Dr. Manish Mishra, PhD
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Professional Summary

Detail-oriented Biomedical researcher with more than 5 years of experience in preclinical research in aging, frailty, cardiovascular science, protein/cellular science and immunology. Expertise in experimental design, data analysis, interpretation and troubleshooting, scientific writing, review and presentation. Proven ability to lead research projects, publish in peer-reviewed journals, and collaborate across research teams.

Work Experience

(1) Department of Pharmacology, Dalhousie University, Halifax, Canada

Research Associate: [Jan 2024 - March 2025]
Postdoctoral Fellow: [Oct 2022 - Dec 2023]
Reynolds Postdoctoral Fellow: [Oct 2019 - Oct 2022]
Projects: (i) Effect of ACE-inhibitor (Enalapril) on cellular senescence & frailty in aging mice.
(ii) Impact of frailty and sex-steroid hormones on cardiovascular disease expression in mouse models.

(2) Department of Neurobiology, Physiology and Behavior, University of California, Davis

Research Fellow: [May 2018 - July 2019]
Projects: (i) Regulation of molecular and cellular changes in the heart by ubiquitin proteins.
(ii) Improvement in Western blotting technique for protein analysis.

(3) Justus Liebig Universität, Giessen, Germany

Research Fellow: [June 2009-Nov. 2010]
Project: Molecular mechanisms of apoptosis regulation in lymphocytes by exercise and training.

(4) Center for Applied Medical Research, Pamplona, Spain

Research Fellow: [Jan-Nov. 2007]
Project: Evaluation of function of Indoleamine 2, 3-deoxygenase gene in murine hepatocytes.

(5) National Institute of Immunology, New Delhi, India

Project Assistant: [Jun 2005-Aug 2006]
Projects: Characterization of non-toxic LPS-derivative (LPS-NABA) in development of adjuvant.

(6) Centre for Cellular and Molecular Biology, Hyderabad, India

Project Research-Fellow: [Nov. 2003-Dec. 2004]
Project: Creation of radiation hybrid mapping panel for Indian Buffalo. (Genome sequencing)

Education

PhD in Physiology
University of Saskatchewan, Saskatoon, Canada.

Master of Science in Biotechnology
Awadhesh Pratap Singh University, Rewa, India.

Bachelor of Science in Biology
Maharshi Dayanand University, Ajmer, India.

***Immigration status/ Nationality:** Canadian

Core Preclinical Research Skills and Strength

- **DNA, RNA**: (isolation and purifications), PCR, RT-PCR, and qPCR, Electrophoresis
- **Proteomics skills**: Protein isolation, purification, SDS PAGE, Western blotting and detection, Immunohistochemistry and basic Mass Spectrophotometer
- **Protein and cellular assays**: ELISAs, cytokines, drug toxicity and apoptosis assays. Tissue fibrosis, oxidative stress and enzymatic assays. Basic flow cytometer and microbiology skills.
- **Preclinical Drug Testing and evaluation**
- **Cell culture**:
  Primary cultures: Hepatocytes, Cardiomyocytes, Macrophages
  Cell lines: C2C12, HepG2, HuH7, Hep3b, Raw 264.7, THP1, HEK cells
- **Rodent handling** (Mice & Rats): Basic animal surgeries, drug treatments, Echocardiography, Frailty measurements, Exercise protocols and breeding
- **Preclinical models:** Zuker diabetic fatty rats, Obese Zuker fatty rats, Spontaneously hypertensive rats (SHR), Angiotensin II-induced hypertensive mice, Streptozotocin and alloxan induced diabetics rats, Diet-induced obese mice models
- **Data analysis tools:** Microsoft Office, Bio-Rad CFX Maestro & Image Lab, Sigma Plot 14, GraphPad 10.0**,** Bioinformatics tools (BLAST, NCBI)
- Grant/scientific writing, publication and project management skills

Teaching and mentoring Activity

- **Teaching assistant:** PHPY 306 course, Department of Physiology, University of Saskatchewan, (Sep. 2012 - Aug. 2015).

