Title: Bacterial sensory perception

Application deadline: Applications accepted all year round

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Funding: Self-funding only Summary

Bacteria sense numerous environmental stimuli and integrate this information to regulate their own cellular processes accordingly. Understanding the molecular mechanisms that bacteria use to sense and transmit information brings opportunities to deliberately disrupt sensing in order to kill pathogenic bacteria or to manipulate the behaviour of commercially important bacteria, for example those used in industrial fermentation to produce food or antibiotics.

We have recently identified a new mechanism by which the human pathogen Mycobacterium tuberculosis senses amino acids in its surroundings and uses this information to regulate its own metabolism.

We welcome applications from students wishing to use approaches from the disciplines of microbiology, genetics, biochemistry, biophysics and structural biology to investigate the stimuli that bacteria can sense and how this information is used to regulate bacterial behavior.

Students within our group receive training in modern techniques of microbiology, biochemistry and molecular biology, in addition to the broad training programme offered to all PhD students at the University. There is also the opportunity to interact with the many other microbiology research groups within the University and benefit from collaborations elsewhere in the UK and Europe.

Relevant papers from our group:

1. "PknG senses amino acid availability to control metabolism and virulence of Mycobacterium tuberculosis" http://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1006399
2. Ventura M, Rieck B, Boldrin F, Degiacomi G, Bellinzoni M, Barilone N, Alzaidi F, Alzari PM, Manganelli R, O'Hare HM. (2013) GarA is an essential regulator of metabolism in Mycobacterium tuberculosis. Mol Microbiol. 90(2):356-66.
3. Wagner T, Bellinzoni M, Wehenkel A, O'Hare HM, Alzari PM (2011) Functional plasticity and allosteric regulation of alpha-ketoglutarate decarboxylase in central mycobacterial metabolism. Chemistry & Biology 18 (8) 1011-1020.
4. Nott TJ, Kelly G, Stach L, Li J, Westcott S, Patel D, Hunt DM, Howell S, Buxton RS, O'Hare HM, Smerdon SJ (2009) An intra-molecular switch regulates phospho-independent FHA domain interactions in Mycobacterium tuberculosis. Science Signaling 2 (63) ra12.