genome-wide analysis. *Computational Biology and Chemistry*, 2017, 71: 32-56

Hajiebrahimi A, Owji H and **Hemmati S***. Genome-wide identification, functional prediction and evolutionary analysis of R2R3-MYB superfamily in *Brassica napus*. *Genome*, 2017, 60(10): 797-814

Hemmati S*. Physiological roles of aquaporins in the improvement of plant water and nutrient usage. *Research & Reviews in Biosciences*, 2017, 12(3):133

Hemmati S*, Seradj H and Mehrabi N. Characterization of the lignin polymer in Brassicaceae family. *Research Journal of Pharmacognosy*, 2017, 4(2): 1-13

Hemmati S*. Analysis of the expression level of aquaporins under acetylene treatment and pathogen attack. *Trends in Pharmaceutical Sciences*, 2017, 3(2):71-82

Rahmatabadi S, Sadeghian I, Nezafat N, Negahdaripour M, Hajighahramani N, **Hemmati S** and Ghasemi Y. *In silico* investigation of pullulanase enzymes from various *Bacillus* species. *Current Proteomics*, 2017, 14(3): 175-185

Asnafi R and **Hemmati S***. Screening *Salvia macrosiphon* transcriptome for 4- coumarate CoA ligase enzyme coding genes. *Trends in Pharmaceutical Sciences*, 2016, 2(5):205-218

Hemmati S* and Seradj H. Justicidin B: A promising bioactive lignan. *Molecules*, 2016, 21(7): 82

Hemmati S*. Predicting the functionality of major intrinsic proteins: An *in silico* analysis in *Musa*. *Trends in Pharmaceutical Sciences*, 2016, 2(2):139-150

Raisnejadian H, Ebrahimi S, **Hemmati S**. Ethical challenges in the community pharmacy setting from the perspective of faculty members of Shiraz School of Pharmacy and

pharmacy practitioners: a qualitative study. Iranian Journal of Medical Ethics and History of Medicine, 2016, 8(5): 77-93

Dabbagh F, Ghoshoon MB, **Hemmati S**, Zamani M, Mohkam M, Ghasemi Y. Engineering Human Urate Oxidase: Towards Reactivating It as an Important Therapeutic Enzyme. Current Pharmaceutical Biotechnology, 2016, 17(2): 141-146

Hemmati S*. Phenylalanine ammonia-lyase through evolution: A bioinformatic approach. Trends in Pharmaceutical Sciences, 2015, 1(1):10-14

Ghoshoon MB, Berenjian A, **Hemmati S**, Dabbagh F, Karimi Z, Negahdaripour M, Ghasemi Y. Extracellular Production of Recombinant l-Asparaginase II in Escherichia coli: Medium Optimization Using Response Surface Methodology. International Journal of Peptide Research and Therapeutics, 2015, 21(4): 487-495

Zamani M, Berenjian A, **Hemmati S**, Nezafat N, Ghoshoon MB, Dabbagh F, Mohkam M, Ghasemi Y. Cloning, Expression, and Purification of a Synthetic Human Growth Hormone in Escherichia coli Using Response Surface Methodology. Molecular Biotechnology, 2015, 57(3): 241-250

Karimi Z, Nezafat N, Negahdaripour M, Berenjian A, **Hemmati S**, Ghasemi Y. The effect of rare codons following the ATG start codon on expression of human granulocyte colony stimulating factor in Escherichia coli. Protein Expression and Purification, 2015, 114: 108-114.

Farhadi T, Nezafat N, Ghasemi Y, Karimi Z, **Hemmati S**, Erfani N. Designing of complex multi-epitope peptide vaccine based on Omps of Klebsiella pneumoniae: An in silico approach. International Journal of Peptide Research and Therapeutics. 2015, 21(3): 325-341.

Farhadi T, Karimi Z, Ghasemi Y, Nezafat N, **Hemmati S**, Erfani N. Production of a novel multi-epitope vaccine based on outer membrane proteins of Klebsiella pneumoniae. Trends in Pharmaceutical Sciences. 2015, 1(3): 167-172.

Mobasher A, Ghasemi Y, Montazeri-Najafabady N, Ghasemian A, Rasoul Amini S, **Hemmati S**, Ebrahimi S. Two step production of optimized interferon beta 1b; A way to overcome its toxicity. Journal of Pure and Applied Microbiology. 2014, 7(4):2867-2871.

