

Project Details	
Project Code	MRC21NMBa Husbands
Title	Advanced detection of synthetic cannabinoids and other drugs abused in the South West (GW4) region
Research Theme	Neuroscience & Mental Health
Summary	Drug abuse has serious adverse neuronal effects leading to major mental health issues. In this interdisciplinary research, we will apply a range of advanced detection methods to assay prison and police samples from areas of deprivation in the South West. Using outcomes data, we will research the mental health and cognitive consequences of drug use in prison and aim to track how this predicts social and psychological functioning following release.
Description	<p>Synthetic cannabinoid receptor agonists (SCRAs), found in street products such as “Spice”, are hot topics which continue to generate considerable scientific interest. Due to their high cannabinoid receptor binding affinity, SCRAs have a substantial risk of adverse effects including mental (psychotic symptoms, anxiety) and physical outcomes (seizures, death). A recent study of nine UK prisons found that Spice is the most widely used drug: 33% had used in the last month compared to 14% for cannabis and 8% for heroin. In 2018, Public Health England reported that Spice was the most prevalent novel psychoactive agent requiring specialist addiction treatment in secure settings, increasing by 35% in the past two years. The clinical management of Spice is hindered by a lack of evidence-based guidelines. Importantly, the laboratory detection of Spice is obfuscated by the rapidly evolving nature of different synthetic compounds “on the street” and thence in different HM Prisons and the inability of conventional analytical methods to detect them. This studentship will address these challenges in a series of novel, interdisciplinary Open Science studies:</p> <p>1) How can novel analytical techniques improve the detection of Spice? In Year 1, the student will be trained in quantitative Nuclear Magnetic Resonance (q-NMR) spectroscopy and advanced Mass Spectrometry (MS). The student will apply these methods to analyse samples of Spice and drugs supplied from the police (Avon and Somerset, Swindon), Bristol Drugs Project (BDP) and from HMP Bristol. The samples will be analysed in our new in vitro smoking model (recently published in RSC Analytical Methods) to see what molecules are actually being inhaled and how the inhalation profile of Spice is related to the parent compound. This innovative technology will be used in quantitative analysis. Also, as a part of Year 1, (Exeter) vetting processes will be undertaken and ethical approval for the prison project sought in order to be in position to carry out these studies in Year 2.</p> <p>2) In Year 2, the student will work within HMP Exeter and HMP Dartmoor, with a potential to expand to HMP Channings Wood, investigating the impacts of Spice on cognition, aggression, and mental and psychological health. The Exeter team have privileged access to the prisons and have existing collaborations with Exeter Drugs Project (EDP) which has the contract for providing drug services to prisons and working with probation services on discharge. The student will be trained in qualitative analysis to interview inmates who have been identified as Spice users; themes will be extracted relating to use. We use a prison approved device (experience sampling method) to allow</p>

	<p>inmates to monitor their mood and wellbeing dynamically over a 7-day period and will link this with confidential self-reported drug use, as well as urine analysis. The student will be trained in advanced statistical techniques such as multilevel modelling for quantitative analysis of this complex dataset and then, in Year 3, these components will be integrated, the relevance of the results verified using such advanced statistics. This studentship has the added value of being truly interdisciplinary offering a range of high-quality training opportunities between analytical chemistry and neuropsychopharmacology, with quantitative analysis and advanced statistics, manipulating complex big-data sets in the analysis. This PhD will be challenging for the student, but its feasibility is supported by our previous cross-disciplinary collaborations which have resulted in various co-authored publications across all four supervisors. The student will be trained in dissemination to generate impact through national clinics (Prof Morgan), The EU Drugs Agency (Dr Freeman), and The Society for the Study of Addiction (Prof Morgan, Dr Freeman). They will learn about industrial knowledge transfer and maximising their research impact as part of the (compulsory) Bath Course.</p>
Supervisory Team	
Lead Supervisor	
Name	Professor Stephen Husbands
Affiliation	Bath
College/Faculty	Science
Department/School	Pharmacy and Pharmacology
Email Address	prssmah@bath.ac.uk
Co-Supervisor 1	
Name	Professor Celia Morgan
Affiliation	Exeter
College/Faculty	Life and Environmental Sciences
Department/School	Washington Singer Laboratories, Dept of Psychology
Co-Supervisor 2	
Name	Dr Ian Blagbrough
Affiliation	Bath
College/Faculty	Science
Department/School	Pharmacy and Pharmacology
Co-Supervisor 3	
Name	Dr Tom Freeman
Affiliation	Bath
College/Faculty	Humanities and Social Sciences
Department/School	Department of Psychology
Co-Supervisor 4	
Name	Professor Huw Williams
Affiliation	Exeter
College/Faculty	Life and Environmental Sciences
Department/School	Dept of Psychology