

Symposium 11: Neuronal control of nutrition: integrating energy balance and motivation

Theme: Attention, motivation, behaviour

Tuesday 11th April, 9:00 – 10:40

How the brain controls feeding is a subject of intense interest to neuroscientists and the general public alike. In part, this may be because obesity and related diseases continue to grow in prevalence across society and show little sign of abating. Another reason is that, even in non-pathological scenarios, each of us can relate to the powerful motivational force that food and associated stimuli can exert over our behaviour. These cravings or urges to consume are often thought to be due to the hyperpalatability of food, i.e. because it tastes so good. However, accumulating evidence suggests it is actually the nutritional value of food (e.g. its caloric content) that may play a more prominent role in driving consumption. How the nutritional value of food is relayed to the brain and integrated to produce a behavioural output is only now being unravelled.

In this symposium, this topic will be explored with respect to energy balance, its links to motivational and reward circuitry, and the molecular plasticity that emerges after experience with nutritionally-dense foods. Dr Denis Burdakov (Crick Institute) will describe how circuits within the hypothalamus signal nutritional value and are modulated by energy balance to bias animals behaviour. Dr. Ana I. Domingos (Gulbenkian Institute, Portugal) will discuss how hypothalamic circuits drive activity in dopamine cells and contribute to encoding of nutritional value. Dr. Carrie R. Ferrario (University of Michigan, USA) will discuss the molecular, synaptic, and physiological adaptations that are produced in response to an energy-dense diet and the extent to which this state overlaps or not with drug addiction. Finally, James E. McCutcheon (University of Leicester, UK) will describe modulation of the dopamine system that is induced by foods containing different caloric loads as well as examining situations in which an appetite develops for a specific nutrient (e.g. salt, protein), rather than for caloric content.

Chair: Dr James McCutcheon (University of Leicester)

Co-chair: Dr Carrie Ferrario (University of Michigan, USA)

Speaker 1: Dr Denis Burdakov (The Francis Crick Institute, London)

'Natural orexin signals: to eat or not to eat?'

Speaker 2: Dr Ana Domingos (Gulbenkian Institute of Science, Portugal)

'Sweet, light and beyond'

Speaker 3: Dr Carrie Ferrario

'Why did I eat that? Differences in striatal function and motivation that contribute to obesity'

Speaker 4: Dr James McCutcheon

'Mesolimbic response to energy and other nutrients'