Hemmati S, von Heimendahl CBI, Klaes M., Alfermann AW, Schmidt TJ, Fuss E. Pinoresinol-lariciresinol reductases with opposite enantiospecificity determine the enantiomeric composition of lignans in the different organs of *Linum usitatissimum* L. *Planta Medica*, 2010, 76 (9): 928-934.

Schmidt TJ, **Hemmati S**, Klaes M, Konuklugil B, Mohagheghzadeh A, Ionkova I, Fuss E, Alfermann AW. Lignans in flowering aerial parts of *Linum* species- Chemodiversity in the light of systematic and phylogeny. *Phytochemistry*, 2010, 71 (14-15): 1714-1728

Mohagheghzadeh A, Dehshahri S, **Hemmati S**. Accumulation of lignans by three *in vitro* cultures of *Linum* species. *Zeitschrift für Naturforschung-Section C-A Journal of Biosciences*, 2009, 64 (1-2): 73-76

Hemmati S, Schneider B, Schmidt TJ, Federolf K, Alfermann AW, Fuss E. Biosynthesis of justicidin B and diphyllin in cell cultures of *Linum perenne* L. *Himmelszelt. Planta Medica*, 2008, 74 (9): 1168

Mohagheghzadeh A, Gholami A, **Hemmati S**, Dehshahri S. Bag culture: A method for root-root co-culture. *Zeitschrift für Naturforschung-Section C-A Journal of Biosciences*, 2008, 63 (1-2): 157-160

Hemmati S, Schneider B, Schmidt TJ, Federolf K, Alfermann AW, Fuss E. Justicidin B 7-hydroxylase, a cytochrome P450 monooxygenase from cell cultures of *Linum perenne* Himmelszelt involved in the biosynthesis of diphyllin. *Phytochemistry*, 2007, 68 (22-24): 2736-2743

Hemmati S, Schmidt TJ, Fuss E. (+)-pinoresinol/(-)-lariciresinol reductase from *Linum perenne* Himmelszelt involved in the biosynthesis of justicidin B. *FEBS Letters*, 2007, 581 (4): 603-610

Mohagheghzadeh A, Gholami A, **Hemmati S**, Ardakani MRS, Schmidt TJ, Alfermann AW. Root cultures of *Linum* species section *Syllinum* as rich sources of 6-methoxypodophyllotoxin. *Zeitschrift für Naturforschung-Section C-A Journal of Biosciences*, 2007, 62 (1-2): 43-49

Schmidt TJ, **Hemmati S**, Fuss E, Alfermann AW. A combined HPLC-UV and HPLC-MS method for the identification of lignans and its application to the lignans of *Linum usitatissimum* L and *L. bienne* Mill. *Phytochemical Analysis*, 2006, 17 (5): 299-311

Mohagheghzadeh A, **Hemmati S**, Alfermann AW. Quantification of aryltetralin lignans in *Linum album* organs and *in vitro* cultures. *Iranian Journal of Pharmaceutical Sciences*, 2006, 2 (1): 47-56

Ardakani MS, **Hemmati S**, Mohagheghzadeh A. Effect of elicitors on the enhancement of podophyllotoxin biosynthesis in suspension cultures of *Linum album*. DARU, 2005, 13 (2): 56-60

Mohagheghzadeh A, Gholami A, Soltani M, **Hemmati S**, Alfermann AW. *Linum mucronatum* sp. *mucronatum*: organ to organ lignan variation. Zeitschrift für Naturforschung-Section C-A Journal of Biosciences, 2005, 60 (5-6): 508-510

Mohagheghzadeh A, **Hemmati S**, Mehregan I, Alfermann AW. *Linum persicum*: Lignans and placement in Linaceae. Phytochemistry Reviews, 2003, 2 (3): 363-369

Ph.D. Dissertation:

Biosynthesis of lignans in plant species of section *Linum*: pinoresinol-lariciresinol reductase and justicidin B 7-hydroxylase. (Heinrich Heine University, Dusseldorf, Germany)

Pharm. D. Dissertation:

Establishment of in vitro cultures of *Linum album* and screening for high lignan producing lines. (Shiraz University of Medical Sciences, Shiraz, Iran)

Abstracts and Congress Presentations:

Hemmati S, Therapeutic peptide identification and analysis using artificial intelligence.