- **Mentoring**: Graduate students, Honors and summer students.

  i) Department of Pharmacology, Dalhousie University. (Oct 2019-March2025).

  ii) NPB Department, University of California, Davis. (May 2018 - July 2019)

Academic Journal review Activity

(i) **PloS Journal** (Reviewer)

(ii) **Oxidative Medicine and Cellular Longevity Journal** (Reviewer)

Awards and Honors

- **Dr. Magda Horackova Research award:** Department of Pharmacology, Dalhousie University, Cardiac Research Day. Halifax, Canada. (27th March 2023),

- **Reynolds Postdoctoral Fellowship 2019:** Department of Pharmacology, Dalhousie University, Halifax, Canada. (Oct. 2019 - Oct. 2022)

- **James Reagan Cardiology Scholarship:** (Sep. 2014 - Aug. 2017), College of Medicine, University of Saskatchewan, Canada.

- **Have a Heart Bursary Award 2015:** (Oct. 24-27, 2015), Canadian Cardiovascular Society Academy, Canada for excellence in the cardiovascular research field.

- **Travel Award** from Canadian Hypertension Society for presentation at Canadian Hypertension Congress, Toronto, (Oct. 22-24, 2015).

- **CIHR-ICS Travel Award 2015:** Institute of Nutrition, Metabolism & Diabetes, Canada for Experimental Biology Meeting-2016, San Diego, USA.

- **Graduate Teaching Assistantship Award:** (Sep. 2013 - Aug. 2014), College of Medicine, University of Saskatchewan, Canada.

- **Conference Travel Award:** College of Medicine, University of Saskatchewan for Canadian Hypertension Congress, Montreal, (Oct.17-19, 2013).

- **Trainee Travel Award:** from Canadian Hypertension Society for oral talk at Canadian Hypertension Congress, Montreal, (Oct. 17-19, 2013).

Publications:

1) Khuong N, **Mishra M*,** Banga S, Howlett SE. Angiotensin II promotes ventricular fibrosis and systolic dysfunction more in aging male mice than in females. **GeroScience 7th Nov 2025,** (*First Co-author).

2) **Mishra M**, Wu J, Kane AE, Howlett SE**.** The Intersection of Frailty and Metabolism. **Cell Metab. 2024 May 7;36(5):893-911**

3) Banga S, **Mishra M**, Heinze-Milne S, Hailey J. Jansen, Robert A Rose, Howlett SE, Chronic testosterone deficiency increases late inward sodium current and promotes 3 triggered activity in ventricular myocytes from aging male mice. **Am J Physiol Heart Circ Physiol 325: H264–H277, 2023.**

4) **Mishra M,** Howlett SE**.** Reference Genes in Aging Tissues: What are you referring To ? (**Editorial**). **AGING 2023**, **Vol. 15**, **Advance**.

5) **Mishra M,** Kane AE, Young AP, Howlett SE**.** Age, sex, and frailty modify the expression of common reference genes in skeletal muscle from ageing mice**. Mech Ageing Dev. 2022 Dec 9; 210:111762.**

6) Prasad K, **Mishra M.** Mechanism of Hypercholesterolemia-Induced Atherosclerosis. **Rev. Cardiovasc. Med. 2022; 23(6): 212.**

7) **Mishra M,** Howlett SE**.** Preclinical models of frailty: focus on interventions and their translational impact. **Nutrition and Healthy Aging 2021,** vol.6 no.1 17-33.

8) Tiwari S, **Mishra M**, Salemi MR, Phinney BS, Newens JL, Gomes AV. Gender-specific changes in energy metabolism and protein degradation as major pathways affected in livers of mice treated with ibuprofen. **Sci Rep. 2020** Feb 25;10(1):3386.

9) **Mishra M**, Tiwari S, Gunaseelan A, Li D, Hammock BD, Gomes AV. "Improving the sensitivity of traditional Western blotting via streptavidin containing poly horseradish peroxidase (PolyHRP)" **Electrophoresis, 2019** Apr 25.

10) Prasad K, **Mishra M.** AGE-RAGE stress, stressors, and anti-stressors in health and disease. **Int J Angiol. 2018** Mar;27(1):1-12.

