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CENTRO DE BIOLOGÍA MOLECULAR "SEVERO OCHOA"

12ª Lección Conmemorativa en Honor de David Vázquez

Imparted by **Professor Jeff Errington**

(The Centre for Bacterial Cell Biology, Baddiley-Clark Building Medical School, Newcastle University, Newcastle, UK)

The 12th David Vázquez Memorial Lecture imparted by **Professor Jeff Errington** is scheduled for Friday, **October 20, at 12.00 (noon)** in Sala Ramón Areces del Centro de Biología Molecular Severo Ochoa. The title of his seminar is:

"L-form bacteria: antibiotics, lysozyme and chronic infection"

Born in 1956 in Gateshead, England, Jeff Errington received his Bachelor's degree in genetics from Newcastle University and went on to gain his PhD in bacterial genetics at Thames Polytechnic in London. He moved to Oxford University to do postdoctoral research with Dr. Mandelstam in the Biochemistry Department. He stayed in Oxford for over 30 years, latterly as Professor of Microbiology in the Sir William Dunn School of Pathology (where Penicillin was first purified). He returned to Newcastle in 2006 to lead the newly formed Institute of Cell and Molecular Biosciences and setting up the Centre for Bacterial cell Biology, the world's first major research centre focused specifically on the molecular and cellular biology of bacterial cells, in 2006, where he is currently Director.

Professor Errington has spent much of his research career studying fundamental questions about the structure and function of bacterial cells. Early on, he made important contributions to our understanding of the molecular biology underpinning endospore formation in *Bacillus subtilis*. More recently he has contributed substantially to understanding of chromosome replication and segregation, cell division and cell morphogenesis in bacteria. His lab was one of the pioneers in the application of digital fluorescence imaging methods to bacteria.

His contributions to basic science have been recognized by election to various learned societies, including Fellowship of the Royal Society, EMBO, the UK Academy of Medical Sciences and the European and American Academies of Microbiology. His academic work is currently funded by major grants from the European Research Council and the Wellcome Trust. He has also been honoured with a number of prizes including most recently, the Lwoff Award presented by the Federation of European Microbiological Societies (2017).

The mechanisms underlying essential cellular functions in bacteria include many essential proteins that are actual or potential targets for antibiotics. Errington's work has generated opportunities for discovery of novel antibiotics, which have been pursued through two spin out companies, Prolysis Ltd (now part of Aviragen Therapeutics Inc) and now Newcastle-based Demuris Ltd.

In the last 10 years or so, Errington's lab have pioneered the application of modern molecular cell biology methods to an old problem – cell wall deficient or "L-form" bacteria. The peptidoglycan cell wall is an ancient, well conserved and usually essential structure. It is the target for our best antibiotics and fragments of the wall trigger powerful innate immune responses against infection. Surprisingly, many bacteria can switch almost effortlessly into a cell wall deficient state – the L-form – which was first described in the 1930's. L-forms become completely resistant to cell wall active antibiotics and may be able to pass under the radar screen of our immune systems. Studies of L-forms have provided surprising insights into various aspects of bacterial cell physiology and biochemistry, as well as providing a model illuminating how the earliest true cells on the planet might have proliferated. Recent work has focused on understanding how the switch from walled cells to L-forms occurs in the context of infection and the possible impact of this on antibiotic resistance and evasion.

Key references

Leaver et al., 2009, **Nature** 457, 849-853. Mercier et al., 2013, **Cell** 152, 997-1007. Errington, 2013, **Open Biology** 3, 120143. Mercier et al., 2014, **eLife** 04629. Kawai et al., 2015, **Current Biology** 25, 1613-1618; Mercier et al., 2016, **Nature Microbiology** 1, 16091.

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