Shima Davoudi

Shahid Beheshti University of Medical Sciences

Academic Degree: PhD in Physiology

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Research Interests

- The mechanisms of neurodegeneration and neurodevelopmental disorders.
- Neurobehavior.
- Electrophysiology.
- Immunohistochemistry.

Motivation

An enthusiastic, adaptive, and fast-learning person with a broad and acute interest in innovative research based approaches, I enjoy collaborating with scientists from different disciplines to develop new skills and solve new challenges

Education

1. PhD Student of Medical physiology |Shahid Beheshti University of Medical Science|2016-2023 |Thesis: Investigating the astroglia-neuron interaction in the hippocampal CA1 area in a rat model of autism: Focusing on the role of aquaporin 4|Supervisor: Dr. Mahyar Janahmadi

2. Master of Medical physiology| Kashan University of Medical Science| 2013-2016|Thesis: Effect of sertraline and nitrergic system on pentylenetetrazole induced seizure in mice| Supervisor: Dr.Azhdar Heydari

3. Bachelor of Surgical Technology| Isfahan University of Medical Science| 2009-2013

Position held

1. Assistant Professor (Since 2024), Medical School, Shahid Beheshti Medical Sciences University, Tehran, Iran

Publication

1. Azhdar Heydari, **Shima Davoudi** |The effect of sertraline and 8-OH-DPAT on the PTZ_induced seizure threshold: Role of the nitrergic system| European Journal of Epilepsy-Seizure | DOI: 10.1016/j.seizure.2016.12.005

2. Razieh Hajisoltani, Seyed Asaad Karimi, Mona Rahdar, **Shima Davoudi**, Mehdi Borjkhanic, Narges Hosseinmardi, Gila Behzadi, Mahyar Janahmadi |Hyperexcitability of hippocampal CA1 pyramidal neurons in male offspring of a rat model of autism spectrum disorder (ASD) induced by prenatal exposure to valproic acid: A possible involvement of Ih channel current| Brain research journal | DOI: 10.1016/j.brainres.2018.12.011

3. Maryam Khodaverdi, Mona Rahdar, **Shima Davoudi**, Razieh Hajisoltani, Zohreh Tavssoli, Zahra Ghasemi, AeenEbrahim Amini, Narges Hosseinmardi, Gila Behzadi, Mahyar Janahmadi | 5-HT7 receptor activation rescues impaired synaptic plasticity in an autistic-like rat model induced by prenatal VPA exposure | Neurobiology of Learning and Memory | DOI: 10.1016/j.nlm.2021.107462

4. Negin Saeedi, Mahgol Darvishmolla, Zohreh Tavassoli, **Shima Davoudi**, Soomaayeh Heysieattalab, Narges Hosseinmardi, Mahyar Janahmadi, Gila Behzadi | The role of hippocampal glial glutamate transporter (GLT-1) in morphine-induced behavioral responses| Brain and Behavior | DOI: 10.1002/brb3.2323

5. Shima Ebrahimi Khonacha, Seyed Hamidreza Mirbehbahani, Mona Rahdar, **Shima Davoudi**, Mehdi Borjkhani, Fariba Khodaghli, Fereshteh Motamedi, Mahyar Janahmadi | Kisspeptin-13 prevented the electrophysiological alterations induced by amyloid-beta pathology in rat: Possible involvement of stromal interaction molecules and pCRE | Brain Research Bulletin | DOI: 10.1016/j.brainresbull.2022.03.003

6. Mona Rahdar, Razieh Hajisoltani, **Shima Davoudi**, Seyed Asaad Karimi, Mehdi Borjkhani, Vahid Ahli Khatibi , Narges Hosseinmardi, Gila Behzadi, Mahyar Janahmadi |Alterations in the intrinsic discharge activity of CA1 pyramidal neurons associated with possible changes in the NADPH diaphorase activity in a rat model of autism induced by prenatal exposure to valproic acid | Brain Research |DOI: 10.1016/j.brainres.2022.148013

7. Vahid Ahli Khatibi, Mona Rahdar, Mahmoud Rezaei, **Shima Davoudi**, Milad Nazari, Mohammad Mohammadi, Mohammad Reza Raoufy, Javad Mirnajafi-Zadeh, Narges Hosseinmardi, Gila Behzadi, Mahyar Janahmadi| The Glycolysis Inhibitor 2-Deoxy-d-Glucose Exerts Different Neuronal Effects at Circuit and Cellular Levels, Partially Reverses Behavioral Alterations and does not Prevent NADPH Diaphorase Activity Reduction in the Intrahippocampal Kainic Acid Model of Temporal Lobe Epilepsy | Neurochemical Research | DOI: 10.1007/s11064-022-03740-8

8. Vahid Ahli Khatibi, Morteza Salimi, Mona Rahdar, Mahmoud Rezaei, Milad Nazari, Samaneh Dehghan, **Shima Davoudi**, Mohammad Reza Raoufy, Javad Mirnajafi-Zadeh, Mohammad Javan, Narges Hosseinmardi, Gila Behzadi, Mahyar Janahmadi | Glycolysis inhibition partially resets epilepsy-induced alterations in the dorsal hippocampus-basolateral amygdala circuit involved in anxiety-like behavior | Scientific Report | https:// doi.org/10.1038/s41598-023-33710-1