11) **Mishra M**, Tiwari S, Gomes AV. Protein purification and analysis: next generation Western blotting techniques. **Expert Rev Proteomics. 2017** Nov;14(11):1037-1053.

12) Prasad K, **Mishra M.** Do advanced glycation-end products and its receptor play a role in pathophysiology of hypertension? **Int J Angiol. 2017** Mar;26(1):1-11.

13) **Mishra M,** Ndisang JF. A critical and comprehensive insight on heme oxygenase and related products including carbon monoxide, bilirubin, biliverdin and ferritin in type-1 and type-2 diabetes. **Curr Pharm Des. 2014**; 20(9):1370-91.

14) Ndisang JF, Jadhav A, **Mishra M.** The heme oxygenase system suppresses perirenal visceral adiposity, abates renal inflammation and ameliorates diabetic nephropathy in Zucker diabetic fatty rats. **PLoS One. 2014** Jan 30; 9(1): e87936.

15) Ndisang JF, **Mishra M**. The heme oxygenase system selectively suppresses the proinflammatory macrophage m1 phenotype and potentiates insulin signaling in spontaneously hypertensive rats. **Am J Hypertens. 2013** Sep; 26(9):1123-31.

16) Tiwari S, **Mishra M**, Jadhav A, Gerger C, Lee P, Weber L**,** Ndisang JF. The risk of heart failure and cardiometabolic complications in obesity may be masked by an apparent healthy status of normal blood glucose. **Oxid Med Cell Longev. 2013**; 2013:253657.

17) Salley TN, **Mishra M**, Tiwari S, Jadhav A**,** Ndisang JF. The heme oxygenase system rescues hepatic deterioration in the condition of obesity co-morbid with type-2 diabetes. **PLoS One. 2013** Nov 15;8(11): e79270.

18) Krüger K, Agnischock S, Lechtermann A, Tiwari S, **Mishra M,** Pilat C, Wagner A, Tweddell C, Gramlich I, Mooren FC. Intensive resistance exercise induces lymphocyte apoptosis via cortisol and glucocorticoid receptor-dependent pathways. **J Appl Physiol. 2011***,* May; 110(5):1226-32.

19) Nagarajan M, Kumar N, Nishanth G, Haribaskar R, Paranthaman K, Gupta J, **Mishra M**, Vaidhegi R, Kumar S, Ranjan AK, Kumar S. Microsatellite markers of water buffalo, Bubalus bubalis-development, characterization, and linkage disequilibrium studies. **BMC Genet. 2009,** Oct 21; 10:68.

Book Chapters

Mishra M, Howlett SE. **Preclinical Models of Frailty**" in "Frailty - A Multidisciplinary Approach to Assessment, Management, and Prevention. **Springer Publishing Company, 2024. Ed.** Jorge G. Ruiz, Olga Theou. ISBN: 9783031573606.

Mishra M, Ribeiro AR, Howlett SE. "**Frailty Indices"**. Studying Ageing and Disease in Laboratory Mice: A Handbook. **Elsevier Science, 2023**. **Ed**. Dr. Paul K Potter and Dr. Ilaria Bellantuono. ISBN: 9780128240182.

Mishra M, Gomes AV. "**Ubiquitin- Latest research and new direction***"* Ubiquitin Proteasome System: A Review and Directions for Research 2018**, Nova Science Publishers,** Hauppauge NY, U.S.A ISBN: 9781536135183.

Abstracts

1) **Mishra M**, Khuong N, Banga S and Howlett SE. Chronic angiotensin II infusion promotes sex-specific ventricular remodeling in aged mouse hearts. XLIII ISHR-NAS 2024 meeting, Long Beach, USA, Aug 19-24, 2024.

2) **Mishra M**, Khuong N, Banga S and Howlett SE. Chronic Infusion of Angiotensin II Promotes Ventricular Fibrosis and Diastolic Dysfunction in Aging Male but Not Female Mouse Hearts. Circulation Research**.** Volume 133, Number Suppl_1, 13 October 2023. (Abstract P3124)

3) **Mishra M**, Kane AE, Howlett SE. **Enalapril reduces frailty and increases MAPK expression in heart and muscle in aging male mice, even when drug is deprescribed.** 41st North American Meeting of the International Society of Heart Research and 9th International Academy of Cardiovascular Sciences, Winnipeg, Canada, September 6-9, 2022.

