

Curriculum Vitae

PERSONAL INFORMATION:

Name: Navid Ahmadi Nasab

Date of birth: April-06-1984

Nationality: Iranian

Present Position: Assistant Professor

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Bandar Abbas, Iran. P.O. Box: 3995

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EDUCATION:

2013- 2017: Ph.D, in Biotechnology; University of Guilan, Rasht, Iran

2011- 2013: MSc, in Plant Biotechnology; University of Guilan, Rasht, Iran

PhD THESIS:

Design and preparation of curcumin drug delivery system based on chitosan coated mesoporous silica nanostructures and in vitro evaluation of anticancer effects

MSc THESIS:

Studying the effect of mesoporous nanostructure on biodesulfurization of dibenzothiophene by *Rhodococcus erythropolis* IGTS8

AWARDS and HONORS:

1. Top student award in Plant Biotechnology MSc courses, 2011-2013
2. Top student award in Plant Biotechnology PhD courses, 2013-2017
3. Qualified Expert of Iran high-tech laboratory network in 2016
4. PhD scholarships of Exceptional Talents Center (University of Guilan)
5. Best Article Award in the first national conference of nanotechnology application in industries, mine, agriculture & medicine, Materials and Energy Research Center, Karaj, Iran. May 13-15 2013

EMPLOYMENT (Present & previous positions):

Present: Assistant Professor in Biotechnology Lab of Hormoz Research Center, Hormozgan University, Bandar Abbas, Iran

2013-2018: Head of the Biotechnology Lab of Department of Nanotechnology and Advanced Materials, Materials and Energy Research Center

2010-2013: Research scholar at Energy Department, Materials and Energy Research Center. Address: No.5, Ahoramazda St., Alvand St., Argentina Sq., Tehran, Iran. P.O. Box: 31787-316. **Tel:** +98 26 36280040-9 **Fax:** +98-26-36201888

REVIEWER OF JOURNALS:

Plant Molecular Biology Reporter, Publisher Springer New York LLC, United States, Quartiles =Q1

Journal of Cell & Tissue, a Journal of Science and Research, Iran

RESEARCH SUMMARY:

Present Research Work

Presently, I am working on conjugating natural ligands such as folic acids and hyaluronic acid to albumin for more targeting delivery of natural anticancer agents by detection and interaction with special tumor cell receptors. Also, on the other hand, my aim is working on anticancer activities of different herbal extracts and phytochemicals on various cancer cell lines to detect the different apoptotic pathways and signaling molecules involved in apoptosis cell death (*in-vitro* study). Moreover, my research work is also focused on the antitumor activity of the herbal extracts and compounds in tumor model of mice (*in-vivo* study).

Ph.D. work

The focal aim of my Ph.D. work was based on design and preparation of curcumin drug delivery system based on chitosan coated mesoporous silica nanostructures and *in vitro* evaluation of anticancer effects using different cellular and molecular parameters in tumor and normal cells. For this study, in this study to improve the efficiency and bioavailability of curcumin molecule, chitosan-functionalized MCM-41 mesoporous Silica was used as a pH-sensitive biopolymer.

For this purpose, at first MCM-41 mesoporous silica was synthesized by sol-gel method; then chitosan layer was coated on nanoporous of silica using GPTMS in an acidic medium. Different analysis methods such as TEM, FESEM, SAXS, BET and FTIR were used to characterize the synthesized nanocarrier. The results of TEM images and SAXS pattern showed that structure of pores was hexagonal. FESEM images illustrated that the nanoparticles are monodispersed and have uniform nanospheres with average diameter 180 nm. The results of BET and BJH studies showed that the prepared mesoporous adsorbent has ordered porous structures with surface area of 1048 m²/g and mean pore diameter of 3.28 nm. FTIR analysis peaks showed

successful chitosan-capped MSN and drug loading on nanocarrier. On the other hand, calculation of drug loading content and encapsulation efficiency in acidic and physiologic pH, illustrated that nanocarrier has suitable performance and stability for drug loading and release. In the second part of this study, the bioassay tests of Nano-drug was examined on U87MG glioblastoma cancer cells by MTT assay, cell cycle analysis by propidium iodide staining and apoptosis by annexin V-FITC/PI. The MTT evaluations showed that IC₅₀ after 24 h treatment with free curcumin and curcumin-loaded CS-MCM-41 were 29.60 and 15.12 µg/mL (p<0.05) respectively.

