OBITUARY

Charles Philippe Leblond, 1910–2007

Charles Philippe Leblond, who died on 10 April 2007 at age 97, was a giant in the field of cell and tissue biology. He was born in Lille, and entered science after medical school as a student of histochemist Antoine Giroud at the University of Paris. After two years as a Rockefeller Fellow at Yale University, he returned to Paris (1937–40) and joined the lab of Antoine Lacassagne, Director of the Biology Section of the Institut du Radium (Leblond 1991). In 1920 Lacassagne had begun injecting rabbits with radioactive polonium. Organs were removed, paraffin-sectioned and applied to photographic plates. Also at the Institut du Radium were physicist Frederic Joliot and his wife Irene Joliot-Curie (daughter of Pierre and Marie) who shared the 1935 Nobel Prize in Chemistry for their discovery of a method to generate radioactive elements. With a new Rockefeller-funded cyclotron in place, there was much excitement about the power of radiolabelled precursors as an emerging tool in biological research (Fragu 2003). Here Charles made the landmark discovery that iodine is taken up and stored by the thyroid gland at saturating levels under the control of thyroid-stimulating hormone then released over days to other organs (Leblond & Süe 1941). In 1940–41 Charles studied the role of phosphates in bone growth as a Research Fellow in Anatomy at the University of Rochester, then joined McGill University as a Lecturer in Histology in 1941, rising to Assistant (1943), Associate (1946) and full Professor (1948) of Anatomy. He was Chairman of the Department of Anatomy from 1957 to 1974. The early period was interrupted by the war years 1944–45 during which time Charles served in the Free French Forces in France and Britain by helping to organize personnel that numbered more than one million by the end of the war. The return from the war was transformative. ‘In 1946, after returning to Montreal from service with the Free French Forces, it was clear to me that the crude technique previously used for radioautography had to be improved.’ (Leblond 1995). Radioautography (autoradiography) is the histological detection of incorporated radiolabelled precursors. State-of-the-art was to tightly appose glass slide-mounted histological sections onto photographic plates, then develop the plate and compare the two. By melting photographic emulsion directly onto histological sections, resolution improved to the level of individual cells (Belanger & Leblond 1946). Radioautography introduced the dimension of time to histological cell biology, a ‘dynamic histology’.

For lovers of science there is much to be gained by rereading his classics. His early discovery of stem cells (Messier & Leblond 1960) has many insightful nuggets that still lead the field. One learns for example that stem cell-driven renewal is actually less common than the mechanism utilized by ‘expanding cell’ populations in which mitotic cells are dispersed rather than focused in niches. Prominent acknowledgement and confirmation of this under-appreciated observation came recently in Nature (Dor et al. 2004). Other classics include: identification of how skeletal bones grow through osteoblast deposition and osteoclast remodelling (Leblond et al. 1950), early discovery of the biogenesis and metabolism of thyroxine (Gross & Leblond 1950) and detection of triiodothyronine (Gross & Leblond 1951), early prediction of DNA semiconservative replication (Stevens et al. 1953) published days after the Watson and Crick Nature article, the discovery of axonal transport (Droz & Leblond 1962), the Warshawsky et al. (1963) finding that nascent proteins are processed from the rough endoplasmic reticulum through the Golgi apparatus into pancreatic zymogen granules (made in hot competition with the Palade lab at Rockefeller University), the first realization that the Golgi apparatus is the site of terminal glycosylation (Peterson & Leblond 1964), the discovery of the cell coat (Rambourg et al. 1966), the cellular biogenesis of collagen (Weinstock & Leblond 1974), and new insights into the ultrastructure of basement membrane (Inoue et al. 1983). The breadth and originality of his contributions to science are astounding.

Charles Leblond’s child-like openness to the possibilities of new data (‘study every opportunity, learn from every situation’ (http://www.medicine.mcgill.ca/newsletter/summer-2002.pdf)), his courage in controversy with faith in the precision of the data (‘Always, above all, be precise’
and ambition (do better than one’s best), was matched by his enduring gentle humour and personal concern for his associates and students. A remarkable 120 graduate students matriculated under his supervision (http://www.medicine.mcgill.ca/newsletter/summer-2002.pdf). As we graduate students reported our new data to Charles, the Heraclitus quotation ‘Rien n’est permanent sauf le changement’ over his desk reminded us of the flow of science and life. A beginning student’s introductory interview with Charles might include a gentle query about the periodic acid Schiff stain whose lively purple-magenta colouring of carbohydrate 1–2-glycol groups (Leblond 1950; Leblond et al. 1957) inspired Charles Leblond’s Golgi and cell coat discoveries. The student would later realize that it also elegantly inspired the Leblond wardrobe, automobile and even home interiors. His popular histology lectures were accompanied by large carefully rendered multicolour (some purple–magenta) chalk drawings and had a significant historical narrative. As Nobel laureate George Palade noted on the occasion of the 1992 Prix Marie-Victorin to Charles, Leblond’s discoveries are so fundamental that they are taught in schools and colleges throughout the world (http://www.prixduquebec.gouv.qc.ca/recherche/desclaureat.asp?noLaureat=159).

The 1975 international stem cell symposium (Cairnie et al. 1976) honouring Charles Leblond’s 65th birthday was not as it turns out the transition into retirement. Instead, he was awarded an NIH Fogarty Scholarship for a year of retooling in George R. Martin’s lab at the National Institute of Dental Research where a benign, misidentified mouse tumour was soon to revolutionize extracellular matrix biology. Armed with the powerful new technique of immunohistochemistry, Charles returned to McGill to elegantly document previously uncharted steps in the cellular biosynthesis of thyroglobulin (Paiement & Leblond 1977) and collagen I in bone and teeth (Leblond & Wright 1981). Soon, antibodies to collagen IV, a new basement membrane molecule designated ‘GP-2′ – later named ‘laminin’, and to a heparan sulfate proteoglycan (‘perlecan’) began appearing in the Leblond lab from George Martin. This launched a 2-year molecular exploration culminating in the concept of the basement membrane as an integrated polymer (Inoue et al. 1983), rather than as layers of separated macromolecules initially favoured by others. This remarkable productivity did not get in the way of new contributions to the understanding of epithelial renewal, nuclear and nucleolar shape, and bone remodelling – including a September 2006 article detecting the MMP9 cysteine activation switch for the first time in remodelling cartilage (Lee et al. 2006). A whole career in itself beyond age 65.

Charles served as president of the American Association of Anatomists (‘AAA’; 1962–63). His achievements were recognized through many awards including Fellowships of the Royal Society of Canada (1951) and London (1965), the Flavelle Medal (1961), the Medal Leo Pariseau, the Gairdner Foundation Award (1965) – often a predictor of the Nobel prize – honorary member of the American Academy of Arts and Sciences (1970), honorary member of the Anatomical Society of Great Britain and Ireland (1975), honorary fellow of the Royal Microscopical Society, Officer – Order of Canada (1977), the AAA’s Henry Gray Award (1978), the American Society for Cell Biology’s Wilson Award (1982), McLaughlin Medal (1983), inductee into the Canadian Medical Hall of Fame (1995) and honorary doctorates from Acadia, McGill and York Universities and from the Universities of Montreal and Sherbrooke. In 1999, he was appointed to the prestigious Companion of the Order of Canada.

Charles married Gertrude Sternschuss, his wife of 64 years, while at Yale in 1936. A year after her death in December 2000 he married Odette Lengrand, a childhood acquaintance from Lille. Both were 91. Odette died in July 2004. Charles was an inspirational man who showed a zest for beauty and humour in all aspects of his life and work.

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References

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