Sakine Shirvalilou

Finetech in Medicine Research Center, Iran University of Medical Sciences (IUMS),
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Professional Profile

Ph.D. candidate trained in medical physics and radiobiology, with strong communication skills developed from extensive teaching experience and ability to work independently or as part of a team. Presently, my research work is focused on the drug delivery and Nanoparticles in cancer imaging and therapy (in-vitro and in-vivo study).

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Academic Qualifications

2013-2018 PhD in: Medical physics

Iran University of Medical Sciences, Tehran, Iran

PhD title: Evaluation of the Hyperthermia Effect of Radio Frequency Waves and Ionizing Radiation on Response to Therapy-Induced by Nano Graphene Oxide as 5-Iodo-2-deoxyuridine on the Allograft model of C6 Glioma cells in rat

2008-2010 Master of Arts: Atomic & Molecular Physics

Islamic Azad University Mahabad, Iran

Master's Thesis: Atomic Layer Deposition of Noble Metal Thin Films

2004-2008 Bachelor of Arts: Physics

Tabriz University, Tabriz, Iran

Professional Experience

Researcher

2020- current Evaluation of the cytotoxic effect of Ionizing radiation and magnetic hyperthermia in the presence of folic acid conjugated gold coated magnetic core–shell nanoparticles in glioblastoma C6 cell line (NO.19111)

2019-2020 Evaluation of the cytotoxic effects of magnetic hyperthermia in the presence of Janus temperature-sensitive magnetic nanogels as a 5-fluorouracil/Quercetin carrier in C6 glioma Cell Line (NO.16388)

Postdoctoral Researcher

2018-2019 Department of Medical Physics, Iran University of Medical Sciences, Tehran, Iran

Supervisor: Prof. Samideh Khoei

Laboratory Supervisory Experience

2015-2019 Laboratory of Nano-Radiobiology, Department of Medical Physics, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

Academic Employment (Teaching and Research)

2019- current Assistant Professor

Finetech in Medicine Research Center, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

Teaching

2019- current Department of Medical Physics, Iran University of Medical Sciences

- “Molecular Imaging” for PhD students of Medical Physics
- “Radiobiology” for MSc students of Medical Physics
- “Radiation protection” for MSc students of Medical Physics
- “Medical Physics” for medical students
- “Principles of radiation dosimetry” for MSc and PhD students of Medical Physics

2019- current “Theoretical Medical physics” for Pharmacy student: School of Pharmacy-Iran University of Medical Sciences. International campus

Teaching Assistant

2015-2018 Research Assistant to Professor Shiran, Iran University of Medical Sciences

“Physics of ultrasound” for MSc students of Medical Physics

Research Assistant

2019- current Department of Medical Physics, Iran University of Medical Sciences

- Supervisor: Prof. SR. Mahdavi

  Project Title: Evaluation of biological damage and toxicity due to hyperthermia by multiferroic nanostructures on human prostate cancer DU145 cells

- Supervisor: Prof. S. Khoei

  Project Title: Evaluation of the Effect of Alternating Magnetic Field Hyperthermia on the Response to treatment Induced by Targeted Magnetic Nanoparticles carrying fluorescent dye and Doxorubicin in Allograft model of Glioblastoma C6 cancer cells in rat

- Supervisor: Prof. S. Khoei

  Project Title: Evaluation of the cell damages of magnetic hyperthermia and ionizing radiation in the presence of transferrin and folic acid linked magnetic nanoparticles carrying 5-fluorouracil in the retinoblastoma Y79 cancer cell line

- Supervisor: Prof. S. Khoei

  Project Title: Evaluation of biodistribution and tracing of Doxorubicin carrying Folic acid conjugated magnetic-fluorescent nanoparticles under the effect of alternative magnetic field in an allograft model of C6 cell line in rat

- Supervisor: Prof. MB. Shiran

  Project Title: An investigation in to non-thermal effects of ultrasound by gold nanoparticles with different shape (spiky & spherical) in colon cancer in vitro & in vivo

