Richard Edwards

(1939–2009)

Professor Richard HT Edwards was a physiologist and clinician who had a major international reputation for his research into understanding the way that skeletal muscle obtains and uses energy to fuel contractions, in muscle damage and into the muscular dystrophies. He was also widely acknowledged to be a caring and diligent clinician, had huge energy, and was an inspiration and mentor to many junior colleagues.

Richard was born on 28 January 1939 in Llangollen, North Wales, a son of the local butcher and educated at LLangollen Grammar School. He studied Medicine at the Middlesex Hospital Medical School. He was reputed to have won almost every prize available to undergraduate medical students and intercalated in physiology gaining a first class honours. His initial research interest was in respiratory physiology and as a medical student he was able to combine this new enthusiasm with a great love for mountains when he undertook research into the effects of altitude on regulation of breathing at the Observatoire Vallot, the research station at ~4362 m on Mont Blanc.

On completion of his medical training, Richard was appointed to a position at the Hammersmith Hospital and Royal Postgraduate Medical School and began his interest in skeletal muscle that was to be the main theme of his research. This research was particularly stimulated by a sabbatical undertaken as a Wellcome Trust Swedish Research Fellow at the Karolinska Institute in 1970. He worked with Tor Sjostrand, Eric Hultman and Roger Harris, and during that time he learned the technique of needle muscle biopsy that was to shape his research career. This opened up the possibility of undertaking repeated sampling to study rapid changes in muscle composition in both healthy subjects and patients during exercise. On his return to the UK, he exploited this and published a series of landmark papers in *The*

Journal of Physiology, *Clinical Science* and *The Lancet* describing the changes in energy supply in muscles of subjects during exercise. The Hammersmith Hospital at that time was an ideal environment for this work and Richard worked closely with Professor David Hill (son of AV Hill, the 1922 Nobel Prize winner for Physiology) and Professor Victor Dubowitz in developing his studies in muscle and neuromuscular disorders. They secured a major grant from the Muscular Dystrophy Association of America to establish a Neuromuscular Centre with purpose-built laboratories, and attracted an outstanding research team that included Drs Archie Young, Caroline Sewry, David Jones and Jan Witkowski.

In 1976 Richard was appointed to the Chair of Human Metabolism at University College Hospital (UCH) to succeed Professor Charles Dent FRS.

Richard, in 1980, studying muscle metabolism in his own biceps muscle using 31-P NMR with an early Oxford Research Systems Instrument.

He was only 36 on appointment. Several of the research team from the Hammersmith moved with him and others such as Michael Rennie, Diane Newham, Mark Wiles, Kerry Mills and myself now began to work with him. The great strength of Richard Edwards was his ability to inspire and mentor his junior colleagues and all of us benefited greatly from working with him. UCH proved to be an immensely productive environment for this research. The group published important ground-breaking studies in muscle energetics, muscle protein turnover, muscle damage and muscle disorders. At that time, Richard also worked with Professor Doug Wilkie in innovative studies using the new technique of magnetic resonance spectroscopy for obtaining entirely non-invasive measurements of muscle energy metabolism.

Richard was promoted to the Head of the Department of Medicine at UCH in 1982, but in 1984 he became Head of the Department of Medicine at the University of Liverpool. Richard's 12 year old son, Tomos, had been tragically killed in a road accident in 1982 and the call of being near enough to the mountains of North Wales to live there had become very strong for Richard and his family. In Liverpool, he succeeded Professor David Price-Evans and he proceeded to revolutionise the Department of Medicine which increased dramatically in size during his time as Head. He also obtained funding to bring the first whole body magnetic resonance imaging and spectroscopy systems to Liverpool and worked with colleagues to introduce 'problem-based learning' (PBL) into the training of medical students. Richard had learned a great deal from Professor Moran Campbell about PBL as an innovative way of educating medical students to facilitate the life-long learning required by the profession, and together with Sir Robert Shields (Head of Surgery), Professor Michael Orme (Dean of Medicine), Drs Sam Leinster and Richard Griffiths, they restructured the Liverpool medical course to provide a model that eventually became adopted by other

UK medical schools. In Liverpool, Richard also mentored and brought another group of young colleagues into research on muscle including John Coakley, Phil Smith, Maria Stokes and Bob Cooper. At this stage, Richard also developed a major interest in the causes and alleviation of chronic fatigue syndrome (or ME) and developed exercise interventions to alleviate this condition that are still used today.

