



## Professor David Spanswick

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Brain areas dedicated to controlling food intake and body weight include aspects of the hypothalamus, key centres for sensing, integrating and formulating appropriate behavioural responses to changes in energy status and the hedonic, reward-based neural circuits. One nutrient that is controlled and maintained within narrow limits is glucose. Glucose levels are maintained by a network of interacting peripheral and central glucose-sensing systems. Consequently understanding the fundamental mechanisms by which function-specific glucose-sensing neurons and networks detect, respond and formulate appropriate output and if and how they are subject to dysfunction in obesity and diabetes is critical to developing future intervention strategies. We employ an electrophysiological approach to identify mechanisms by which function-specific neurones and circuits detect changes in energy status to co-ordinate appropriate behavioural responses and how they change depending on the energy status of the organism.

### Research Projects

1. **Glucose-sensing neurons in the brain: how do they do it?**
2. **Motivation and reward: glucose, ghrelin and the mechanisms regulating the dopaminergic neural circuits of the ventral tegmental area**

### Selected significant publications:

1. Brown RM, Kupchik YM, Spencer S, Garcia-Keller C, **Spanswick D**, Lawrence AJ, Simonds SE, Schwartz DJ, Jordan KA, Zhou TC, Kalivas PW. 2015. Addiction-like Synaptic Impairments in Diet-Induced Obesity. *Biol Psychiatry* pii: S0006-3223(15)00996-8..
2. Hebeisen S, Pires, N, Loureiro AI, Bonifácio MJ, Palma N, Whyment A, **Spanswick D**, Soares-da-Silva P. 2015. Eslicarbazepine and the enhancement of slow inactivation of voltage-gated sodium channels: A comparison with carbamazepine, oxcarbazepine and lacosamide. *Neuropharmacology* 89, 122-135.
3. Simonds SE, Pryor JT, Ravussin E, Greenway FL, Dileone R, Allen AM, Bassi J, Elmquist JK, Keogh JM, Henning E, Myers MG Jr, Licinio J, Brown RD, Enriori PJ, O'Rahilly S, Sternson SM, Grove KL, **Spanswick DC**, Farooqi IS, Cowley MA. 2014. Leptin mediates the increase in blood pressure associated with obesity. *Cell*, 159, 1404-1416.
4. Van den Top M, Lee K, Whyment A, Blanks A, **Spanswick D**. 2004. Orexigen-sensitive NPY/AgRP pacemaker neurons in the hypothalamic arcuate nucleus. *Nature Neuroscience* 7, 493-494
5. **Spanswick D**, Smith MA, Mirshamsi S, Routh VH, Ashford MLJ. 2000. Insulin activates ATP-sensitive potassium channels in hypothalamic neurones of lean, but not obese rats. *Nature Neuroscience* 3, 757-758.