Publications

- Habib Ghaznavi, Milad Shirvaliloo, Saman Sargazi, Zahra Mohammadghasemipour, Zinat Shams, Zahra Hesari, Omolbanin Shahraki, Ziba Nazarlou, Roghayeh Sheervalilou, **Sakine Shirvalilou,** SARS-CoV-2 and Influenza Viruses: Strategies to Cope with Co-infection and Bioinformatics Perspective. Cell Biology International. 2022.
- **Shirvalilou S**, Khoei S, Esfahani AJ, Kamali M, Shirvaliloo M, Sheervalilou R, et al. Magnetic Hyperthermia as an adjuvant cancer therapy in combination with radiotherapy versus radiotherapy alone for recurrent/progressive glioblastoma: a systematic review. Journal of Neuro-Oncology. 2021:1-10.
- Sheervalilou R, Shirvaliloo M, Sargazi S, **Shirvalilou S**, Shahraki O, Pilehvar-Soltanahmadi Y, et al. Application of Nanobiotechnology for Early Diagnosis of SARS-CoV-2 Infection in the COVID-19 Pandemic. Applied Microbiology and Biotechnology. 2021:1-10.
- Sheervalilou R, Shirvaliloo M, Sargazi S, Bahari S, Saravani R, Shahraki J, **Shirvalilou S**, et al. Convalescent Blood: Current Perspective on the Efficacy of a Legacy Approach in COVID-19 Treatment. Blood purification. 2021:1-14.
- Mirzaghavami PS, Khoei S, Khoee S, **Shirvalilou S**, Mahdavi SR, Mahabadi VP. Radio-sensitivity enhancement in HT29 cells through magnetic hyperthermia in combination with targeted nano-carrier of 5-Flourouracil. Materials Science and Engineering: C. 2021;124:112043.
- Kiamohammadi L, Asadi L, **Shirvalilou S**, Khoei S, Khoee S, Soleymani M, et al. Physical and Biological Properties of 5-Fluorouracil Polymer-Coated Magnetite Nanographene Oxide as a New Thermosensitizer for Alternative Magnetic Hyperthermia and a Magnetic Resonance Imaging Contrast Agent: In Vitro and In Vivo Study. ACS omega. 2021.
- Khoei S, Hosseini V, Hosseini M, Khoee S, **Shirvalilou S**, Mahdavi SR, et al. Enhancement of Radio-Thermo-Sensitivity of 5-Iodo-2-Deoxyuridine-Loaded Polymeric-Coated Magnetic Nanoparticles Triggers Apoptosis in U87MG Human

Glioblastoma Cancer Cell Line. Cellular and Molecular Bioengineering. 2021:1-13.

