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Obituary

Dennis Chapman, FRS (1927–1999): A pioneering biospectroscopist

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Dennis Chapman was born May 6, 1927 in Sunderland, County Durham and died October 28, 1999, in Beaconsfield, Buckinghamshire. He had an exceptionally varied and influential career in both industry and academia, and was one of only a few scientists to feel entirely at ease in both cultures. He received a BSc degree from the University of London in 1948 then obtained a PhD degree in Electrical Engineering from D. E. Craggs in Liverpool in 1951. From then until 1969 he was associated with Unilever, where an interest in the use of spectroscopy and crystallography to investigate phase behavior (in triglycerides and cocoa butter) led to rapid promotion to Head of the Molecular Physics Unit and General Research Division of Unilever Limited, and to a chance meeting with L.L.M. van Deenen. Van Deenen's group had obtained infra-red spectra of phospholipids, but were puzzled by the very broad lines obtained, which Chapman instantly recognized as being due to the presence of a liquid crystalline phase, based on his earlier work with soaps and triglycerides. The Unilever group then embarked on a major synthetic and structural characterization program, investigating the effect of chain lengths, unsaturation, headgroup type, and the effects of cholesterol on the newly coined "membrane fluidity" – results and concepts now taken for granted in biochemistry and biophysics.

Dennis Chapman

[1] Yukihiro Ozaki presented the first *Chapman Memorial Lecture at the First International Conference on Biomedical Spectroscopy* in Cardiff, Wales, UK (7–10 July 2002).

In 1969 Chapman moved to Reckitt and Coleman as Director of Research and joined the University of Sheffield as a visiting Professor. He expanded his research team at Sheffield to some 25 researchers, all devoted to the biophysical characterization of complex lipids and membrane proteins. These years in commercial and academic research environments generated hundreds of scientific papers and spawned literally thousands of articles on lipid and membrane structure from laboratories throughout the world. Indeed, the work of the group at this time was found by the Institute of Scientific Information to be amongst the most cited research carried out in the United Kingdom.

Chapman then moved to the Royal Free Hospital Medical School as Professor of Biophysical Chemistry in the Department of Biochemistry and Chemistry in the late 1970's, where he soon founded the Department of Protein and Molecular Biology and was promoted to vice Dean of the School. He was elected a Fellow of the Royal Society in 1986.

In London, Chapman began to investigate ways of manipulating lipid properties, by catalytic hydrogenation and by polymerization, with a view to developing novel lipid materials to be used in biomedical research. In particular, Chapman asked the question: how could mechanical devices used in medicine (such as catheters, stents, contact lenses) be made more "biocompatible", and not be rejected by the body, or acting as foci for blood clots, crystallization or other irritations? The breakthrough was his realization that the outside surfaces of cells, for example the red cells in blood, were made of lipids which contained no net electrical change, and were blood or haemo-compatible. However, the molecules which comprised the inner surface of such cells were negatively charged, and were thrombogenic (causing blood clots) or otherwise immunogenic. Chapman hit on the clever idea that it might therefore be possible to take a fragment of the electrically neutral lipid molecule and cover the surfaces of various medical devices, thereby making them biocompatible, and in 1984 he established the UK firm "Biocompatibles International PLC". The basic hypothesis of biocompatibility was then rapidly expanded and it was found to be possible to actually polymerise lipid molecules with other species to form new plastics – a brilliant idea which resulted in an extremely broad range of "friendly plastics" which are being used in contact lenses and other refractive and opthalmic surgical devices (Biocompatibles Eye Care Division) as urologic stents and catheters (manufactured by Biocompatibles' wholly owned subsidiary, Urotech, GmbH), and lipid coated coronary stents are now the first choice of many cardiologists. The firm, headquartered in Surrey and with manufacturing facilities in the US, Ireland and Germany, was floated on the London Stock Exchange in 1995, and now has over 300 employees and has raised £50M for product development.

Dennis Chapman was one of only a few scientists to have made a successful transition from industry to academia, feeling entirely at ease in both cultures. He was well known on the International Conference circuit as an enthusiastic and entertaining speaker. Although his lectures were delivered with apparent ease and confidence, he often suffered considerable anxiety beforehand. His public persona also masked a more private and domestic side of his character. He was devastated by the tragic death of his first wife, Margaret, who provided him with a happy and stable family life during his often-turbulent scientific career. His marriage to his second wife, Francoise rekindled his spirits and got his scientific interests back on track.

Dennis Chapman's influence will live on with the many colleagues whose careers he strongly influenced. In his valedictory address, he strongly urged young scientists to respond to the needs of society, as he had endeavored to with great vigor and success over a lifetime devoted to this cause. He is survived by his wife Francoise, children form his first marriage, Michael, Alison and Paul, and stepdaughter Natasha, and will be greatly missed by all who had the pleasure of matching wits with him for many years.