

Caroline Rickards, PhD
Graduate School of Biomedical Sciences
Physiology & Anatomy
Institute for Healthy Aging
Email: Caroline.Rickards@unthsc.edu



Area of Expertise

The brain is very sensitive to reductions in blood and oxygen supply. Major clinical events such as stroke, heart attack, and traumatic hemorrhage, and even the simple movement to the standing posture (orthostasis) can challenge this supply, often leading to damage to the brain tissue and subsequent neurological and physical impairment.

My laboratory strives to understand how the heart and brain respond to environmental and behavioral stressors in humans, with an emphasis on hemorrhage, orthostasis, exercise, and smoking (specifically electronic cigarettes). We also assess potential therapies that may improve how the heart and brain respond to reductions in blood and oxygen supply, including resistance breathing, oscillatory perfusion therapy, and occlusive exercise.

Qualifications

BAS in Physiology, RMIT University Melbourne

PhD in Physiology, RMIT University Melbourne

BS in Physiology, University of Melbourne

Recent Publications

Responses of cerebral blood velocity and tissue oxygenation to low-frequency oscillations during simulated haemorrhagic stress in humans

Anderson, G. K., Sprick, J. D., Park, F. S., Rosenberg, A. J. & Rickards, C. A., 1 Aug 2019, In: *Experimental physiology*. 104, 8, p. 1190-1201 12 p.

Vive la résistance! The role of inspiratory resistance breathing on cerebral blood flow

Rickards, C. A., 1 Jul 2019, In: *Respiratory Physiology and Neurobiology*. 265, p. 76-82 7 p.

Hemorrhage simulated by lower body negative pressure provokes an oxidative stress response in healthy young adults

Park, F. S., Kay, V. L., Sprick, J. D., Rosenberg, A. J., Anderson, G. K., Mallet, R. T. & Rickards, C. A., 1 Mar 2019, In: *Experimental Biology and Medicine*. 244, 3, p. 272-278 7 p.

Ischaemic and hypoxic conditioning: potential for protection of vital organs

Sprick, J. D., Mallet, R. T., Przyklenk, K. & Rickards, C. A., 1 Mar 2019, In: *Experimental physiology*. 104, 3, p. 278-294 17 p.

Impact of environmental stressors on tolerance to hemorrhage in humans

Crandall, C. G., Rickards, C. A. & Johnson, B. D., Feb 2019, In: *American Journal of Physiology - Regulatory Integrative and Comparative Physiology*. 316, 2, p. R88-R100

Time course of compensatory physiological responses to central hypovolemia in high-and low-tolerant human subjects

Xiang, L., Hinojosa-Laborde, C., Ryan, K. L., Rickards, C. A. & Convertino, V. A., 20 Aug 2018, In: *American Journal of Physiology - Regulatory Integrative and Comparative Physiology*. 315, 2, p. R408-R416

Combining remote ischemic preconditioning and aerobic exercise: A novel adaptation of blood flow restriction exercise

Sprick, J. D. & Rickards, C. A., Nov 2017, In: *American Journal of Physiology - Regulatory Integrative and Comparative Physiology*. 313, 5, p. R497-R506

Cyclical blood flow restriction resistance exercise: A potential parallel to remote ischemic preconditioning?

Sprick, J. D. & Rickards, C. A., Nov 2017, In: *American Journal of Physiology - Regulatory Integrative and Comparative Physiology*. 313, 5, p. R507-R517

Cerebral oxygenation and regional cerebral perfusion responses with resistance breathing during central hypovolemia
Kay, V. L., Sprick, J. D. & Rickards, C. A., 2017, In: American Journal of Physiology - Regulatory Integrative and Comparative Physiology. 313, 2, p. R132-R139

The efficacy of novel anatomical sites for the assessment of muscle oxygenation during central hypovolemia
Sprick, J. D., Soller, B. R. & Rickards, C. A., 1 Nov 2016, In: Experimental Biology and Medicine. 241, 17, p. 2007-2013 7 p.

Sponsored Projects

Acute Effects of Vaporized Nicotine on Metabolic, Cardiovascular, and Cerebrovascular Responses in Humans
Rickards, C.

University of Texas at San Antonio

1/09/13 → 31/07/14

A Novel Approach for Improving Cerebral Tissue Blood Flow and Oxygenation via Pulsatile Perfusion Therapy

Rickards, C. & Yurvati, A.

American Heart Association

1/07/17 → 30/06/19

Assessment of Muscle Oxygenation at Multiple Anatomical Sites during Central Hypovolemia

Rickards, C.

Reflectance Medical Inc.

27/09/13 → 26/09/14

Cerebral Blood Flow Regulation during simulated hemorrhage.

Rickards, C.

Department of the Army

1/07/12 → 31/05/14

Development of a Clinically-Relevant Test for Assessment of Cerebral Vascular Function (for Dr. Alexander Rosenberg)

Rickards, C.

NHLBI: Nat Heart, Lung & Blood Institute

1/06/19 → 31/05/22

Evaluation of Microvascular Oxygenation with Resonance Raman Spectroscopy

Rickards, C.

Pendar Medical

1/11/14 → 30/06/16

Phase II: A Novel Approach for Improving Cerebral Tissue Blood Flow and Oxygenation via Pulsatile Perfusion Therapy

Rickards, C. & Yurvati, A.

American Heart Association

1/07/19 → 30/06/22

Potential Therapeutic Benefits of Remote Ischemic Preconditioning vs. Occlusive Exercise - An Acute Study

Rickards, C.

Intramural Research(UNTHSC)

1/03/15 → 30/04/18

Potential Therapeutic Benefits of Remote Ischemic Preconditioning vs. Occlusive Exercise - An Acute Study (For: Justin Sprick)

Rickards, C.

NHLBI: Nat Heart, Lung & Blood Institute

1/06/17 → 31/05/19

Potential Therapeutic Benefits of Remote Ischemic Preconditioning vs. Occlusive Exercise - An Acute Study (For: Justin Sprick)

Rickards, C.

TX Chapter of the Am Coll of Sports Med

1/04/16 → 31/03/17

Protection of Cerebral Blood Flow and Oxygenation during Stimulated Hemorrhage with Low-frequency Oscillations in Arterial Pressure and Cerebral Blood Flow (For: Tyler Petree)

Rickards, C.

Intramural Research(UNTHSC)

1/06/16 → 31/05/17

Pulsatile Perfusion Therapy: A Novel Approach for Improving Cerebral Tissue Blood Flow and Oxygenation

Rickards, C.

Intramural Research(UNTHSC)

1/07/16 → 28/02/18

Pyruvate-enriched Resuscitation to Reduce Inflammation and Free Radical Production During Simulated Hemorrhage

Rickards, C., Yurvati, A. & Mallet, R.

William & Ella Owens Med Research Foun

1/06/17 → 30/06/18