- Karimipour K, Rad JK, **Shirvalilou S**, Khoei S, Mahdavian AR. Spiropyran-based photoswitchable acrylic nanofibers: A stimuli-responsive substrate for light controlled C6 glioma cells attachment/detachment. Colloids and Surfaces B: Biointerfaces. 2021;203:111731.
- Ghaznavi H, Shirvaliloo M, Zarebkohan A, Shams Z, Radina F, Bahmanpour Z, **Shirvalilou S**, et al. Implications of autophagy and apoptosis in tumorgenesis; Possible alterations in autophagy through engineered nanomaterials and their importance in cancer therapy. Molecular Pharmacology. 2021.
- Afzalipour R, Khoei S, Khoee S, **Shirvalilou S**, Raoufi NJ, Motevalian M, et al. Thermosensitive magnetic nanoparticles exposed to alternating magnetic field and heat-mediated chemotherapy for an effective dual therapy in rat glioma model. Nanomedicine: Nanotechnology, Biology and Medicine. 2021;31:102319.
- **Shirvalilou S**, Khoei S, Khoee S, Mahdavi SR, Raoufi NJ, Motevalian M, et al. Enhancement radiation-induced apoptosis in C6 glioma tumor-bearing rats via pH-responsive magnetic graphene oxide nanocarrier. Journal of Photochemistry and Photobiology B: Biology. 2020;205:111827.
- Sheervalilou R, Shirvaliloo M, Dadashzadeh N, **Shirvalilou S**, Shahraki O, Pilehvar-Soltanahmadi Y, et al. COVID-19 under spotlight: A close look at the origin, transmission, diagnosis, and treatment of the 2019-nCoV disease. Journal of Cellular Physiology. 2020;235(12):8873-924.
- Sheervalilou R, Shahraki J, Shahraki O, **Shirvalilou S**, Ghaznavi H. A review on microRNAs' function, detection and evaluation methods, expression dysregulation mechanisms and possible applications in clinical phase as diagnostic, prognostic and therapeutic biomarkers of lung cancer patients. 2020.
- Rajaee Z, Khoei S, Mahdavian A, **Shirvalilou S**, Mahdavi SR, Ebrahimi M. Radio-thermo-sensitivity induced by gold magnetic nanoparticles in the monolayer culture of human prostate carcinoma cell line DU145. Anti-Cancer Agents in Medicinal Chemistry (Formerly Current Medicinal Chemistry-Anti-Cancer Agents). 2020;20(3):315-24.
- Mahdavi S, Khalafi L, Nikoofar A, Fadavi P, Arbabi Kalateh F, Aryafar T, **Shirvalilou S**, et al. Thermal enhancement effect on chemo-radiation of glioblastoma multiform. International Journal of Radiation Research. 2020;18(2):255-62.
- Golbaz R, Khoei S, Khoee S, **Shirvalilou S**, Safa M, Mahdavi SR, et al. Apoptosis pathway in the combined treatment of x-ray and 5-FU-loaded triblock copolymer-coated magnetic nanoparticles. Nanomedicine. 2020;15(23):2255-70.
- Changizi O, Khoei S, Mahdavian A, **Shirvalilou S**, Mahdavi SR, Rad JK. Enhanced radiosensitivity of LNCaP prostate cancer cell line by gold-photoactive nanoparticles modified with folic acid. Photodiagnosis and photodynamic therapy. 2020;29:101602.
- **Shirvalilou S**, Khoei S, Khoee S. In Vivo 3T Magnetic Resonance Imaging (MRI) of Rat Brain Glioma-Bearing Tumor: A Comparison with Digital Caliper Measurement and Histology. Frontiers in Biomedical Technologies. 2019;6(2):73-8.

