University of Birmingham

Dr Gareth Lavery PhD

BBSRC David Phillips Fellow

Endocrinology, Diabetes and Metabolism

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About

Gareth Lavery is a BBSRC David Phillips Career Development Fellow and has published a number of high impact research papers in scientific journals as well as reviews in the fields of endocrinology, metabolism and genetics. He has received major grants from the Welcome trust, The MRC, the BBSRC and the European Research Council.

Gareth is keen to talk about his science and gives frequent seminars to various groups at the local, national and international level, and is active in postgraduate studies development and the scientific development of the Society for Endocrinology.

Qualifications

- PhD Medicine 2003
- BSc (Hons) Genetics 1998

Biography

Gareth Lavery qualified with a BSc (Hons) in Genetics from the University of Wales, Swansea in 1998. He went on to study for a PhD in Medicine at the University of Birmingham, receiving this is 2003. He then went on to study for 3 years a as a research fellow at the University of Texas Southwestern Medical Center at Dallas in the USA, one of the top ranked universities in the USA, with 4 Nobel laureates currently research active.

Subsequently Gareth joined the Department of Medical Sciences at the University of Birmingham in 2005. Since then he has progressed and in 2009 secured a prestigious 5 year BBSRC David Phillips Career Development Fellowship, allowing him to become an independent researcher and establish his own group.

Gareth sits on the Science Committee of the Society for Endocrinology and is active in its conference programme organisation and enhancing the career development of research scientists with the Society.

Locally Gareth sits on the School of Clinical and Experimental Medicine Postgraduate studies Committee and acts as a personal mentor on the both the MBChB and PhD courses.

Teaching

Teaching Programmes

- BMedSci
- MBChB
- Mres
- BDS
- BioMat

Postgraduate supervision

Gareth is interested in supervising doctoral research students in the following areas:

- The role of glucocorticoids in the pathogenesis of sarcopenia, diabetes and metabolic syndrome.
- Energy homeostasis and molecular metabolism in muscle.

If you are interesting in studying any of these subject areas please contact Gareth on the contact details above, or for any general doctoral research enquiries, please email: dr@contacts.bham.ac.uk (mailto:dr@contacts.bham.ac.uk) or call +44 (0)121 414 5005.

For a full list of available Doctoral Research opportunities, please visit our **Doctoral Research programme listings.** (http://www.bham.findaphd.com/?es=y&apl=y&aplt=&show) .

Research

RESEARCH THEMES

Pre receptor steroid metabolism, redox regulation of steroid hormone metabolism, translational endocrine physiology, healthy aging, metabolic regulation.

RESEARCH ACTIVITY

Dr Lavery is head of a research group focusing on understanding the regulation of glucocorticoid hormone metabolism and intracellular glucose utilisation with relevance to diverse disease processes such as obesity, glucose intolerance and type 2 diabetes, and sarcopenia. He has expertise of coupled glucocorticoid and glucose metabolism within the endoplasmic reticulum. Specifically determining how a pathway involving 3 proteins: the glucose-6-phosphate transporter (G6PT), hexose-6-phospahte dehydrogenase (H6PDH) and 11β-hydroxysteroidedehydrogenase type 1 (11β-HSD1), can influence cellular energy availability and insulin sensitivity. He utilise a range of *in vitro* (cell culture, over-expression, knockdown and small molecule modulation of target proteins) and *in vivo* models (including global and tissue specific knockout strategies in mice), physical methods (GC/MS, LC/MS) and bioinformatics to elucidate the pathways of metabolism that control normal and patho-physiological states. The transgenic animal models developed have demonstrated the obligate requirement of H6PDH for 11β-HSD1 activity, as glucocorticoid sensitivity is abolished, leading to blunted metabolic responses, hypoglycaemia and increased insulin sensitivity. H6PDHKO mice also develop a vacuolating myopathy associated with abnormal local glucose homeostasis and activation of ER stress pathways, identifying H6PDH as an important regulator of cellular G6P, glucose and energy homeostasis. Dr Lavery is now extending these studies to determine the integrated role of the G6PT/ H6PDH/ 11β-HSD1 pathway in controlling tissue glucose and insulin homeostasis and sensitivity.

Specific projects include:

- **Glucocorticoid regulation of hepatic and skeletal muscle metabolism**
- **Ageing and pre receptor glucocorticoid metabolism**
- **Redox control of skeletal muscle metabolism**

Other activities

Science Committee member of the Society for Endocrinology

Publications

Lawson AJ, Walker EA, Lavery GG, Bujalska IJ, Hughes BA, Arlt W, Stewart PM, Ride JP. Novel heterozygous mutations in 11β-hydroxysteroid dehydrogenase type 1 compromise formation of active enzyme dimer. Under review, **PNAS** 2011 Feb 15. [Epub ahead of print]

Zielinaska A, Walker EA, Stewart PM, Lavery GG. Biochemistry and physiology of H6PDH null mice. **Mol Cell Endocrinol**. 2010 Dec 10. (Epub ahead of print)

Semjonous NM, Sherlock M, Jeyasuria P, Parker KL, Walker EA, Stewart PM, Lavery GG. Hexose-6-phosphate dehydrogenase contributes to skeletal muscle homeostasis independent of 11β-hydroxysteroid dehydrogenase type 1. **Endocrinology**. 2011 Jan;152(1):93-102.

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Morgan SA, Sherlock M, Gathercole LL, Lavery GG, Lenaghan C, Bujalska IJ, Laber D, Yu A, Convey G, Mayers R, Hegyi K, Sethi JK, Stewart PM, Smith DM, Tomlinson JW. 11β-hydroxysteroid dehydrogenase type 1 regulates glucocorticoid-induced insulin resistance in skeletal muscle. **Diabetes.** 2009 Nov;58(11):2506-15.

Swali A, Walker EA, Lavery GG, Tomlinson JW, Stewart PM. 11β-hydroxysteroid dehydrogenase type 1 regulates insulin and glucagon secretion in pancreatic Islets. **Diabetologia.** 2008 Nov;51(11):2003-11.

Lavery GG, Walker EA, Tiganescu A, Ride JP, Shackleton CHL, Tomlinson JW, Connell JMC, Ray DW, Biason-Lauber A, Malunowicz EM, Wales JK, Thalange N, Arlt W, and Stewart PM. Mutations in hexose-6-phosphate dehydrogenase and 11β-hydroxysteroid dehydrogenase type 1 independently cause the syndrome of Cortisone Reductase Deficiency. **J Clin Endocrinol Metab**. 2008 Oct;93(10):3827-32.

Kim AC, Reuter AL, Zubair M, Serecky K, Else T, Bingham NC, Lavery GG, Parker KL, Hammer GD. Targeted disruption of β-catenin in Sf-1-expressing cells impairs development and maintenance of the adrenal cortex. **Development.** 2008 Aug;135(15):2593-602