9. **Shima Davoudi**, Mona Rahdar, Narges Hosseinmardi, Gila Behzadi, Mahyar Janahmadi| Chronic inhibition of astrocytic aquaporin-4 induces autistic-like behavior in control rat offspring similar to maternal exposure to valproic acid| Physiology and Behavior | https:// doi.org/10.1016/j.physbeh.2023.114286

10. Zahra Hosseindokht, **Shima Davoudi**, Mona Rahdar, Mahyar Janahmadi, Mohammadreza Kolahdouz, Pezhman Sasanpour | Photoacoustic viscoelasticity assessment of prefrontal cortex and cerebellum in normal and prenatal valproic acid-exposed rats| Photoacoustics | https://doi.org/10.1016/j.pacs.2024.100590

11. Mona Rahdar, **Shima Davoudi**, Samaneh Dehghan, Mohammad Javan, Narges Hosseinmardi, Gila Behzadi, Mahyar Janahmadi | Reversal of electrophysiological and behavioral deficits mediated by 5-HT7 receptor upregulation following LP-211 treatment in an autistic-like rat model induced by prenatal valproic acid exposure |Neuropharmacology| https://doi.org/10.1016/j.neuropharm.2024.110057

12. Mohammad J. Eslamizade, Fatemeh Saffarzadeh, Sanaz Khatami, **Shima Davoudi**, Zahra Soleimani, Sara Anajafi, Amineh Khoshnazar, Mehdi Mehdizadeh, Samira Mohammadi-Yeganeh, Mahyar Janahmadi | Deregulation of Melatonin Receptors and Differential Modulation of After-Hyperpolarization and Ih Currents Using Melatonin Treatment Due to Amyloid-β-Induced Neurotoxicity in the Hippocampus | Cell Biochemistry and Function | https://doi.org/10.1002/cbf.4129

13. **Shima Davoudi**, Ablofazl Ardjmand, Azhdar Heydari | Effects of dietary nitrate or nitrite supplementation on inhibitory avoidance task and pentylenetetrazole induced clonic seizure threshold in mice | Physiology and Pharmacology | http://dx.doi.org/10.61186/phypha.28.3.295

14. **Shima Davoudi**, Mona Rahdar, Mehdi Borjkhani, Hamid Alavi-Majd, Narges Hosseinmardi, Gila Behzadi, Mahyar Janahmadi | The Impact of Astroglia Kir4.1 Channel Dysfunction on Neuronal Activity and Autism-Related Behavioral Abnormalities | Glia | https://doi.org/10.1002/glia.24676

15. Zahra Soleimani, **Shima Davoudi**, Fatemeh Saffarzadeh, Gila Behzadi, Mehdi Mehdizadeh, Mona Rahdar, Narges Hosseinmardi, , Mahyar Janahmadi, Mohammad J Eslamizade | Restoring neuronal excitability and spatial memory through inhibiting amyloid-β-induced hyperactive NF-κB in a rat model of Alzheimer's disease | Brain Research | https://doi.org/10.1016/j.brainres.2025.149703

16. Vesal Abbasian, **Shima Davoudi**, Amin Vahabzadeh, Mohammad Javad Maftoon-Azad, Mahyar Janahmadi | Astroglial Kir4.1 and AQP4 Channels: Key Regulators of Potassium Homeostasis and Their Implications in Autism Spectrum Disorders | Cellular and Molecular Neurobiology | https://doi.org/10.1007/s10571-025-01574-w

17. Mona Rahdar, Morteza Salimi, Kiarash Eskandari, Milad Nazari, **Shima Davoudi**, Mohammad Reza Raoufy, Javad Mirnajafi-Zadeh, Narges Hosseinmardi, Gila Behzadi, Mahyar Janahmadi | Behavioral assessments and differential excitability, oscillatory dynamics in dorsal and ventral hippocampal CA1 neurons in male rats of a prenatal VPA-exposed autism model | Progress in Neuropsychopharmacology & Biological Psychiatry | https://doi.org/10.1016/j.pnpbp.2025.111507

18. Ali Asghar Peyvandi, **Shima Davoudi**, Narges Bazgir, Mahyar Janahmadi, Hamid Norioun, Shahrokh Khoshsirat, Somayeh Niknazar | A time course analysis of the electrophysiological and gene expression properties during differentiation of hair cell-like cells in culture | Experimental Cell Research | https://doi.org/10.1016/j.yexcr.2025.114775

Research Projects

1. Effect of acute and long term exposure of caffeine on pentylenetetrazole- induced clonic seizure threshold in mice: role of nitrergic system

2. Effect of chronic dietary nitrate and nitrite supplementations on pentylenetetrazole-induced clonic seizure threshold and inhibitory avoidance memory in mice
3. Investigating the effect of astrocytic aquaporin-4 inhibition on autistic-like behaviors in male rats
4. Investigating the possible differential effects of the autism-like behavioral induction on the electrophysiological properties and functional connectivity of dorsal and ventral hippocampal CA1 pyramidal neurons