In: The First Congress of Artificial Intelligence in Pharmaceutical Sciences, Shiraz, Iran, December 2023

Hemmati S, Secretory production of the recombinant enzyme eugenol synthase applicable in pharmaceutical and cosmeceutical industries. In: 3rd International Congress of Biotechnology, Tehran, Iran, September, 2019

Hemmati S, Characterization of a novel thermostable bilirubin oxidase and its application in bioremediation and dye decolorization. In: 3rd International Congress of Biotechnology, Tehran, Iran, September, 2019

Hemmati S, Sadeghian I. TAT-mediated intracellular delivery of carboxypeptidase G2 against methotrexate induced cell death. Tartu, Estonia, August 2018

Owji H, **Hemmati S**. *In silico* analyses of several signal peptides for the excretory production of phenylalanine ammonia lyase in *Escherichia coli*. 15th Annual European Pharma Congress, Frankfurt, Germany, May 2018

Hemmati S. *In silico* genome wide analysis of aquaporins in *Musa acuminata*. The 7th Congress on Bioinformatics, Tehran, Iran, January 2018

Hemmati S. Enantiospecific enzymes responsible for the formation of phytoestrogens in flax. In: Iranian Pharmaceutical Science Congress, Isfahan, Iran, September 3-6, 2012.

Hemmati S, Chapple C. A cytochrome P450 from the CYP81 family is required for the N-hydroxylation of indole glucosinolates in *Arabidopsis thaliana* roots. In: Biochemistry Retreat, Purdue University, Indiana, USA, October 2010.

Hemmati S, Chapple C. Reconstitution of the entry point of Arabidopsis phenylpropanoid metabolism with a bacterial tyrosine ammonia-lyase. In: Gordon Research Conferences (Plant Metabolic Engineering), Waterville valley, New Hampshire, USA, July 12-17, 2009.

Hemmati S, Chapple C. Identification of cytochrome P450 monooxygenases acting against phenylpropanoid intermediates in *Arabidopsis thaliana*. In: Biochemistry Retreat, Brookston, Indiana, USA, October 13, 2008. **Hemmati S,** Fuss E. (+)-pinoresinol/(-)-lariciresinol reductase from *Linum perenne* Himmelszelt involved in the biosynthesis of justicidin B. In: 50 Years of the Phytochemical Society of Europe, Cambridge, UK, April 11-14, 2007.

Hemmati S, Schmidt TJ, Alfermann AW. Evolution and diversity of lignan biosynthesis in the genus *Linum*. In: 5th Kurt-Mothes-Doktoranden-Workshop, Halle, Germany, October 5-7, 2005.

Hemmati S, Fuss E. Pinoresinol lariciresinol reductase in justicidin B producing cell cultures of *Linum perenne*. In: XVII International Botanical Congress, Vienna, Austria, July 17-23, 2005.

Hemmati S. Lignans in *Linum perenne*. In: Sektion Pflanzliche Naturstoffe der Deutschen Botanischen Gesellschaft, Kaub am Rhein, Germany, March 16-18, 2005.

Hemmati S, Schmidt TJ, Alfermann AW, Fuss E. Chemodiversity of lignan accumulation in the genus *Linum*. In: Botanikertagung, Braunschweig, Germany, September 5-10, 2004.

Hemmati S. Reductases in *Linum* species. In: Workshop der Graduierten Kollegs Molekular Physiologie, Debringhausen, Germany, June 25-27, 2004.

Hemmati S, Alfermann AW, Fuss E. Diversity of lignans in *Linum* species. In: Future trends in phytochemistry, Gargnano, Italy, May 5-8, 2004.

Hemmati S, Mohagheghzadeh A, Alfermann AW. Quantification of aryltetralin lignans in plant parts and ontogenic stages of *Linum album*. In: Phytochemistry and biology of lignans, Bornheim-Walberberg, Germany, April 6-9, 2003.

Hemmati S, Mohagheghzadeh A, Alfermann AW. *In vitro* cultures of *Linum album* and screening for high lignan producing lines. In: Future trends in phytochemistry, Gargnano, Italy, May 22-25, 2002.

Honors and Awards:

Distinguished Associate Professor, Shiraz University of Medical Sciences, May 2023, Shiraz, Iran.

Distinguished Associate Professor, Shiraz University of Medical Sciences, May 2019, Shiraz, Iran.

Distinguished Assistant Professor, Shiraz University of Medical Sciences, May 2015, Shiraz, Iran.

Postdoc. scholarship from “The Global Climate and Energy Project” (led by Stanford University), Department of Biochemistry, Purdue University, West Lafayette IN, USA.

Ph. D. scholarship from “Gesellschaft von Freunden und Förderen der Heinrich-Heine Universität Düsseldorf (Duesseldorf Entrepreneurs Foundation), Duesseldorf, Germany.

First prize winner from the president (Outstanding pharmacy student-2002).