

Solvay Colloquium



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Chemical Information Processing

This presentation will describe two different projects dealing with communication of chemical information in molecular systems: synthetic information molecules and transmembrane signal transduction.

Transmission and amplification of chemical signals across lipid bilayer membranes is of profound significance in many biological processes, from the development of multi-cellular organisms to information processing in the nervous system. The ability to reproduce such processes in artificial systems has potential applications in sensing, controlled drug delivery and communication between compartments in tissue-like constructs of synthetic vesicles. We have developed a new mechanism for transmitting chemical information across membranes based on controlled translocation of a synthetic molecular transducer from one side of a lipid bilayer membrane to the other.¹

The encoded recognition properties of nucleic acids are currently unrivalled in any other material. High fidelity sequence selective duplex formation is the molecular basis for replication of the genetic information encoded by DNA and is finding widespread applications in the programmed assembly of complex nucleic acid nanostructures. We have been investigating the sequence-selective duplex formation properties of synthetic recognition-encoded oligomers that bear no resemblance to the natural system.²

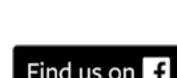
1. (a) Langton, M. J.; Keymeulen, F.; Ciaccia, M.; Williams, N. H.; Hunter, C. A. *Nat. Chem.* 2017, 9, 426–430. (b) Langton, M. J.; Williams, N. H.; Hunter, C. A. *J. Am. Chem. Soc.* 2017, 139, 6461–6466.

2. (a) Stross, A. E.; Iadevaia, G.; Hunter, C. A. *Chem. Sci.* 2016, 7, 94; (b) Iadevaia, G.; Stross, A. E.; Neumann, A.; Hunter, C. A. *Chem. Sci.* 2016, 7, 1760; (c) Stross, A. E.; Iadevaia, G.; Hunter, C. A. *Chem. Sci.* 2016, 7, 5686; (d) Núñez-Villanueva, D.; Hunter, C. A. *Chem. Sci.* 2017, 8, 206; (e) Núñez-Villanueva, D.; Iadevaia, G.; Stross, A. E.; Jinks, M. A.; Swain, J. A.; Hunter, C. A., *J. Am. Chem. Soc.* 2017, 139, 6654.

Tuesday 4 December 2018 at 4.00 P.M.

COFFEE AND TEA WILL BE SERVED AT 3.45 P.M. IN FRONT OF THE SOLVAY ROOM

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