

# What is the relationship between apathy and disruptions in normal biological rhythms?

## **Supervisory team:**

**Main supervisor:** Dr Emma Robinson (University of Bristol)

**Non-academic supervisor:** Dr Hugh Marston (Eli Lilly)  
Prof Stafford Lightman (University of Bristol)

**Collaborators:** Dr Matthew Jones (University of Bristol)

**Host institution:** University of Bristol

## **Project description:**

Apathy is defined as a lack of feeling and emotion with a loss of interest and concern for everyday activities. Apathy is not a disease in itself but is often observed in patients with neurological, neurodegenerative neuroendocrine and neuropsychiatric disorders. Despite the apparent prevalence of apathy, few studies have been undertaken to try to understand the neurobiology of this psychological state or how its symptoms could be treated. Apathy is commonly seen in the elderly and is prevalent in patients with neurodegenerative disorders. It is anticipated that new treatments to slow or halt the progression of neurodegenerative diseases will become available in the next 5-10 years. Whilst this has huge potential benefits, there is also the likelihood that patients will still retain many of the early symptoms of the disease. Until a method to reverse the degenerative process is found or better early detection, there is a need to provide appropriate treatment for these patients' ongoing symptoms. As one of the prominent symptoms of early neurodegeneration, and with prevalence rates estimated at ~70%, understanding the biology of apathy is important.

This project is an industrial collaboration between researchers at the University of Bristol and the pharmaceutical company, Eli Lilly. The proposed research will integrate behavioural measures of apathy in rodents with studies quantifying the biological rhythms which underlie endocrine and sleep patterns. The work will test the hypothesis that changes in these biological rhythms lead to the development and perpetuation of the psychological presentation of apathy. The work will also test whether remedying dysfunctional patterns in either corticosterone release or sleep cycles can impact on the behavioural measures. The project will combine a range of in vivo techniques and will provide the student with training in, automated blood sampling and the measurement of the ultradian and circadian rhythms associated with circulating levels of glucocorticoids; electroencephalography (EEG) recording of sleep-wake cycles in freely moving animals and behavioural analysis of animals' affective and motivational states.

Whilst the focus of this project will be normal aging and how biological rhythms and behavioural characteristics associated with apathy develop over the life course, this project will also have much wider implications. Apathy is not just a disease of aging and degenerative disorders and is commonly seen in other chronic illnesses. By understanding the relationships between normal biological rhythms and how these may or may not contribute to the development of neuropsychological symptoms, novel hypotheses in these other conditions can be developed and tested.