

## FORM E – PROJECT SYNOPSIS, School of Life Sciences

Please complete this form in respect of each proposed project

**Project title: Exploring chemosensory influences of caffeine on cardiovascular function, arousal and mood.**

**Cross School Project?** Yes

**If so, name of other School/s:** Psychology

**The proposal falls into the following priority area(s), Please underline:** East Medicine, Ageing Research, informing policy and practice, New technologies for Biosciences

### Background to research and synopsis

Although caffeine is the most widely consumed behaviourally active substance worldwide little is known about the immediate and early effects of this drug. We have recently demonstrated early increases in heart rate (HR) following the ingestion of caffeinated coffee that cannot be explained by the classical pharmacodynamic profile of caffeine - antagonism of the adenosine receptors due to elevated caffeine plasma levels. Instead, we propose that chemosensory stimulation via bitter taste receptors (*hTAS2Rs*) located in the oropharyngeal cavity and gut is responsible for the early effects of caffeine (0-15 minutes post ingestion) on the cardiovascular system.

We wish to establish the extent to which these early chemosensory induced changes in HR correspond with concomitant changes in arousal and mood and how they may interact with the later effects of caffeine (antagonism of the adenosine receptors) on cardiovascular changes, arousal and mood.

In a series of studies using regular healthy coffee users we will use placebo controlled blinded experimental designs to examine the dose dependent effects of regular coffee on HR, arousal and mood. As in our previous research, controls will include decaffeinated coffee, caffeine and placebo capsules. Additional controls will include ingestion of hot water with and without caffeine, a “sip and spit no swallowing” condition to limit the effects of caffeine/coffee to the chemosensory/somatosensory domain as well as monitoring baseline and post ingestion caffeine plasma levels.

The student will receive training in psychometric testing and psychophysiological methods including quantitative EEG and heart rate variation analysis to test for CNS activation following caffeine administration.

These novel studies of the chemosensory action of caffeine will have impact on both the caffeine industry in exploring the optimal dose regime of caffeine to promote arousal and mood enhancement with minimal increases in cardiovascular function as well as informing public health policy on cardiovascular health and caffeine.

### Supervisory Team and Research Environment

Supervisor Name	Role (DoS, 2 <sup>nd</sup> Supervisor, 3 <sup>rd</sup> Supervisor)	No. of successful PhD/ MPhil supervisions	Current student load for 2009/10 (FTE)	School (for cross School projects)
Tony Towell	DoS	6	3	Psychology
Julie Whitehouse	2 <sup>nd</sup>	2	1	Life Sciences
Ihab Tewfik	3 <sup>rd</sup>			Life Sciences

Reference:

Michael K. McMullen, Julie M. Whitehouse, Gillian Shine, Peter A. Whitton and Anthony Towell, **The immediate and short-term chemosensory impacts of coffee and caffeine on cardiovascular activity** *Food Funct.*, 2011, **2**, 547

Informal enquiries (email address of Director of Studies) and any web links that prospective applicants would be referred to: Tony Towell [towella@wmin.ac.uk](mailto:towella@wmin.ac.uk)