Data of cell cycle and apoptosis assays of cancer cells showed that the encapsulation of curcumin in CS-MCM-41, decreased G1 population but G2/M population and apoptosis were significantly increased compared to that of free curcumin.

Real-time PCR analysis was used to evaluate relative gene expression of genes; *RBI*, *Bcl-2* and *p21*. Data indicated that *Bcl-2* gene expression in cancer cells significantly decreased but *RBI* and *p21* gene tumor suppressor expression in these cells significantly increased after treatment with Cur@CS-MCM-41 in comparison to free curcumin. Eventually this study showed Chitosan-functionalized Mesoporous Silica nanocarrier could significantly increase bioavailability of curcumin compared with free curcumin and this nanocarrier could be considered as a smart and biocompatible drug delivery system for curcumin to cancer cells treatment.

TECHNICAL PROFICIENCY:

Cell and tissue culture: Isolation and culture calvaria osteoblasts and chondrocyte cells from rat model and induction of osteoclasts from bone marrow progenitor cells. Culture and preservation of different osteoblast and different cancer cell lines viz. SaOS2, MG63.

Animal handling: Rats/Mice

In vitro studies: Fluorescence microscopy imaging of cell, cellular uptake behavior of drug-NPs study, cell attachment studies, evaluation of cell proliferation, cell cycle study, mineralization assay, collagenation, alkaline phosphatase activity and anti-resorptive activity in bone cells. Anticancer activity including nuclear apoptosis, DNA fragmentation, Annexin V/FITC, ROS generation and caspase 3 estimation of promising anticancer agents in different cancer cell lines (U87MG, MCF7, A549, HeLa, A431, HEK293, KB, etc.).

Molecular analysis: Isolation and estimation of genomic DNA/RNA, cDNA synthesis, PCR amplification, Restriction digestion, carried out agarose and polyacrylamide gel electrophoresis, quantitative real-time PCR of expression analysis of bone cells specific genes and apoptotic markers of cancer cell lines. Estimation of pro-apoptotic and anti-apoptotic markers of cancer cells and immunoblot analysis of different protein markers in bone cells and cancer cells.

In vivo osteogenic/toxicity studies: RBC lysis assay, LDH release assay, Blood glucose 5 measurements, serum ALP, cholesterol, creatinine, serum glutamic oxaloacetate transaminase (SGOT), serum glutamic pyruvate transaminase (SGPT) and triacyl glycerides. Histology of pancreas, uterus, ovary and microtomy of femur and tibia bones. Estimation of biochemical markers of bone turn over including serum osteocalcin, estradiol and progesterone. Estimation of antioxidant enzymes and bone mineral contents.

Histochemistry and Immunocytochemistry: Histochemical and immunocytochemical localization of osteoclasts markers in decalcified bone tissues.

Proteomics: Isolation and estimation of proteins, PAGE-SDS & Native.

Bioinformatics and computer skills: Knowledge of computational and statistical analysis of biological systems by using softwares viz. RNA-seq analysis, python and r programming for data science, SPSS, and GraphPad Prism 5, BLAST, Primer design using NCBI and other web-based bioinformatics tools.

Microbial techniques: Isolation and identification of antibiotic sensitive bacteria, maintenance of microbiological strains, plasmid isolation from microbial cells, cloning and transformation.

