

Role of microRNAs in regulating sex differences in stress responsive neurocircuitry across the lifespan

Supervisory team:

Main supervisor: Prof Mark Lindsay (University of Bath)

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Host institution: University of Bath

Project description:

The ability of an organism to respond appropriately to stress is essential for survival in its' environment. This project will investigate the role that microRNAs play in the dynamic transcriptional regulation of genes in sexually dimorphic parts of the brain involved in responding to stress. Sex differences are evident in the response to stress both hormonally and behaviourally. For example, in rodents, females have a more robust stress hormone response to stress than males. Although the hypothalamic-pituitary-adrenal axis (HPA) mediates the body's primary neuroendocrine response to a range of stressors, multiple brain regions are involved in mediating both the rapid and long-term behavioural, physiological and molecular adaptations to stress. Micro RNAs (miRNAs) are short non-coding RNAs that are post-transcriptional regulators of gene expression. Emerging evidence shows that the neonatal brain miRNA environment is sexually dimorphic and responsive to gonadal sex hormones. Whether this is also true across the lifespan is not yet known, but could be a critical determinant of sexual dimorphism in the response to stress.

The approach will be to combine transcriptomic analysis and bioinformatics with an *in vivo* systems neuroscience approach to studying behavioural stress responses in sexually dimorphic brain regions across the lifespan. Full training will be provided in all bioinformatics and molecular techniques, as well as completion of Home Office licence training for animal studies. PhD students are actively encouraged to attend scientific meetings and publish their data. PhD students will join a vibrant group of researchers in the Department of Pharmacy and Pharmacology at Bath and have the opportunity to collaborate with Prof Rosalind John in the School of Biosciences at Cardiff University. Through journal clubs and other informal activities students support one another with shared experiences and expertise. There are also excellent opportunities for generic skills training e.g. public engagement activities. At the end of this PhD you will have acquired the skills to plan and undertake independent research and you will be equipped to follow a variety of different postgraduate career paths.

For further information about this research at the University of Bath:
http://www.bath.ac.uk/pharmacy/contacts/academics/mark_lindsay/
http://www.bath.ac.uk/pharmacy/contacts/academics/sarah_bailey/