

## Professor Anthony Fairclough Lever

**P**rof Anthony Fairclough Lever (Born: March 18, 1929; Died: March 25, 2018), who was the director and driving force of the Medical Research Council (MRC) Blood Pressure Unit in Glasgow, Scotland, between 1967 and 1994 and, latterly, Prof Emeritus in the Department of Cardiovascular and Medical Sciences at the University of Glasgow, died peacefully on March 25, 2018, aged 89 years.

Born on March 18, 1929, in Surrey and educated in London, Tony graduated BSc in 1952 and Bachelor of Medicine and Surgery in 1955. An outstanding student, he was awarded gold medals in pathology and medicine. His postgraduate career was equally impressive, and he became a house physician to the legendary Sir George Pickering at St Mary's Hospital in London. A research fellowship and a lectureship, together with membership and then fellowship of the Royal College of Physicians of London, all followed in rapid succession.

In 1956, George Pickering moved to Oxford as Regius Professor of Medicine, and Stanley Peart took over the Medical Unit at St Mary's Hospital. Peart had purified and sequenced Ang II (angiotensin II)—the product of the action of the renal enzyme renin and the most potent vasopressor agent known at the time. Tony Lever, together with J. Ian S. Robertson and Jehoiada J. Brown, joined the research team as a clinician scientist to address the challenge of whether renin and angiotensin were the cause of the hypertension caused by renal artery constriction.

In 1964, Tony Lever and Ian Robertson devised the world's first reliable and sensitive method for the assay in blood of the enzyme renin, secreted by the kidney.

In 1967, Tony was invited by the Medical Research Council to become Director of the newly created MRC Blood Pressure Unit in Glasgow. With him came his fellow clinician scientists, Ian Robertson and Jehoiada Brown, and the steroid biochemist, Robert Fraser. Working together, they introduced in Glasgow new ways of pursuing clinical research, with clinicians and scientists working together at the bench and then

translating this knowledge to solve complex clinical problems at the bedside.

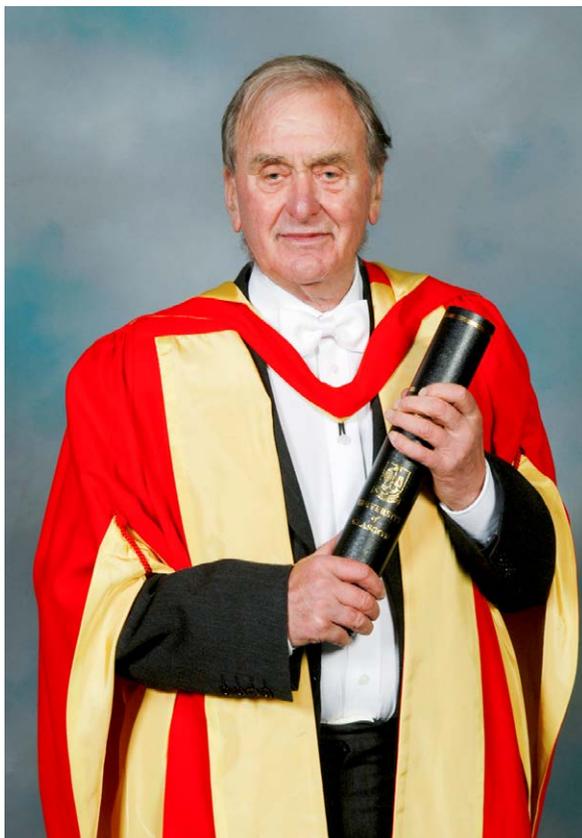
The unit's facilities comprised laboratories, an animal house, and dedicated clinical wards at the Western Infirmary. During its lifetime, improved laboratories, a diet kitchen, a library, and offices were added, but it remained small compared with similar contemporary institutes. It soon earned a distinguished international reputation and had an influence wholly disproportionate to its size.