In 1996, Richard accepted an invitation to become the Professor of Research and Development for Health and Social Care at the University of Wales College of Medicine and Head of Research and Development for the NHS in Wales, based in Cardiff. This was a new departure for him, but was an influential position impacting on the direction of NHS-funded research undertaken in Wales. He eventually retired from that position in 1999.

On retirement, Richard put his enthusiasm and great energy into his home, garden and extensive woodlands in Nantmor, North Wales, a place where he was happy until his unexpected death following a cardiac arrest on 5 December 2009. He is survived by Eleri, his wife of 45 years, his daughter Rhiannon and grandchildren, William and Non. He will be remembered as a fantastically enthusiastic and energetic physiologist and clinician who was highly respected internationally and who inspired a generation of colleagues to work in this research area.

Malcolm J Jackson

School of Clinical Sciences, University of Liverpool

The Society also notes with regret the deaths of James Black, Johann Edge and Alastair Hosie.

James Black was awarded a Nobel Prize in 1985. He was elected a Member of The Physiological Society in 1962 and was made an Honorary Member in 1989.

Alastair became a Member in 2004.

Johann became a Member in 2007.

AD Bangham

(1922–2010)

Most academics believe earlier generations of scientists were more enthusiastic, and more eccentric about research than the present cohort. We can all reminisce about scientists who illustrate this statement, and for me the six decades of active science in Alec Bangham's life are a perfect example. Alec had a tremendous enthusiasm and genuine curiosity in his scientific career. He was always interested in big, important issues, and was prepared to enter new areas with radical and passionate ideas. Although the liposome must be his abiding memorial in research, he contributed in many other areas, including anaesthesia, lung surfactants, haemoglobin polymorphisms, water structure and the evolutionary origin of life. My first experience of his laboratory at Babraham was making surface charge measurements on single red cells using a very dilapidated microscope and electrophoresis chamber set into a grubby old aquarium as a waterbath, which nevertheless gave excellent results. Working in the lab allowed discussions on far-reaching and varied topics with Alec and his visitors, which was a true scientific pleasure.

The discovery that made Alec's lab a Mecca for visitors was the invention of the liposome (or smectic mesophase or bangosome) which offered a perfect experimental paradigm for the cell membrane. From his original EM observations with Bob Horne on hydrated lipid films, the lab developed a simple technique for making multilamellar, and later unilamellar lipid vesicles to be used in permeability and drug delivery studies in a vast number of applications. Protein incorporation was an obvious next step in mimicking cell membranes, and proteoliposomes remain a major tool for functional analysis of membrane transport. Immediate questions that could now be answered included the passive permeability

Alec with his iPhone.

of the cell lipid membrane to water, ions, important non-electrolytes (glucose, amino acids, urea) and lipid-soluble molecules. Manipulation of lipid composition (particularly cholesterol) and charge, saturation and chain length, defined the properties of pure lipid membranes, and lipid preferences of inserted proteins e.g. phosphatidylserine and phosphatidic acid supporting Na^+/K^+-ATPase activity added important information on annulus lipids.

Besides offering an ideal system for investigating the biophysical properties of the membrane, liposomes were developed as drug delivery systems, and with trapped haemoglobin as artificial red cells requiring several modifications of surface (adding polyethylene glycol) and size to avoid rapid removal from the circulation. The final use of liposomes that Alec learnt of whilst walking through the Beauty section of a local department store was in cosmetics. His approach to the elegant lady behind the counter saying '*You know, I invented liposomes*', led somewhat surprisingly to a VIP invitation to Paris to dine with the President of Christian Dior, an occasion he greatly enjoyed.

The mechanism of action of general anaesthetics was and remains a major topic for debate. Liposomes contributed to research in this area