Neurobiology / Ageing Programme

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“Cracking the Olfactory Code – lessons from a ‘simple’ model organism”

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Biography

Catherine McCrohan is Professor of Comparative Neurobiology in the Faculty of Life Sciences at the University of Manchester. The theme of her research is neuronal coding and plasticity underlying behaviour in invertebrates and lower vertebrates. As Associate Dean for Teaching, Learning and Students she has responsibility for strategic oversight and delivery of all undergraduate and postgraduate taught programmes in the Faculty.

Abstract

To understand how olfactory stimuli are perceived requires a full picture of how primary sensory neurons detect and code for different odours. In most animals, this is impossible because of the numerical complexity involved. *Drosophila* larvae possess only 21 paired olfactory sensory neurons (OSN), most of which express a single olfactory receptor (OR) type, together with the co-receptor Orco. Combinatorial coding in the periphery allows larvae to detect and discriminate a large number of odours. We have exploited the UAS-Gal4 system to create single OR lines in which only one identified OSN is functioning. Using electrophysiological recording to characterise the odour-response profiles of 19 of the 21 OSNs, we found that a given OSN’s response to a specific odour is often highly variable, and we hypothesise that odour recognition is based on probabilistic data received by the brain from the periphery, including both responses and spontaneous background activity. We are currently exploring the possibility that the peripheral olfactory code exhibits both short- and long-term plasticity and that this plasticity may be directly involved in mediating experience-dependent behavioural changes in responses to odours. Short-term (minutes) adaptation to specific odours can induce a change in OSN responses depending on the odour, and we are currently exploring the effect of longer-term (days) adaptation on the peripheral olfactory code.

Date and time: Monday, 24 September 2012
Time: 4.00 – 5.00pm
Venue: NUS Centre for Life Sciences Seminar Room 1
Host: A/P Lim Kah Leong, Dept of Physiology