University of Birmingham

Dr Neil Hotchin BSc PhD

Senior Lecturer in Molecular Cell Biology
Director of Graduate Research, College of Life and Environmental Sciences

School of Biosciences (/schools/biosciences/index.aspx)

Contact details

Telephone +44 (0)121 41 45412 (tel:+44 121 41 45412)

Fax +44 (0)121 41 45925

Email n.a.hotchin@bham.ac.uk (mailto:n.a.hotchin@bham.ac.uk)

School of Biosciences
University of Birmingham
Edgbaston
Birmingham
B15 2TT
UK

About

Dr Hotchin is a cell biologist with an interest in normal epithelial cell function and in understanding the processes that contribute to diseases such as cancer. He has published a number of high impact papers on the role of small GTP-binding proteins in control of epithelial cell function. In addition to his research and teaching activities, Dr Hotchin is also currently Director of Graduate Research for the College of Life and Environmental Sciences.

Qualifications

BSc (University of York)

PhD (University of London)

Biography

Dr Neil Hotchin was born in Lincolnshire and did his first degree in Biology at the University of York. His PhD at the Royal Postgraduate Medical School (now part of Imperial College) was on the role of Epstein Barr Virus in the development of Burkitt's Lymphoma. After his PhD he worked as a postdoctoral Research Fellow at the Imperial Research Cancer Research Fund (now the Cancer Research UK London Research Institute) where he first became interested in how cell adhesion to extracellular matrix regulates cell function. He continued this work in the MRC Laboratory for Molecular Cell Biology at University College London before moving to Birmingham to set up his own research group.

Teaching

Dr Hotchin teaches cell biology on a number of first and second year courses and runs a final year module on Cancer Biology. He also teaches on a number of postgraduate level courses.

Postgraduate supervision

For a list of possible PhD projects offered by Dr Hotchin:

http://www.findaphd.com/search/ProjectDetails.aspx?PJID=30610&LID=124 (http://www.findaphd.com/search/ProjectDetails.aspx?PJID=30610&LID=124)

Research

Research Theme within School of Biosciences: Molecular and Cell Biology

The role of Rho family GTPases in regulation of cell function

Throughout the life of an organism cells must 'sample' their environment and take decisions accordingly. Cellular interactions with extracellular matrix proteins such as fibronectin, via integrin adhesion receptors, play an essential role in both developing and adult organisms. Many cellular functions require the integration of adhesion-mediated signals with those received via growth factor receptors. Identifying the nature of these signals and the mechanism by which they are integrated is clearly essential to the understanding of how normal cellular function is regulated.

The Rho family of small GTP-binding proteins regulate both cell adhesion and growth factor mediated signal transduction. As such, they play a pivotal role in integration of adhesion and growth factor dependent signals. The main focus of our research is directed towards understanding how Rho family proteins regulate adhesion-mediated signal transduction events.

1. **Regulation of Epidermal Cell Function by Rho Family GTPases**

The epidermis is a self-renewing epithelial tissue comprised of several layers of keratinocytes and provides the protective function of the skin. Normal epidermal function requires that keratinocyte proliferation, differentiation and death be carefully controlled. Signalling through adhesion receptors such as integrins and cadherins plays a key role in regulating epidermal function and the Rho family of small GTP-binding proteins play a central role in regulating these adhesion-dependent signaling events. We are particularly interested in understanding how Rho GTPases regulate keratinocyte cell function in both the normal skin and in non-melanoma skin cancer.

Ryan et al (2012). Plakoglobin-dependent regulation of keratinocyte apoptosis by Rnd3. J. Cell Sci. 125, 3202-3209.

2. **The role of Rho Family GTPases in Glioma**

Gliomas are the commonest form of malignant brain tumour and the progression from low to high grade malignant glioma is associated with increased invasion and poor prognosis. Gliomas are difficult to treat and there is an urgent need to better understand factors that contribute to disease progression. Recently, in collaboration with

colleagues in Liverpool and Lyon, we have identified that progression from low to high grade glioma is associated with a switch in activity of two distinct subsets of Rho GTPases and, in particular, a novel role for a Rnd3 in the progression to high grade disease. Understanding how Rnd3 influences glioma progression is a current goal of the group.