Decisive early developments were reliable assays for the octapeptide Ang II—the active product of renin—and of its inactive decapeptide precursor Ang I (angiotensin I). Among the many actions of Ang II are stimulation of aldosterone secretion and elevation of blood pressure. Critical also were assay methods for corticosteroids additional to aldosterone, which are relevant to renal and cardiac function and disorders. Always emphasized was the need for strict quantitative measurements of these substances, sampled under carefully controlled circumstances (most especially concerning dietary intake) and assessment of the relation of those measurements to the relevant dose-response curves. Essential although such an approach is, few other departments worldwide possessed at

that time the expertise or dedication to pursue it adequately.

Several reasons can be adduced for the success of the MRC Blood Pressure Unit. Foremost was the availability of a comprehensive array of meticulously calibrated measurement techniques for the evaluation of physiological and pathophysiological control of blood pressure and of cardiac and renal function. These methods were continuously updated and re-evaluated and were deployed in both fundamental and clinical research. Also provided was a major national and international diagnostic service, notably for renovascular hypertension and aldosterone-secreting adrenocortical adenoma.

A second major influence was close collaboration with other university and hospital departments. Instances are measurements of total body electrolyte content, especially



of sodium and potassium, with Keith Boddy at the Scottish Universities Research and Reactor Center, East Kilbride; animal experiments with Kenneth Hosie of the University of Glasgow Department of Veterinary Medicine; population studies with Graham Watt of the University of Glasgow Department of General Practice; and investigations of the pathogenesis and treatment of cardiac failure with Henry Dargie and John Cleland at the Western Infirmary. The pharmacological treatment of hypertension, and especially of essential hypertension, including most particularly the use of drugs acting against various components of the renin-angiotensin system, was undertaken together with physicians across Glasgow.

Third, the work of the unit was continually exposed to scrutiny through frequent invited lectures and by an enormous body of published articles.

Fourth, and arguably most influential, from its inception to its end, the unit attracted a continuous stream of high-quality research fellows from both within the United Kingdom and overseas, who contributed enormously to its research and clinical programmes and also enhanced its reputation when they returned home. Research Fellows came from Australia, New Zealand, the Americas, and many European countries and are now leaders of cardiovascular research throughout the world. Without exception, they have vivid recollections and fond memories of hard work combined with an excellent social life within the MRC Blood Pressure Unit. With his notebook for original scientific ideas, Tony was the life and soul of all these activities. He also shared with many of his research fellows his great enthusiasm for salmon and trout fishing.

Under Tony's leadership, the MRC Blood Pressure Unit became a major international center of excellence known and respected in the United Kingdom, Europe, and worldwide. In 1980, Brown, Lever, and Robertson jointly received the Robert Tigerstedt Lifetime Achievement Award of the International Society of Hypertension.

In 1993, "The Renin-Angiotensin System" was published—a 2-volume book edited by Ian Robertson and Gary Nicholls—a New Zealand physician who had worked with the unit, which surveyed the unit's output during the previous 25 years, together with cognate studies performed globally.

Although the unit reached its natural end with Tony's retirement in 1994—an occasion marked by a Festschrift dedicated to Brown, Lever, and Robertson (*Journal of Human Hypertension*. 1995;9:371–521), research continued within the University of Glasgow Department of Medicine and Therapeutics. There were 2 externally funded blood pressure groups: the MRC Blood Pressure Group led by Prof John Connell and the British Heart Foundation Blood Pressure Group led by Prof Anna Dominiczak. In 2000, these 2 groups became the core of the British Heart Foundation Glasgow Cardiovascular Research Center followed, in 2006, by the official opening of its new building at the University of Glasgow, which continues the tradition of excellence established by Tony in the unit. In 2006, Tony was awarded the Honorary Degree of Doctor of Science by the University of Glasgow.

Tony was the author of >400 published papers and book chapters. His research excellence has been recognized by numerous awards, including the Fellowship of the Royal Society of Edinburgh, as well as prestigious invited lectures, including the Croonian Lecture of the Royal College of Physicians and the Pickering Lecture of the British Hypertension Society.

A truly international cardiovascular scientist, Tony will be sadly missed by his colleagues and friends at the University of Glasgow and across the United Kingdom, as well as the International Hypertension Community.

Tony is survived by his beloved wife Rosemary, children Catherine and Michael, and grandchildren Lulu and Sam.

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