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Lecturer in Exercise and Environmental Physiology

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About

Dr Sam Lucas is an integrative physiologist whose primary research interests are focused on the mechanisms that regulate human cerebral blood flow in health and disease. He has a specific interest in how cerebral blood flow is regulated with ageing and during stress (esp. hypoxia, exercise, orthostatic, thermal and cognitive) and the resultant impact on function (e.g., breathing control, neurophysiological and psychological responses). His research direction is to continue to expand knowledge in this area, as well as investigate how and what forms of exercise best improve brain and systemic vascular function.

Qualifications

2008 Doctor of Philosophy, *University of Otago*

2002 Bachelor of Science (Physiology), *University of Otago*

2001 Bachelor of Physical Education (Honours, 1st Class), *University of Otago*

Biography

Dr Lucas completed his PhD in 2008 at the University of Otago, New Zealand. His thesis investigated the physiological and cognitive consequences of prolonged exercise. Dr Lucas then had 5 years post-doctoral training focused primarily around techniques to measure cerebral perfusion and understanding the integrative mechanisms that regulate cerebral blood flow during stress and how this may be altered in different populations.

He joined SportEx as a Lecturer in March 2013 and also holds an Honorary Lectureship in the Department of Physiology, University of Otago, New Zealand.

Teaching

Dr Lucas contributes to the Environmental Physiology 3rd year Module and to the Exercise Physiology 2nd year module.

Postgraduate supervision

Dr Lucas is currently supervising four doctoral researchers (based in New Zealand) and welcomes applications from prospective doctoral researchers in his areas of interest, particularly those interested in examining the relation between cerebrovascular function, exercise and cognition.

Research

Regulation of cerebral blood flow in health and disease; exercise and brain health; cerebral blood flow, exercise and cognition; role of cerebral blood flow in breathing control; Exercise and Environmental Physiology.

Other activities

Member of The UK Physiological Society and the European College of Sport Science

Publications

Guiney, H., Lucas, S.J.E., Cotter, J.D., Machado, L. (2014). Evidence superior brain blood flow regulation mediates physical activity-related cognitive benefits in healthy young adults. *Neuropsychology*, *in press.*

Faull, O.K., Cotter, J.D., Lucas, S.J.E. (2014). Cerebrovascular responses during rowing performance: Do circadian rhythms explain a difference between morning and afternoon performance? *Scandinavian Journal of Medicine and Science in Sports, in press*

Perry, B.G., Lucas, S.J.E., Thomas, K.N., Cochrane, D.J., Mündel, T. (2014). The effect of hypercapnia on static cerebral autoregulation. *Physiological Report, in press*

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Lizamore, C.A., Stoner, L, Lucas, S.J.E., Lucero, A., Hamlin, M.J. (2014). Does arterial health affect VO_2peak and muscle oxygenation in a sedentary cohort. *Medicine and Science in Sports and Exercise, in press.*

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Francois, M.E., Manning, P.J., Baldi, J.C. Lucas, S.J.E, Hawley, J.H. Cotter, J.D. (2014). Cardiometabolic benefits of 'exercise snacking' in pre-diabetes. *Diabetologia,*

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Smirl, J.D., Lucas, S.J.E., Lewis, N.C.S, duManior, G., Smith, K.J., Sherpa, N., Basnet, A.S., Ainslie, P.N. (2014). Cerebral pressure-flow relationship in lowlanders and natives at high altitude. *Journal of Cerebral Blood Flow and Metabolism, 34:248-57*

Lewis, N.C.S., Bailey, D.M., DuManoir, G.R., Messinger, L., Lucas, S.J.E., Cotter, J.D. Donnelly, J., McEneny, J. Young, I.S., Stembridge, M., Burgess, K.R., Basnet, A.S., Ainslie, P.N. (2014). Conduit artery structure and function in lowlanders and native highlanders: relationships with oxidative stress and role of sympathoexcitation. *Journal of Physiology,* 592(5):1009-24

Perry, B.G., Schalder, Z.J., Barnes, M.J., Cochrane, D.J., Lucas, S.J.E., Mündel, T. (2014). Hemodynamic response to upright resistance exercise: effect of load and repetition. *Medicine and Science in Sports and Exercise,* 46(3):479-87

Ainslie, P.N., Lucas, S.J.E., Burgess, K.R. (2013). Breathing and sleep at high altitude: Invited review: Special issue “Sleep and Breathing” of *Respiratory Physiology & Neurobiology*, 188(3):233-56

Lucas, S.J.E., Lewis, N.C.S., Sikken, E.L.G., Ainslie, P.N. (2013). Slow breathing as a means to improve orthostatic intolerance: a randomized placebo-controlled trial. *Journal of Applied Physiology,* 115(2):202-11

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Ainslie, P.N., Lucas, S.J.E., Fan, J-L., Thomas, K.N., Cotter, J.D., Tzeng, Y.C. & Burgess, K.R. (2012). Influence of sympathoexcitation at high altitude on cerebrovascular function and ventilatory control in humans. *Journal of Applied Physiology,* 113(7):1058-67.

Lewis, N.C.S., Ainslie, P.N., Atkinson G., Jones H., Grant E.J.M. & Lucas, S.J.E. (2012). The effect of time of day on orthostatic tolerance under conditions of sympathetic blockade. *Chronobiology International*, 29(7): 882-90.

Andrews, G., Ainslie, P.N., Shepherd, K., Dawson, A., Swart, M., Lucas, S.J.E., & Burgess, K.R. (2012). The effect of partial acclimatisation to high altitude on loop gain and central sleep apnoea severity. *Respirology*, 17 (5): 835-40.

Lucas, S.J.E., Cotter, J.D., Murrell, C., Thomas, K.N., Franz, E.A., & Ainslie, P.N. (2012). Role of brain perfusion and oxygenation in exercise-induced improvements in cognition for young and old participants. *Experimental Gerontology,* 47 (8): 541-51.

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