Characterizations of materials techniques: Small-angle X-ray scattering (SAXS), XRD FESEM, TEM, FTIR, BET, TGA, DSC, GC, HPLC and UV-visible spectroscopy

RESEARCH PROJECTS:

Evaluation improving curcumin bioavailability for its therapeutic effect in brain cancer cells. This project was supported by the Cellular and Molecular Research Center, Iran University of Medical Sciences, Tehran, Iran under Grant [27313-117-01-95].

Design and optimization of targeted drug delivery system of curcumin derivative based on albumin nanoparticles conjugated hyaluronic acid in cancer therapy. Materials and Energy Research Center and Faculty of Pharmaceutical Sciences, Paris University, France

Controlled-release of anti-inflammatory from nanohybrid based on Zinc Layered Hydroxide. This project has been financially supported by Azarbaijan Shahid Madani University under the Grant Number 96/603.

Fabrication, characterization and biological evaluation of a new generation of hydroxylethyl cellulose based-scaffold using click chemistry for cartilage repair. This project was supported by INSF, Number 96007287.

Synthesis, characterization and release, kinetic and cytotoxicity study of antibiotics from nanohybrids based on metal-organic frameworks. This project has been financially supported by Azarbaijan Shahid Madani University

Magnetic metal-organic framework nanocomposites for thermo-chemotherapy and controlled release of anticancer drugs. This project has been financially supported by Azarbaijan Shahid Madani University

GRANTS:

Scientific research grants of Iran Nanotechnology Initiative Council (INIC), 2013.

Scientific research grants of Biotechnology Development Council, 2016.

MEMBERSHIPS:

1. Iran high-tech laboratory network
2. Iran Nanotechnology Initiative Council (INIC)
3. Council for Stem Cell Sciences and Technologies
4. Biotechnology Development Council

RESEARCH INTERESTS:

1. Smart Drug Delivery Systems (SDDS)
2. Pharmaceutical Biotechnology
3. Natural Products
4. Nanobiotechnology
5. Molecular pharmacology
6. Bioinformatics and System Biology
7. Cancer Research

WORKSHOPS ORGANIZED:

Cell Culture and Assessment of Bioactive Materials in Materials and Energy Research Center, Tehran, Iran (23-24 January 2015)

Cell Culture Technology and Bioactive Materials Characterization in Materials and Energy Research Center, Tehran, Iran (22-23 February 2016)

WORKSHOPS ATTENDED:

1. Certify "Genetic Engineering Techniques: Real-time (PCR) " Organized by the National Institute of Genetic Engineering and Biotechnology (NIGEB), 17-18 August 2016
2. Certify "Molecular Docking" in Institute of Biochemistry and Biophysics, Laboratory of Systems Biology and Bioinformatics, University of Tehran. 29-30 April 2014
3. Certify "Molecular cloning and bacterial transformation. Incubation Center for Pharmaceutical Technologies (ICPT) of Shahid Beheshti, University of Medical Science and Health Services and Iran Biotechnology Society, Tehran, Iran. 22-23 December 2011
4. Certify " ISO/IEC-17025 Standard for Analytical Measurements" Organized by the Materials and Energy Research Center (MERC), Iran. 26 May 2016
5. Certify "Computational Fluid Dynamic (CFD)" in Institute of Materials and Energy. 3 January 2016
6. Training Course Certificate: "Nanobiosensor" in Institute of Biochemistry and Biophysics, University of Tehran. 5-6 March 2013
7. Certify "Cell Culture and Assessment of Cell death and Cytotoxicity" Organized by the National Institute of Genetic Engineering and Biotechnology (NIGEB), 5-6 May 2014

