



ROBERT JOHN NAYLOR BPharm (Hon), PhD, DSc, FPS(FRPSGB), FBPS

Born in Bradford to Constance (Cambridge educated Schoolmistress) and John Naylor (Detective Constable), young Robert soon found his bearings in the world. Initially started studying Law in London, soon realised his interests were in pharmacy. He was acclaimed Student of the Year in UK Pharmacy! Entering the first cohort of the first course in Pharmacy at the new University of Bradford, Robert's love of enquiry quickly turned to the brain. Dopamine was new, haloperidol was new, it was the start of a golden era of research into the role of Dopamine in the brain.

Many researchers and clinicians know the tremendous contribution of Robert to science and drug discovery. His contributions to central nervous system disease particularly Parkinson's disease and nausea and emesis are well-known and have benefited millions of patients world-wide. He successfully brought neurochemistry into behavioural analyses, which provided clues to mechanisms of action of drugs. He could devise and test a hypothesis based on his extensive knowledge of the literature and his precision of interpretation was remarkable.

From 1970 Robert's main research interest was dopamine function in the brain, initially with emphasis on the disturbances known to occur in schizophrenia and Parkinson's disease. The research that spanned almost 2 decades extended to the identification of therapeutics to alleviate the symptoms. Ropinirole is an example of an agent which was studied by the group and is in successful use as a treatment for Parkinson's disease. This research extended beyond dopamine to the study of 5-HT and neurokinin receptors, to emesis and to the development of new therapies to combat the nausea and vomiting associated with cancer chemotherapy

It is from here on it became even more apparent that there was something else important that made Robert unique. Being respected by both academics and those working in industry is elusive to most, but Robert commanded this innocently and effortlessly. Under his group in Bradford, he tested several compounds supplied from industry to solve the puzzle of why metoclopramide was different to other dopamine receptor antagonists to prevent emesis. Under this new direction of research, major

projects were undertaken in the fields of acute and delayed emesis resulting from cancer chemotherapy. Novel animal models were established and the value of neurokinin receptor antagonists was determined for both acute and delayed emesis. In addition, a breeding colony of *Suncus murinus* was established at the University of Bradford, the only university in the UK to have this facility. Such animals have been used to establish a new and important model of motion sickness which led successfully to detection of novel anti-emetic agents.

He identified 5-HT<sub>3</sub> receptors in the human brainstem and showed chemotherapy caused elevations in 5-HT in the plasma; this contributed also to the hypothesis that 5-HT had been released from enterochromaffin cells to stimulate 5-HT<sub>3</sub> receptors on vagal afferents. He is known in the same breath as GR38032F, ondansetron and Zofran and other 5-HT<sub>3</sub> receptor antagonists. He also worked on the concept of 'broad inhibitory' anti-emetics that could work against several disparate challenges and together developed a new animal model of chemotherapy-induced acute and delayed emesis to better understand the aetiology of the response. It was this new model that showed that NK1 receptor antagonists could be used to treat chemotherapy-induced delayed emesis underpinning the development of aprepitant and other NK1 receptor antagonists as anti-emetics. Overall, his contribution drove the discovery process, permitting a more effective use of anticancer treatments. Without effective anti-emetics, people have refused life-saving cancer treatments. History should not forget how experiments were done. Ondansetron is perhaps one of the most important anti-emetic agents and is on the WHO Model List of Essential Medicines and represents the first advance in antiemetic medication in many years. This aspect of Robert's research dates back to 1981 as part of a PhD project in collaboration with Glaxo and MRC.

Robert's contribution to the combined use of 5-HT<sub>3</sub> and NK1 receptor antagonists therefore has saved lives, will save lives, and he is embedded in our humanity.

Robert had a unique drive and relentless approach to science that set a high standard. He always viewed himself as fortunate for he felt he never worked a day in his life. Amassing an amazing bibliography of 317 refereed papers, 54 book chapters and 318 refereed conference proceedings, with 634 conference presentations, Robert co-supervised 63 PhD students. His reputation brought in significant levels of collaborations and funding that he shared widely and used to nurture students and staff to innovate. The end-of-the-day 'pantry debriefs' were special. All fellows and students wanted to be there, no matter how late; to be part of the discussions; to be part of the family; to learn. This was the 'Neuropharmacology Research Group'.

Robert was extremely modest and attuned with people without prejudice. He was an excellent speaker at conferences, meetings and lectures which he did so sagely and commanded authority. He wrote hundreds of beautiful manuscripts. He was not obsessed with the 'impact factor' of a journal, or the list of order of authors on a manuscript.

As a hobby, he published two independent books on medications errors and the state of higher education. The former resulted in him being awarded the Baxter award. His scientific contributions continued even after retirement and he was instrumental in the identification of the role of beta1 integrin in cellular senescence.

Most important of all, although Robert in his latter years left a legacy of twin daughters, many of his fellows and students as well as colleagues regarded him as a fatherly figure. This is the ultimate testament to Robert's humanity and scientific prowess.

Robert was generous to a fault and kind. He inspired and he was inspired. He was warm and caring with remarkable sense of humor. Robert loved beauty and everything beautiful and pursued it with passion. Robert will be eternally missed and we are all blessed for having him. Till later, Adieu, salam, Arrivederci, etc.

Farideh Javid, John Rudd and Diana Wood.