- Afzalipour R, Khoei S, Khoee S, **Shirvalilou S**, Jamali Raoufi N, Motevalian M, et al. Dual-targeting temozolomide loaded in folate-conjugated magnetic triblock copolymer nanoparticles to improve the therapeutic efficiency of rat brain gliomas. ACS Biomaterials Science & Engineering. 2019;5(11):6000-11.
- Afzalipour R, Darniani SZ, **Shirvalilou S**, Minaei SE. Occupational Burnout and Its Related Factors Among Medical Imaging Employees in Bandar Abbas Hospitals, Iran. Hormozgan Medical Journal. 2019;22(4):e89349-e.
- **Shirvalilou S**, Khoei S, Khoee S, Raoufi NJ, Karimi MR, Shakeri-Zadeh A. Development of a magnetic nano-graphene oxide carrier for improved glioma-targeted drug delivery and imaging: in vitro and in vivo evaluations. Chemico-biological interactions. 2018;295:97-108.
- Rezaie P, Khoei S, Khoee S, **Shirvalilou S**, Mahdavi SR. Evaluation of combined effect of hyperthermia and ionizing radiation on cytotoxic damages induced by IUdR-loaded PCL-PEG-coated magnetic nanoparticles in spheroid culture of U87MG glioblastoma cell line. International journal of radiation biology. 2018;94(11):1027-37.
- Rajaee Z, Khoei S, Mahdavi SR, Ebrahimi M, **Shirvalilou S**, Mahdavian A. Evaluation of the effect of hyperthermia and electron radiation on prostate cancer stem cells. Radiation and environmental biophysics. 2018;57(2):133-42.
- Keyvan Rad J, Mahdavian AR, Khoei S, **Shirvalilou S**. Enhanced photogeneration of reactive oxygen species and targeted photothermal therapy of C6 glioma brain cancer cells by folate-conjugated gold–photoactive polymer nanoparticles. ACS applied materials & interfaces. 2018;10(23):19483-93.
- Kargar S, Khoei S, Khoee S, **Shirvalilou S**, Mahdavi SR. Evaluation of the combined effect of NIR laser and ionizing radiation on cellular damages induced by IUdR-loaded PLGA-coated nano-graphene oxide. Photodiagnosis and photodynamic therapy. 2018;21:91-7.
- Bakhtiarzadeh F, Nahavandi A, Goudarzi M, **Shirvalilou S**, Rakhshan K, Niknazar S. Axonal transport proteins and depressive like behavior, following Chronic Unpredictable Mild Stress in male rat. Physiology & behavior. 2018;194:9-14.
- Asadi L, **Shirvalilou S**, Khoee S, Khoei S. Cytotoxic effect of 5-fluorouracil-loaded polymer-coated magnetite nanographene oxide combined with radiofrequency. Anti-Cancer Agents in Medicinal Chemistry (Formerly Current Medicinal Chemistry-Anti-Cancer Agents). 2018;18(8):1148-55.
- Sheervalilou R, **Shirvaliloo S**, Fekri Aval S, Khamaneh AM, Sharifi A, Ansarin K, et al. A new insight on reciprocal relationship between microRNA expression and epigenetic modifications in human lung cancer. Tumor Biology. 2017;39(5):1010428317695032.
- Sheervalilou R, Ansarin K, Fekri Aval S, **Shirvaliloo S**, Pilehvar-soltanahmadi Y, Mohammadian M, et al. An update on sputum Micro RNA s in lung cancer diagnosis. Diagnostic cytopathology. 2016;44(5):442-9.
- **Shirvaliloo S**, Kangarloo H. Production of iridium metal thin films for application as electrodes in DRAMs and FRAMs. Journal of Electrical and Electronic Engineering. 2015;3(2-1):35-8.

- Kangarlou H, **Shirvaliloo S**. Protection effect of gold nanoparticles coated on fruit and vegetables using PVD method. Journal of Applied Sciences. 2012;12(17):1782-91.

Conferences Presentations/Posters

Presentations

- **S Shirvalilou**, S Khoei, S Khoee, S Emamgholizadeh Minaei, (2018) Magnetic Graphene Oxide Nanocarrier as a drug delivery vehicle for MRI monitored magnetic targeting of rat brain tumors. 12th Iranian Congress of Medical Physics, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
- S Emamgholizadeh Minaei, S Khoei, S Khoee, **S Shirvalilou**, (2018) Formulation of temozolomide by folic acid-conjugated tri-block copolymer nanoparticles for targeted drug delivery, 12th Iranian Congress of Medical Physics, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
- Sheervalilou R, Fekri SH, **Shirvaliloo S**, (2014) Evaluation of airway miRNAs in nasal biopsies of asthma and rhinitis patients. 7th International Congress of Laboratory and Clinic (Infectious Disease) and 1th Conference of Clinical Virology, Tehran, Iran.
- **Shirvaliloo S**, Kangarloo H, Khalafi L, Faramarzi V, Zahedifard L, (2014) Production of Carbon Nano Tube for Application as Save Data Devices. 4th International Conference on Information Technology Management, Communication and Computer.93.104.214. Tehran, Iran.
- Sheervalilou R, Vardyani M, Ghadiri F, Alipour M, **Shirvaliloo S**, (2013) Resveratrol administration effect on diabetes-induced pulmonary inflammation. 21th Iranian congress of Physiology and Pharmacology. 10341. Tabriz, Iran.
- Sheervalilou R, Vardyani M, Ghadiri F, Alipour M, **Shirvaliloo S**, (2013) Resveratrol administration effect on diabetes-induced pulmonary oxidative stress and ultra-structure of lung. 21th Iranian congress of Physiology and Pharmacology. 10341. Tabriz, Iran.
- **Shirvaliloo S**, Kurepaz A, (2012) Production of Iridium Metal Thin Films for Application as electrodes in RAMs of Computer. National Conference Physics. Shooshtar, Iran.
- **Shirvaliloo S**, Eisaloo N, Evaluation of Optical Constants of Thin Films of Copper Oxide on Silicon substrates by Sputtering. Regional Conference Nano Technology. Mahabad, Iran.