*Clarke K et al (2015). Inference of Low and High-Grade Glioma Gene Regulatory Networks Delineates the Role of Rnd3 in Establishing Multiple Hallmarks of Cancer. PLOS Genet. **11**, e1005325.*

Other activities

Dr Neil Hotchin has been an Editor for PLoS ONE since 2007.

Publications

Clarke K, Daubon T, Turan N, Soulet F, Zahari MM, Ryan KR, Durant S, He S, Herbert J, Ankers J, Heath JK, Bjerkvig R, Bicknell R, Hotchin NA*, Bikfalvi A*, Falciani F*. (2015). Inference of Low and High-Grade Glioma Gene Regulatory Networks Delineates the Role of Rnd3 in Establishing Multiple Hallmarks of Cancer. PLOS Genet. 11, e1005325 (* joint senior authors)

Hotchin NA, Cover TL and Akhtar N (2000). Cell vacuolation induced by the VacA cytotoxin of *Helicobacter pylori* is regulated by the Rac1 GTPase. *J. Biol. Chem.* **275**, 14009-14012.

Akhtar N and Hotchin NA (2001). RAC1 regulates adherens junctions through endocytosis of E-cadherin. *Mol. Biol. Cell* **12**, 847-862.

Sawada S,Yoshimoto M, Odintsova E, Hotchin NA and Berditchevski F (2003). The tetraspanin CD151 functions as a negative regulator in the adhesion-dependent activation of Ras. *J. Biol. Chem.* **278**, 26323-26326.

McMullanR, Lax S, Robertson VH, Radford DR, Broad S, Watt FM, Rowles A, Croft DR, OlsonMF and Hotchin NA (2003). Keratinocyte differentiation is regulated by the Rho and ROCK signaling pathway. *Curr. Biol.***13**, 2185-2189.

Turner FE, Broad S, Khanim FL, Jeanes A, Talma S, Hughes S, Tselepis C, Hotchin NA (2006). Slug regulates integrin expression and cell proliferation in humanepidermal keratinocytes. *J. Biol. Chem.* **281**, 21321-21331.

Latysheva N, Muratov G, Rajesh S, Padgett M, Hotchin NA, Overduin M, Berditchevski F (2006). Syntenin-1 is a new component of tetraspanin-enriched microdomains:mechanisms and consequences of the interaction of syntenin-1 with CD63. *Mol.Cell Biol.* **20**, 7707-7718.

Brookes MJ, Boult J, Roberts K, Cooper BT, Hotchin NA, Matthews G, Iqbal T, Tselepis C (2008). A role for iron in Wnt signaling. *Oncogene* **27**, 966-975.

Lock FE and Hotchin NA (2009). Distinct roles for ROCK1 and ROCK2 in the regulation of keratinocyte differentiation. *PLOS ONE* **4**, e8190.

Lim J, Hotchin NA, Caron E (2011). Ser756 of β2 integrin controls Rap1 activity during inside-out activation of αMβ2. *Biochem. J.* **437**, 461-467.

Lock FE, Ryan KR, Poulter NS, Parsons M, Hotchin NA (2012) Differential Regulation of Adhesion Complex Turnover by ROCK1 and ROCK2. *PLOS ONE* **7**, e31423.

Ryan KR, Lock FE, Heath JK, Hotchin NA. (2012). Plakoglobin-dependent regulation of keratinocyte apoptosis by Rnd3. *J. Cell Sci.* **125**, 3202-3209.

Lim J and Hotchin NA (2012). Signalling mechanisms of the leukocyte integrin aMb2: Current and future perspectives. *Biol. Cell* doi: 10.1111/boc.201200013.

Scales TM, Jayo A, Obara B, Holt MR, Hotchin NA, Berditchevski F and Parsons M (2012). a3b1 integrins regulate CD151 complex assembly and membrane dynamics in carcinoma cells within 3D environments. *Oncogene* doi:10.1038/onc.2012.415.

Lim J, Thompson J, May RC, Hotchin NA and Caron E. (2013). Regulator of G-Protein Signalling-14 (RGS-14) regulates the activation of aMb2 integrin during phagocytosis. *PLOS ONE* **8**, e69163.