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Obituary: Christien Merrifield 1972–2017

Christien Merrifield, a cell biologist and gifted experimentalist distinguished for his work on endocytosis, died tragically on 28 October in France while under treatment for depression.

Christien was born on the Isle of Wight, where Merrifields have lived for centuries. He loved the island and the sea, roaming with his lifelong friend from teenage years, the marine biologist Kim Last, and developing an interest in palaeontology. He crossed the Atlantic under sail as a qualified First Mate and served as Navigator and Biologist on the World Wildlife Fund yacht 'Song of the Whale' in 1994.

Christien began his career as a cell biologist by doing a PhD under Prof Stephen Moss in UCL. While a PdD student, he began to visit and collaborate with Wolfgang Almers in the Max Planck Institute in Heidelberg. Almers invited him to accompany him to the Vollum Institute in Portland Oregon, where he worked until 2002. As well as becoming a key researcher in the Almers group he developed imaging apparatus which was commercialised by the US company Optical Insights. He then took up an appointment at the MRC Laboratory of Molecular Biology, Cambridge and set up a small research group which published an outstanding paper in *PLOS Cell Biology* which has become a classic. The astonishing movies which he made showing individual endocytotic events also gained him the Selwyn Award of the Royal Photographic Society for excellence in scientific imaging in 2007. When asked to

disband his group in Cambridge in 2011, he moved to France.

In France, there was delight and excitement at the arrival of such a distinguished young scientist. Dr Jaqueline Cherfils, the chairperson of the CNRS Laboratory of Enzymology and Structural Biology and her colleague Dr Maghel Zeghouf, have also commented on the simple modesty that made it a delight to stroll down to his lab for a discussion, which contrasted with his high distinction. The latter was recognized in his appointment to a long-term position as a Research Director of CNRS at his unusually young age. His friends, David Perrais, Stéphane Vassilopoulos and Nathalie Sauvonnet, have described him as kind, patient, a real gentleman as well as a scientist of genius.

Recently, in France he invented a new modification of his instrument for total internal reflection microscopy, using polarized light.

He returned regularly to the UK to teach in the EMBO Practical Course on Advanced Optical Microscopy in Plymouth each Spring, giving masterly lectures. Typically, he often lectured on photoproteins rather than on his own field of endocytosis when the course programming demanded this. Gerard Marriot (UC Berkeley), who teaches at that course, has contributed the following words:

I always enjoyed Christien's lectures and our interactions at the Plymouth Workshop. He always struck me as a remarkably talented scientist,

who led a research group that produced high-quality, innovative and high impact publications. It was only after listening to his lecture during my first visit to Plymouth that I connected his name to the influential papers I had read on the molecular mechanism responsible for clathrin-mediated endocytosis. He made these discoveries by cleverly integrating principles and practices of cell biology, physical chemistry with advanced biosensors and optical microscopy techniques. In fact, I still use the article he published in *Trends in Cell Biology* (2004) to show my students how fluorescence microscopy can be used to unravel dynamic molecular events on the surface of an individual femtoliter nanovesicle at the plasma membrane of living cells. In particular, you may recall that Christien showed that endocytosis proceeds by way of a defined sequence of molecular events that begins with the recruitment of dynamin at the plasma membrane followed by a massive pulse of actin polymerization on the cytoplasmic face of the plasma membrane, regulated in part by the Arp2/3 complex and coronin. Christien also used pH-sensitive GFP mutants fused to transferrin to correlate these distinct molecular events with the acidification of individual endosomes. Christien also showed that the localization of these molecular events to the membrane-facing side of the endosome introduced a functional polarity to the endosome that accounted for their directional movements towards the perinuclear region. Christien



excelled in the development and application of high-quality genetically-encoded fluorescent fusions to study dynamic events at the plasma membrane of living cells. The scale of his studies and a measure of his collaborative spirit can be seen in the number of expression plasmids he deposited with Addgene and the large number of high impact papers in the field that thank him for providing these molecular tools. Christien leaves behind a legacy of outstanding academic scholarship and research innovation.

Gerard's words underline Christien's distinction in cell biology, so early in his young life. Anyone who worked with him grew to respect his determination to run his own research lab and be guided by nothing except his own marvellous curiosity about the natural world and his skill and scientific rigour. To those who were his friends there is now shock and inconsolable sadness.

Professor Brad Amos

Taylor MJ., Perrais D & Merrifield CJ. (2011) A High Precision Survey of the Molecular Dynamics of Mammalian Clathrin-Mediated Endocytosis *PLoS Biol* 9(3): e1000604. <https://doi.org/10.1371/journal.pbio.1000604>.