4) **Mishra M**, Howlett SE. **Impact of age and sex on the expression of common reference genes in ventricular muscle from aging C57BL/6 mice**. 41st North American Meeting of the International Society of Heart Research and 9th International Academy of Cardiovascular Sciences, Winnipeg, Canada, September 6-9, 2022.

5) Tiwari S, **Mishra M,** Gunaseelan A, Li D, Hammock BD, Gomes AV. **Improving Western blotting sensitivity for detection of intracellular changes caused by xenobiotics**. Superfund Research Program, Annual Meeting, Sacramento, USA, Nov. 28-30, 2018

6) **Manish M** and Ndisang JF. **Upregulating heme oxygenase system potentiates pancreatic repair by enhancing proteins of regeneration**. FASEB J April 2016.

7) **Mishra M** and Ndisang JF. **Heme oxygenase and pancreatic regeneration**. Canadian Hypertension Congress, Toronto, October 22-24, 2015.

8) Ndisang JF and **Mishra M**. **Heme oxygenase selectively attenuates pro-inflammatory pathways and potentiate insulin-signaling in spontaneously hypertensive rats**. Canadian Hypertension Congress, Montreal, October 17-19, 2013.

9) Ndisang JF and **Mishra M**. **The heme oxygenase system suppresses macrophage infiltration and potentiates insulin signaling in spontaneously hypertensive rats**. 11th Annual World Congress on Insulin Resistance, Diabetes & Cardiovascular Disease, November 7-9, 2012.

10) **Mishra M**, Tiwari S, Krüger K, Mooren F.C. **Effects of long time voluntary free wheel running exercise training on apoptosis and cell proliferation of splenic lymphocytes in aging mice**. 3rd annual conference of GGL, Department of Sports Medicine, Justus-Liebig-University, Giessen, Germany, 29-30 Sep;2010.

11) Tiwari S, **Mishra M**, Krüger K, Mooren F.C. **Effects of a single bout of exercise on murine bronchoalveolar macrophages activation, differentiation, and apoptosis.** 3rd annual conference of GGL, Department of Sports Medicine, Justus-Liebig-University, Giessen, Germany, 29-30 Sep; 2010.

Poster Presentation

- **Mishra M**, Khuong N, Banga S and Howlett SE. Chronic angiotensin II infusion promotes sex-specific ventricular remodeling in aged mouse hearts. 43rd ISHR-NAS 2024 meeting, Long Beach, USA, Aug 19-24, 2024.

- **Mishra M**, Khuong N, Banga S and Howlett SE. Chronic infusion of angiotensin II promotes ventricular fibrosis and diastolic dysfunction in ageing male but not female mouse hearts. Basic Cardiovascular Sciences meeting 2023. July 31-Aug 3, 2023, Boston, Massachusetts, USA.

- **Mishra M**, Kane AE, Howlett SE. Enalapril reduces frailty and increases MAPK expression in heart and muscle in aging male mice, even when drug is deprescribed. 41st ISHR-NAS 2023 meeting, Winnipeg, Canada, Sep.6-9, 2022.

- **Mishra M**, Howlett SE. Impact of age and sex on the expression of common reference genes in ventricular muscle from aging C57BL/6 mice. 41st ISHR-NAS 2023 meeting, Winnipeg, Canada, Sep 6-9, 2022, Winnipeg, Canada.

- **Mishra M**, Ndisang JF. Up-regulating Heme Oxygenase System Potentiates pancreatic repair by enhancing proteins of regeneration. Experimental Biology Conference, San Diego, USA, April 2016.

- **Mishra M**, Ndisang JF. Heme oxygenase and pancreatic regeneration. Canadian Hypertension Congress, Toronto, Oct 22-24, 2015.

- **Mishra M**, Heme oxygenase selectively attenuates pro-inflammatory pathways and potentiates insulin-signaling in spontaneously hypertensive rats. Canadian Hypertension Congress, Montreal, October 17-19, 2013 (Oral Presentation**)**

References

1) Dr. Susan E. Howlett
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