

PROJECT SYNOPSIS, School of Life Sciences

Director of studies: Dr Vinood Patel

Project title: An investigation into the anti-oxidant and anti-inflammatory properties of Chinese medical products in preventing fatty liver disease

Background and synopsis

Liver disease can arise from consuming a high fat diet or more commonly by alcohol ingestion. Prevalence of each disease is rapidly increasing and is strongly linked to the rise in obesity and diabetes. The precise mechanisms responsible for liver disease are poorly understood, however we have evidence that *perturbed mitochondrial function* is central to the pathology, as fatty acids or alcohol cause reduced mitochondrial respiration, increased free radical production and cell death (1-2). Although there are no therapeutic strategies for early prevention of chronic liver damage, there is an abundance of studies indicating that Chinese or botanical medical products may prevent or ameliorate liver toxicity, due to their anti-oxidant or anti-inflammatory properties (3). Using *in vitro* cell culture and *in vivo* approaches properties of Chinese medical and botanical agents in improving mitochondrial function (ATP production, oxygen consumption and membrane potential) and reducing oxidative stress (free radical levels, antioxidant status, cytochrome c release) will be investigated, following treatment with alcohol or fatty acids. The PhD student will be trained in tissue culture, flow cytometry, confocal microscopy, cytotoxicity and mitochondrial functional assays. The student will also be enrolled in the School's Graduate Training Programme, which entails demonstration and teaching opportunities. This project combines research expertise and strengths of Dr Patel (liver metabolism) and Dr Scheid (Chinese medicine). Impact of this work will lead to improved understanding of pathology and therapeutic treatment of patients with fatty liver disease.

Supervisory Team and Research Environment

Supervisor Name	Role (DoS, 2 nd Supervisor, 3 rd Supervisor)	No. of successful PhD/ MPhil supervisions	Current student load for 2009/10 (FTE)	School (for cross School projects)
Dr. Vinood Patel	DoS	2	3 FTE	
Dr Volker Scheid	2 nd	0	1.5 FTE	

Recent publications by supervisors relevant to the project:

Gyamfi, D and **Patel V.B.** (2009). Liver Metabolism: Biochemical and Molecular Regulations. In Nutrition, Diet Therapy, and the Liver. Editor, Preedy, V. R. Taylor Francis Group, CRC Press, London. p3-15.

Patel, V. B., Spencer, C. and Cunningham, C. C. (2007). Post-translational modification of 3-hydroxy-3-methyl glutaryl Coenzyme A by 4-HNE following chronic ethanol consumption. Free Rad Biol Med 43, 1499-1507.

Scheid, V. (2008). Authenticity, best practice, and the evidence mosaic. The challenge of integrating traditional East Asian medicines into Western Health Care. Complementary Therapies in Medicine 16, 107-108.

Informal enquiries: v.b.patel@westminster.ac.uk

<http://www.westminster.ac.uk/schools/science/research/research-groups/cell-communication>