CiQUS

Centro Singular de Investigación en Química Biolóxica e Materiais Moleculares

Conferencia: *Minimal artificial tissues from communicating droplet networks*

Hagan Bayley

University of Oxford

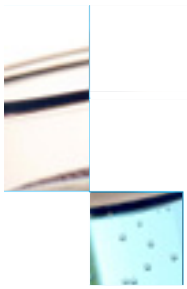
05/04/13

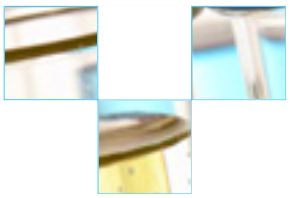
.....

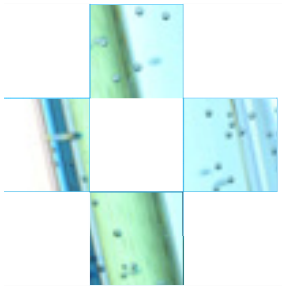
Aula de Seminarios do CIQUS

12:15 h

Máis información:
www.usc.es/ciqus







FEDER - FONDO EUROPEO DE DESENVOLVEMENTO REXIONAL
"Unha maneira de facer Europa"

UNIÓN EUROPEA

XUNTA DE GALICIA
CONSELLERÍA DE CULTURA, EDUCACIÓN E ORDENACIÓN UNIVERSITARIA

HAGAN BAYLEY is the Professor of Chemical Biology at the University of Oxford. He received his B.A. in chemistry from Oxford in 1974, while at Balliol College, and his Ph.D. in chemistry from Harvard University in 1979 in the laboratory of Jeremy Knowles. After postdoctoral work with Gobind Khorana at the Massachusetts Institute of Technology, he was on the faculty at Columbia University and the University of Oxford. From 1988 to 1996, he was at the Worcester Foundation for Experimental Biology in Shrewsbury, Massachusetts, and from 1997 to 2003 at Texas A&M University in College Station. The development of engineered pores for stochastic sensing, the study of covalent chemistry at the single molecule level, ultrarapid DNA sequencing and the synthetic biology of minimal tissues are major interests of the laboratory. In 2005, Dr. Bayley founded Oxford Nanopore Technologies to exploit the potential of stochastic sensing technology.

http://bayley.chem.ox.ac.uk/

Minimal artificial tissues from communicating droplet networks

Hagan Bayley

Department of Chemistry, University of Oxford, Oxford OX1 3TA, UK

Synthetic biology is being used to build devices through both top-down and bottom-up approaches.[1] For example, genome engineering has been used to reprogram cells, and DNA origami has been used to produce a variety of nanodevices. While progress has been made on the assembly of minimal cells, synthetic tissues have so far received limited attention.[1] We have assembled networks of aqueous droplets joined by lipid bilayers.[2] The droplets in the networks can communicate with each other and with the environment through engineered protein pores[3] and, like tissues, exhibit emergent properties.[4] To mimic tissues, droplet networks should be endowed with various properties including the ability to store and use energy, to move and change shape, to detect signals, to carry out computations and take up and release molecules. At a certain level, these goals have been achieved.[2-5] We now aim to interface droplet networks with living tissues and control them with electrical or optical signals.

1 Woolfson, D. N. & Bromley, E. H. C. Synthetic biology. *The Biochemist* February, 19-25 (2011).

2 Holden, M. A., Needham, D. & Bayley, H. Functional bionetworks from nanoliter water droplets. *J. Am. Chem. Soc.* **129**, 8650-8655 (2007).

3 Villar, G., Heron, A. & Bayley, H. Formation of droplet networks that function in aqueous environments. *Nature Nanotechnology* **6**, 803-808 (2011).

4 Maglia, G. *et al.* Droplet networks with incorporated protein diodes show collective properties. *Nature Nanotechnology* **4**, 437-440 (2009).

5 Villar, G., Graham, A. D. & Bayley, H. A tissue-like printed material. *Science*, in press (2013).