

Faculty of Health and Medical Sciences
Research Themes

Sleep, Chronobiology & Neurodisorders



Overview

Sleep, Chronobiology & Neurodisorders research is highly multidisciplinary, and draws upon expertise in sleep physiology and EEG analysis, neuroendocrinology, molecular genetics, rest-activity and waking performance monitoring, circadian photoreception, shift work, sleep disorders, nutritional physiology, neuropharmacology, psychopharmacology, clinical pharmacology, neurotoxicology and neurodegeneration.

Research activities are supported by medical and clinical staff in state-of-the-art facilities at the Surrey Clinical Research Centre with a 12-bed ward and 12 individual sound-attenuated, light-controlled rooms equipped for sleep and circadian physiology studies.

An additional Clinical Investigation Unit also provides facilities for controlled light exposure and ultrasound endothelial function measurement. Radioimmunoassay labs enable the measurement of circadian hormones from samples collected in the field or in the lab.

Extensive molecular biology facilities provide equipment for gene expression profiling and genotyping, backed up by transgenic animal facilities. Patch clamp and multielectrode array electrophysiology set-ups and state-of-the-art imaging and microdialysis methodology allows a broad range of in vivo and in vitro research.

Sleep, Chronobiology & Neurodisorders research at Surrey has a high national and international profile and consistently attracts significant government, EU, charitable, and industrial funding. Academic research staff members are also actively engaged in postgraduate and postdoctoral research training, including participation in EU training networks.

Examples of our Current Research

Dr Simon Archer

Genetic and phenotypic outputs of the circadian clock in Per3 knock-out and humanised Per3 knock-in mice, BBSRC

Dr Ying Chen

GABAB receptors in the hippocampus: allosteric modulation, BBSRC

Prof Derk-Jan Dijk

Circadian and homeostatic contributions to physiology, cognition and genome-wide expression in human and mouse variants of the PER3 VNTR polymorphism, BBSRC

Dr Johnathan Johnston

Regulation of melatonin receptor expression by gonadotrophin-releasing hormone (GnRH), BBSRC

Prof Ian Kitchen

Genomics, mechanisms and treatment of addiction GENADDICT, European Commission

Dr Margaret Robertson

Partial sleep restriction and insulin resistance; development of a physiological sleep protocol for field use. Diabetes UK

Prof Debra J Skene

Cross-Council New Dynamics of Ageing (NDA) Initiative, a multidisciplinary research programme supported by AHRC, BBSRC, EPSRC, ESRC and MRC, SomnIA

Dr Malcolm Von Schantz

Functional genomics of sleep deprivation. Royal Society

Publications

Dijk, DJ, Groeger JA, Stanley, N. & Deacon, S. (2010)

Age-related Reduction in Daytime Sleep Propensity and Nocturnal Slow Wave Sleep. *Sleep*, 33(2)

Jud C, Chappuis S, Revell VL, Sletten TL, Saaltink DJ, Cajochen C, Skene DJ, Albrecht U (2009)

Age-dependent alterations in human PER2 levels after early morning blue light exposure. *Chronobiology International*, 26(7): 1462-9

Lena, I, Bradshaw, S, Pintar, J, Kitchen, I (2008)

Adaptive changes in the expression of central opioid receptors in mice lacking the dopamine D2 receptor gene. *Neuroscience*, 153: 773-788

Otway DT, Frost G, Johnston JD (2009)

Circadian rhythmicity in murine pre-adipocyte and adipocyte cells. *Chronobiology International*, 26(7): 1340-54

Van Der Veen, DR & Archer, SN (2010)

Light-dependent behavioural phenotypes in PER3 deficient mice. *Journal of Biological Rhythms*, 25(1): 3-8