Professor R.H. (Bob) Michell BSc, PhD, DSc, FRS, FMedSci

Emeritus Professor of Biochemistry
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School of Biosciences (/schools/biosciences/index.aspx)

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About

Since the 1960s Bob Michell has been one of the pioneers in revealing the diverse biological functions of inositol lipids in eukaryote cells. He had major roles in establishing that receptor-controlled phospholipase C hydrolysis of PtdIns(4,5)P_2 is a signaling reaction and that PtdIns(3,5)P_2 is a regulator of intracellular trafficking processes.

Qualifications

BSc and PhD, Medical Biochemistry and Pharmacology, Birmingham

Biography

BSc (1962) and PhD (1965, supervisor: J N Hawthorne), Medical Biochemistry, University of Birmingham.

DSc (1978), Biochemistry, University of Birmingham

Research Fellow (with Prof Manfred L Karnovsky), Harvard Medical School, 1966-68

Research Fellow (1968-70), Lecturer (1970-81), Senior Lecturer (1981-4), Reader in Biochemistry (1984-6), Professor of Biochemistry (1986-2006) and Emeritus Professor of Biochemistry (2006-present), all in School of Biosciences and its predecessor Department of Biochemistry (to 1999), University of Birmingham.

Elected FRS (1986)

Royal Society Research Professor at the University of Birmingham, 1987-2006.

CIBA Medal and Prize, Biochemical Society (1988),

Elected to European Molecular Biology Organization (1991).

Royal Society UK-Canada Rutherford lecturer (1994).

Elected FMedSci (2002)

Morton Lecturer, Biochemical Society (2002).

Honorary member, Biochemical Society (2010-)

Research

Bob's PhD work with Tim Hawthorne placed the biosynthesis of phosphatidylinositol 4-phosphate (Ptdins4*P*, then known as diphosphoinositide or DPI) at the plasma membrane. The dogma of the time was that all phospholipids were made in the endoplasmic reticulum, so this immediately identified Ptdins4*P* as a lipid with unusual properties.

During the 1970s, Bob – with colleagues (Eduardo Lapetina, Shamshad Jafferji/Cockcroft, David Allan, Motassim Billah, Chris Kirk, etc.) – promulgated and gathered evidence in support of their hypothesis that receptor-controlled hydrolysis of a phosphoinositide by phospholipase C is a signaling reaction that initiates a Ca^{2+} rise in stimulated cells. In 1981, his laboratory's discovery that PtdIns(4,5)P_2 is the substrate for the receptor-stimulated phospholipase C, opened the way for discovery that Ins(1,4,5)P_3 is a Ca^{2+}-mobilising second messenger.

From the mid-1990s onwards, with Stephen Dove, his laboratory described the novel phosphoinositide PtdIns(3,5)P_2 and started to define its metabolism and functions, particularly in intracellular trafficking processes.

For many years, he has sustained a collaboration with Geoff Brown's team in Immunology that investigates the generation and maturation of haematopoietic cells

A main focus of Bob's recent work has been on gaining some understanding of the evolutionary processes by which inositol and its derivatives might have acquired their key roles in multiple processes in the regulation of eukaryotic cell function.

Publications

Recent review publications

Versatility and nuances of the architecture of haematopoiesis – Implications for the nature of leukaemia. G Brown, P J Hughes, R Ceredigand R H Michell. (2012) *Leukemia Research*, 36, 14-22.

Inositol and its derivatives: Their evolution and functions. (http://www.ncbi.nlm.nih.gov/pubmed/21070803) R H Michell . (2011) *Advances in Enzyme Regulation* 51, 84-90

First came the link between phosphoinositides and Ca2+ signalling, and then a deluge of other phosphoinositide functions. (http://www.ncbi.nlm.nih.gov/pubmed/19371949) R H Michell (2009) *Cell Calcium* 45, 521-6.

Inositol derivatives: evolution and functions. R H Michell (2008) *Nature Reviews in Molecular Cell Biology* 9, 151-61.

Phosphatidylinositol 3,5-bisphosphate and Fab1p/ PIKfyve underPPIn endo-lysosome function. S K Dove, K Dong, T Kobayashi, F K Williams &, R H Michell (2009) *Biochemical Journal* 419, 1-13

Phosphatidylinositol 3,5-bisphosphate: metabolism and cellular functions. R H Michell, V Heath, M Lemmon & S K Dove (2006) *Trends in Biochemical Sciences* 31, 52-63 (plus online material)

Historically important contributions

Inositol phospholipids and cell surface receptor function. R H Michell (1975) Biochimica et Biophysica Acta, 415, 81-147.

The stimulation of inositol lipid metabolism that accompanies calcium mobilization in stimulated cells: defined characteristics and unanswered questions. R H Michell, C J Kirk, L M Jones, C P Downes & J A Creba (1981) Philosophical. Transaction of the Royal Society of London. Series B. 296, 123-133.

Rapid breakdown of phosphatidylinositol 4-phosphate and phosphatidylinositol 4,5-bisphosphate in rat hepatocytes stimulated by vasopressin and other Ca2+-mobilising hormones. J A Creba, C P Downes, P T Hawkins, G Brewster, R H Michell & C J Kirk (1983) Biochem. J. 212, 733-747.

Osmotic stress activates phosphatidylinositol 3,5-trisphosphate synthesis. S K Dove, F Cooke, M R Douglas, P Parker & R H Michell (1997) *Nature*, 390, 187-192.