8. Certify "Linux for Biologists" in Institute of Biochemistry and Biophysics, Laboratory of Systems Biology and Bioinformatics, University of Tehran. 1 May 2014
9. Certify " Scanning Electron Microscope (SEM)" Organized by the Materials and Energy Research Center (MERC), Iran. 20 February 2017
10. Certify "General information about small angle scattering (SAXS and SANS) and light scattering and illustrating it by givesome examples from polymer science" which was introduced by professor Bo Orijan Gunnar Nystrom University of Oslo Norwa "INN International Conference/Workshop on "Nanotechnology and Nanomedicine" NTN2017. 2-3 May 2017
11. Certificate of attendance "Iran-Korea Nanotechnology Workshop (IKNW-2012)" in Tarbiat Modares University, Tehran, Iran. 2-3 October 2012
12. Certify "Nanoscale Heat Transfer: Fundamentals and Engineering Aspects" which was introduced by professor Fatemeh Esmaceli University of Utah USA "INN International Conference/Workshop on "Nanotechnology and Nanomedicine" NTN2017. 2-3 May 2017
13. Certify "Nanobiomaterials surface characterization by X-Ray photoelectron spectroscopy (XPS): chemical composition, in-depth analysis and nano-imaging" which was introduced by professor Shaaker Hajati "INN International Conference/Workshop on "Nanotechnology and Nanomedicine" NTN2017. 2-3 May 2017
14. Certify " Genetic Engineering & Molecular techniques" training included the topics: nucleic acid extraction & gel electrophoresis, molecular principles of PCR, primer design, cDNA synthesis & RT-PCR, molecular cloning and bacterial transformation. Central labs of Shahid Beheshti, University of Medical Science and Health Services. For 60 hours, Tehran, Iran. July 2014

CONGRESS PRESENTATIONS:

1. **Navid Ahmadi Nasab**, Masoume Keshavarz, Armin Ahmadi Nasab, Alireza Kolahi. (2017) "In vitro cytotoxicity evaluation of free curcumin and curcumin-loaded chitosan capped mesoporous silica nanocarriers against MCF-7 breast cancer cells" International Conference/Workshop on "Nanotechnology and Nanomedicine", At Materials and Energy Research Center (MERC), Karaj, Iran.
2. Mansoureh Ganjali, Monireh Ganjali, **Navid Ahmadi Nasab**. (2017) " Study on cytotoxicity effect of laser synthesis of silver nanoparticles on human breast adenocarcinoma cell line" International Conference/Workshop on "Nanotechnology and Nanomedicine", At Materials and Energy Research Center (MERC), Karaj, Iran.
3. **Navid Ahmadi Nasab**, Hassan Hassani Kumleh, Mahmood Kazemzad, Farideh Ghavi Panjeh, Fatemeh Davoodi-Dehaghani (2013) " Biological recovery from mesoporous silica for desulfurization process from model oil" The first national conference of nanotechnology application in industries, mine, agriculture & medicine, Materials and Energy Research Center, Karaj, Iran.

4. **Navid Ahmadi Nasab**, Hassan Hassani Kumleh, Mahmood Kazemzad, Farideh Ghavi Panjeh, Fatemeh Davoodi-Dehaghani (2013) " Enhanced Biological Desulfurization of model oil" 1st National Conference and Workshop on Nanoscience and Nanotechnology (NCWNN1392), Tarbiat Modares University, Tehran, Iran.
5. **Navid Ahmadi Nasab**, Hassan Hassani Kumleh, Mahmood Kazemzad (2013) "Synthesis of nanoporous materials with spherical molecules for improving internal mass transfer effect", The 1st Bioremediation Conference, Sharif University of Technology, Tehran, Iran.

PUBLICATIONS:

