

## Philip Benjamin Bradley 1919-2009

Philip Benjamin Bradley who died on the 29th August 2009 was a highly influential neuropharmacologist whose studies contributed to the foundation for much of what we presently understand of the actions of many key medications used to treat psychotic illness. Born into a relatively poor family in Bristol in 1919, the last of six children, aspirations for an academic career might have seemed low, particularly as the second world war loomed. However in 1937 Philip Bradley gained a place to study Zoology and Chemistry at the University of Bristol but studies were interrupted by the war. Philip was recruited into the Army where he was in charge of radar and wireless workshops and taught electronics, an experience that proved to serve him well later in civilian life. He returned to Bristol University in 1946 and completed his degree in 1948. This led to a research post in the department of Pharmacology in the Medical School in Birmingham to study the effects of drugs on the brain, for which he was awarded a PhD in 1952. These early studies shaped his subsequent career. The next ten years proved to be a remarkable period in world neuroscience and it must have been a very exciting time to be involved at the cutting edge of the new brain pharmacology. Not only were the secrets of how brain cells communicate revealed but for the first time many neurochemicals we take for granted today, like catecholamines, indolamines, amino acids, acetyl choline, were shown to be located in the brain. Furthermore, pharmaceutical companies were beginning to develop a number of anti-psychotic drugs that proved to have dramatic and clear clinical benefits. The problem was that no one knew how the drugs worked. This was the challenge taken up by colleagues in the department of Experimental Psychiatry headed by Professor Elkes and which Philip Bradley joined. Pioneering studies into the effects of lysergic acid diethylamide (LSD), chlorpromazine and cholinergic agents on brain electrical activity were conducted and published in the top scientific journals including several in Nature. It was during this period in particular that Philip Bradley's army experience in electronics was of great value in development and building equipment necessary for recording electrical activity of the brain, since unlike today nothing suitable was available commercially. Not content with measuring gross brain activity Bradley went on to study the effects of drugs on single

neurons. This commenced with a Rockefeller Fellowship in Pisa (Italy), where he spent a year in the department of Professor Moruzzi one of the all time greats of brain neuroscience. Here with Dr Molluca, he carried out the first studies on the effects of intravenous drugs on the activity of single neurons recorded with a microelectrode inserted into their vicinity in the brain. After his return to Birmingham he was awarded a Doctor of Science degree in 1959, for his studies in neuropharmacology. There followed the establishment of a Division of Neuropharmacology, from where he directed a Medical Research Council Neuropharmacology Research Unit which retained funding for the next 20 years.

His curiosity led him further to study the actions of drugs applied directly on neurons in the brain. This was considerably helped when Dr John Wolstencroft (later to become a Professor in the Department of Physiology), joined the group and utilised multibarrel glass micropipettes, a technique learned by spending time in Professor David Curtis's lab in Canberra, Australia. It was here that studies on chemical neurotransmission in spinal neural circuits was being pioneered that later led to Curtis being awarded a Nobel Prize in Medicine and Physiology. The multibarrel technique enabled recording of single neuron activity whilst exposing the immediate environment of the neurons to endogenous as well as exogenous chemicals expelled under the control of electric currents applied to each barrel. Birmingham became the first centre where this technique was applied to the brain and this attracted scientists from around the world. Many important papers followed revealing actions of 5-hydroxytryptamine, chlorpromazine, catecholamines, LSD, prostaglandins, opioid peptides and morphine, that were published in journals such as Nature, Journal of Physiology and British Journal of Pharmacology.

Meanwhile changes were occurring in the organisation of the Medical School. Birmingham had been slow to recognize the importance to medical education of an academic department of basic pharmacology. After much heated discussion and protracted decision making a department of preclinical pharmacology was established in 1970 under the leadership of Professor Bradley. He remained head of this, enjoying his teaching that

was much appreciated by students, until his retirement in 1986.

He was President of the British Association of Psychopharmacology 1978-1980, served on several editorial boards, was joint editor in chief of the journal *Neuropharmacology* and regional editor of *Physiology and Behaviour*. He was at the forefront of recognizing the confusion of names for the multitude of receptor subtypes for 5-hydroxytryptamine and was a member of a classification committee that published its proposal in 1986.

His contribution to pharmacology was recognized by the award of the 'Pythagorus Prize' from the University of Cantazaro, Italy in 1990, and by being made an Honorary Fellow of the British Pharmacological society and Fellow of the Institute of Biology.

In a long career Philip Benjamin Bradley was responsible for many important developments in the new science of brain pharmacology. Many students trained in his laboratory and look back with gratitude for the opportunities it has given them to become highly influential in their subsequent careers. He lived through an age when strong opinions were needed and he was not afraid to express them but nonetheless he was highly respected amongst his academic peers. His contribution overall is something the University of Birmingham should be proud of.

Philip Bradley moved to Somerset where he spent the last eleven years playing an active part in local affairs and enjoying his family. He married twice, firstly Joan Salter with whom he had a son and daughter and secondly Gillian Smith with whom he had a daughter. All survive him.

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