Introductory Handout: Centre for Advanced Discovery and Experimental Therapeutics (CADET)

The Centre for Advanced Discovery and Experimental Therapeutics (CADET) was established in 2011, to coincide with the recruitment of Professor Cooper to The University of Manchester, with the vision of applying cutting-edge methods of biochemical analysis, in particular proteomics and metabolomics, to elucidate molecular mechanisms of chronic non-communicable diseases with the ultimate aim of identifying and developing new and improved therapeutics. CADET's main disease targets are: diabetes mellitus and related cardiovascular, renal, neurological and retinal diseases (the complications of diabetes); other chronic cardiovascular diseases; the main causes of adult-onset dementia, particularly Alzheimer's disease; and age-related macular degeneration (AMD), the leading cause of blindness. These diseases have several pathogenic molecular processes in common and may be closely linked from a mechanistic perspective. The 'advanced discovery' (AD) methods of proteomics and metabolomics, and the linked 'experimental therapeutics' (ET) gave rise to our name and are intended to emphasise the linkage between the processes of discovery and experimental therapeutic development.

CADET is part of the Institute of Human Development in the Faculty of Medical and Human Sciences; it also has close links with the Central Manchester Hospitals NHS Foundation Trust (CMFT), where our centre is located. Initial capital funding of around £3 million was obtained from the Manchester NIHR BRC, the Department of Health and the North-West Development Agency to refurbish and equip CADET, with six mass spectrometers for proteomics and metabolomics (three in each laboratory). We are also located on the same floor as the Hospitals' Biobank from which we can obtain banked clinical samples. Professor Garth JS Cooper is CADET's Director; Professor Paul N Bishop is Co-director; and Dr Richard Unwin leads the mass-spectrometry laboratories.

We have obtained funding from the Medical Research Council and the Biotechnology and Biological Sciences Research Council, as well as charities such as Alzheimer's Research UK, Fight for Sight and Diabetes UK. We also obtained funding to purchase an additional mass spectrometer, an Inductively Coupled Plasma Mass Spectrometer for trace metal analysis, bringing our total to seven. We collaborate extensively with colleagues particularly those who work in fields aligned with CADET's main objectives, in the Faculties of Medical and Human Sciences, and Life Sciences, as well as in the various Hospital Trusts around Greater Manchester. As well as maintaining our Manchester collaborations, we plan on building our existing collaborations with the University of Auckland. Professor Cooper has recently opened up collaborations with the University of Hong Kong and the Guangzhou Institutes of Biomedicine and Health, People's Republic of China. Finally, we also support Fellows and PhD students by training them in proteomics, metabolomics and mass spectrometry.

We have two experimental therapeutic leads currently in development: opticin and trientine. Opticin has been shown to act as an anti-angiogenic agent in the vitreous humour and so could prevent neovascularisation during conditions such as diabetic retinopathy. Trientine is effective against diabetic cardiomyopathy in human clinical trials and in rodent models of diabetic nephropathy and arteriopathy. Our aim is to explore avenues for getting these leads to clinical trials in the next two to three years.

December 2015