1. **Navid Ahmadi Nasab**, Hassan Hasani Kumleh, Mojtaba Beygzadeh, Shahram Teimourian and Mahmood Kazemzad. (2018) " Delivery of curcumin by a pH-responsive chitosan mesoporous silica nanoparticles for cancer treatment" Artificial Cells, Nanomedicine, and Biotechnology.
2. Maryam Farokhi, Mojgan Heydari, Saeed Hesarak, Nader Nezafati and **Navid Ahmadi Nasab**. (2019) " In vitro bioactivity and cytocompatibility of a novel injectable calcium phosphate cement/silanated gelatin microsphere composite" Journal of Composites Part B.
3. Maryam Saeidifar, Reihaneh Sabbaghzade and **Navid Ahmadi Nasab** (2020) "Biophysical Investigation and Antitumor Potential of Heterocyclic Palladium Based Agent: Cytotoxicity, Spectroscopic and Molecular Docking Approaches in Interaction with Human Serum Albumin" Polycyclic Aromatic Compounds.
4. Maryam Saeidifar, Hamidreza Mirzaei, **Navid Ahmadi Nasab** and Hassan Mansouri-Torshizi. (2017) "Mononuclear Pd(II) complex as a new therapeutic agent: synthesis, characterization, biological activity, spectral, electrochemical and DNA binding approaches". Journal of Molecular Structure – Elsevier.
5. Behzad Soltani, Hafezeh Nabipour and **Navid Ahmadi Nasab**. (2017) "Fabrication, Controlled Release and Kinetic Studies of Indomethacin-Layered Zinc Hydroxide Nanohybrid and its Effect on viability of HFFF2 Cell line" Journal of Dispersion Science and Technology.
6. Behzad Soltani, Hafezeh Nabipour and **Navid Ahmadi Nasab**. (2017) "Efficient Storage of Gentamicin in Nanoscale Zeolitic Imidazolate Framework-8 Nanocarrier for pH-Responsive Drug Release" Journal of Inorganic and Organometallic Polymers and Materials.
7. Behzad Soltani, Hafezeh Nabipour and **Navid Ahmadi Nasab**. (2017) "Gentamicin loaded nanoscale Zn₂(bdc)₂(dabco) frameworks as efficient materials for drug delivery and antibacterial activity" Journal of Inorganic and Organometallic Polymers and Materials.
8. Somaye Shahraki, Ameneh Heidari, Hamidreza Mirzaei, Maryam Saeidifar, **Navid Ahmadi Nasab** and Hassan Mansouri-Torshizi. (2017) "Synthesis, characterization, cytotoxicity, DNA binding and computational studies of an anionic palladium(II) complex derived from 8-hydroxyquinoline and 1,1-cyclobutanedicarboxylate" Journal of the Iranian Chemical Society.

9. **Navid Ahmadi Nasab**, Hassan Hasani Kumleh, Mahmood Kazemzad, Farideh Ghavipankeh. (2014) "Application of spherical mesoporous silica MCM-41 for adsorption of dibenzothiophene (a sulfur containing compound) from Model Oil". Iranian Journal of Chemistry and Chemical Engineering.
10. Mansoureh Ganjali, Monireh Ganjali, **Navid Ahmadi Nasab**. (2018) " cytotoxicity effect of laser synthesis of silver nanoparticles on human breast adenocarcinoma cell line" Journal of Materials Today: Proceedings.
11. Armin Ahmadi Nasab and **Navid Ahmadi Nasab**. (2017) "Review and compare Python and Perl programming languages used in bioinformatics". Shaa journal.
12. **Navid Ahmadi Nasab**, Hassan Hasani Kumleh, Mojtaba Beygzadeh, Shahram Teimourian and Mahmood Kazemzad.(2016) " Formulation, Characterization and Evaluation of Quercetin-loaded Chitosan-functionalized Mesoporous Silica for Targeted Drug Delivery in Cancer Treatment" Journal of Advanced Materials and Technologies (JAMT).
13. **Navid Ahmadi Nasab**, Hassan Hasani Kumleh, Mahmood Kazemzad, Farideh Ghavipankeh, Fatemeh Davoodi-Dehaghani. (2015) "Improvement of desulfurization performance of *R. erythropolis* IGTS8 by assembling of spherical mesoporous silica nanosorbents on the surface of the bacterial cells". Journal of Applied Chemical Research (JACR).

REFERENCES:

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Dr. Manouchehr Vossoughi (Professor) Department of Chemical and Petroleum Engineering & Bioenvironmental Research Center (BBRC), Sharif University of Technology (SUT), Tehran, Iran
Email: vosoughi@sharif.edu ; mvossoughish@gmail.com

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