

NIHR Oxford BRC Neurological Conditions

Vision:

- To improve quality of life and reduce costs for the care of patients with neurological conditions.
- To translate rapidly recent advances in remote monitoring, patient stratification and emerging treatments for benefit of major healthcare challenges in neurological conditions.

Current and proposed plans:

- ***Develop smart remote monitoring to detect changes in disease state and comorbidities to intervene early***

Management out of hospital with expert guidance will be crucial for improved care of chronic neurological conditions. We are developing and testing technology for remote monitoring (of sleep, EEG, cognition, mood and motivation) integrated with self- and carer-report so that interventions for disease and comorbidities can be targeted and delivered early.

- ***Improve earlier diagnosis and stratification of disease severity and prognosis***

We are developing combined markers (molecular, brain imaging, sleep and cognitive) for earlier diagnosis; key biomarkers of clinical outcome and therapeutic targets; and new imaging methodology for diagnosis and stratification.

- ***Introduce new treatments for conditions with unmet needs***

We are developing a range of interventions, from high-technology ones – DBS (deep brain stimulation) for Parkinson's and epilepsy, tDCS (transcranial direct current stimulation) for stroke survivors, induced pluripotent stem cells (iPSCs) from patients to identify abnormalities and screen for drugs – through to repurposing of drugs for multiple sclerosis, behavioural training to improve

hearing function in people with hearing aids or cochlear implants and internet-delivered cognitive behavioural therapy for sleep disorders.

- Our focus is on priority model diseases but also on comorbidities that cross disease boundaries.

Research Areas:

- 1) **Cognitive disorders:** *PI Husain*
- 2) **Epilepsy:** *PI Sen*
- 3) **Hearing loss:** *PI King*
- 4) **Limbic encephalitis:** *PI Irani*
- 5) **Multiple sclerosis:** *PI Fugger*
- 6) **Neuropathy:** *PI Bennett*
- 7) **Parkinson's disease:** *PIs Brown, Hu, de Vos, Tofaris*
- 8) **Sleep:** *PIs Espie, Kyle*
- 9) **Stem cell research:** *PI Cader*
- 10) **Stroke rehabilitation and neuroimaging:** *PIs Jenkinson, Johansen-Berg, , O'Shea, Stagg*
- 11) **Surgical neurostimulation:** *PIs Fitzgerald, Green*