Posters

- **Shirvalilou Sakine**, Khoei Samideh, Khoee Sepideh, (2019) In vivo 3T magnetic resonance imaging (MRI) of rat brain glioma-bearing tumor: A comparison with

digital Caliper measurement and Histology. 3rd Iranian Symposium on Brain Mapping Updates, Tehran, Iran.

- **Sakine Shirvalilou**, Samideh Khoei, Sepideh Khoee, Nida Jamali Raoufi, (2017) Multifunctional magnetic graphene-based Nanoparticles design for drug delivery, Second Nanomedicine and Nanosafety Conference, Tehran, Iran.
- **Shirvaliloo S**, Khalafi L, Sheervalilou R, (2014) Internal Dosimetry for Targeted Radionuclide Therapy. 11th Iranian Conference of Medical Physics. 9301. Tehran, Iran.
- **Shirvaliloo S**, Kangarloo H, (2013) Protection Effect of Gold Nanoparticles Coated on Fruits Using PVD Method. 1th International e-Conference Novel Food Processing. Mashhad, Iran.

Technical Skills

- Cellular biology: Monolayer and spheroid cell culture, MTT test
- Microscopy: Fluorescence and light microscopy.
- Molecular biology: Primers design, RNA extraction, cDNA synthesis, Real-time PCR, DNA gel analysis, Annexin V/FITC
- Biochemistry: Protein extraction, Western blotting
- Animal manipulation: Handling, Feeding, Tumor modeling, Stereotaxic, harvesting of liver, spleen, heart, Kidney and brain, Tail vein injection.
- Histochemistry: Slide Preparation, Staining
- Nanotechnology: Drug delivery, Photothermal therapy, Magnetic hyperthermia
- Bioinformatics skills: SPSS, and GraphPad Prism 9 (statistical analysis software), Oligo 7 and Primer 3 (Primer Design software), ImageJ, MaZda (Image processing software)
- ISOGray Software (Treatment Planning System Dose calculation)
- Systematic Review and Meta-Analysis (search and analysis)
- Write manuscript for publications

Professional Memberships

Royal Society of Biology, England

Medical Physics Society, IRAN

Leadership Activities / Extra-Curricular Activities

2019- current	Vice-President of Finetech in Medicine Research Center, School of Medicine, Iran University of Medical Sciences, Tehran, Iran
2019- current	Web Designer of Finetech in Medicine Research Center, School of Medicine, Iran University of Medical Sciences, Tehran, Iran
2019- current	Member of the Iran University of Medical Sciences Research Council
2013-2018	Student Representative, Department of Medical Physics, Iran University of Medical Sciences

Languages and Computer Skills

Languages	Turkish (Mother tongue); Persian (Native); English (Fluent)
Computer	Proficient in Microsoft office, Camtasia, Adobe Photoshop

Referees

- Prof. Samideh Khoei (PhD Supervisor)
  Department of Medical Physics
  Iran University of Medical Sciences
  Tehran, Iran, 14155-6183
  E-mail: Khoei.s@iums.ac.ir

- Prof. Sepideh Khoee (PhD Supervisor)

  Polymer Laboratory, School of Chemistry

  College of Science, University of Tehran

  Tehran, Iran, 14155-6455

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- Dr. Ali Shakeri-Zadeh (PhD Supervisor Assistant)

  Cellular Imaging Section and Vascular

  Biology Program, Institute for Cell Engineering

  The Johns Hopkins University School of Medicine,

  Baltimore, MD, USA

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