Conferences Attended

1. Effect of sertraline on pentylenetetrazole-induce clonic seizure in mice: role of nitrergic system|4th neuroscience congress2015|Poster Presentation

2. Nitric oxide modulate the anticonvulsant effect of 8-OH-DPAT on PTZ-induce in mice|5th neuroscience congress 2016| Oral Presentation

3. Seizure severity alteration through 5HT1A receptor: involvement of nitric oxide|17th annual research congress of Iranian medical students | Oral Presentation

4. The effect of sertraline and 8-OH-DPAT on the PTZ_induced seizure threshold: Role of the nitrergic system| 2st International and 23th Iranian Congress of Physiology and Pharmacology| Poster Presentation

5. Effect of acute and chronic caffeine administration on PTZ-induced clonic seizure in mice: role of nitrergic system| 2st International and 23th Iranian Congress of Physiology and Pharmacology |Oral Presentation

6. The contribution of astrocytic kir4.1 channels to behavioral impairment in a rat model of autistic-like model of autism induced by valproic acid prenatal exposure | 5st International and 26th Iranian Congress of Physiology and Pharmacology | Oral Presentation

7. The contribution of astrocytic kir4.1 channels to neuronal excitability in prenatal valproic acid-exposued model of autism | Georgian Brain & Neuroplasticity conference-2024 | Oral Presentation

8. Targeting Astrocytic Aquaporin-4 as a Contributor to Anxiety and Repetitive Behaviors: Insights from a VPA-Induced Rat Model of Autism | 9th Congress of the Serbian Neuroscience Society held in Belgrade, Serbia | Poster Presentation with a short Oral Presentation

Workshop

1. Patch clamp workshop, department of physiology, Tarbiat Modares University, Tehran, Iran| May 6-10, 2018

2. IBRO-VLTP Course in Neuroscience, Tarbiat Modares University, Tehran, Iran| September 30- October 7,2019

Student thesis (Supervisor and Advisor)

1. Investigation and comparison of the effects of inhibiting NF-κB and HCN ion channels on behavioral changes caused by beta-amyloid injection in the frontal cortex of laboratory rats | MSc Student: Zahra Soleimani | Adviser

2. Behavioral Investigation of the Interplay Between Adenosinergic and Cannabinoid Systems in a rat model of autism induced by prenatal exposure to valproic acid | MSc Student: Amin Vahabzade | Adviser

3. Dopaminergic Modulation of CA1 Hippocampal Pyramidal Neurons in a rat model of valproic acid-induced Autism: Exploring behavioral and Electrophysiological Implications | PhD Student: Mohammad Javad Maftoon Azad | Adviser

4. Investigating the Behavioral Consequences of Interplay between KATP and KCa Channels in a Rat Model of Alzheimer's Disease | MSc Student: Kimia Taghian | Supervisor

Teaching Experience

1. Teaching laboratory physiology for students of Medicine, Dentistry, Pharmacy and paramedical students. Kashan University of Medical Science. (2015-2016)

2. Teaching laboratory physiology for students of Medicine, Dentistry, and Pharmacy. Shahid Beheshti University of Medical Sciences. (2024 to present)

3. Teaching medical physiology for students of paramedical students. Shahid Beheshti University of Medical Sciences. (2024 to present)

4. Teaching Neurophysiology for students of Medicine and Dentistry students. Shahid Beheshti University of Medical Sciences. (2024 to present)

Activity Assistant

1. Member of the Executive Committee|1st International and 22th Iranian Congress of Physiology and Pharmacology

2. Member of the Executive Committee|17th annual research congress of Iranian medical students

Research Experiences & Skills

1. Patch Clamp Recording (In Vitro-Whole cell)
2. Stereotaxic Surgery of Rat and Mouse Brain

3. Behavioural Tasks (including Social interaction test, Zero maze, EP maze, Novel object recognition test, Open field, etc.)
4. Induced animal models for neurodegenerative disorder (including Seizure and VPA-induced model of Autism)

5. Measurement of nitric oxide metabolites with the Greiss method (ELIZA)
6. Light microscopy, fluorescence microscopy
7. Use of Centrifuges: standard /Use of pH meter / Use of Osmometer

8. Perfusions of animals (Rat and Mouse)
9. Embedding processes: paraffin
10. Tissue sectioning by a micro and vibra-tome and cryostats to make slides (paraffin, etc.)

11. Staining techniques (including Nissl, Neutral red, NADPH diaphorase staining)
12. Retrograde fluorescent fast blue tracing
13. Immunohistochemistry (including DAPI, GFAP)
14. Basic techniques for laboratory animals (including Handling, Injection, Blood collection and vaginal smear - Breed and maintain a population of rodents)

Skills & Abilities

1. Computer Skill

Graph Pad Prism, SPSS, Microsoft office, Mendeley, EndNote, Electrophysiology Software, Adobe illustrator

2. Language Skill

Persian, English