

Rigorous, Relevant Research

► Introduction

Improvements in public health continue to lengthen average lifespan. Older age brings with it an increased incidence of chronic diseases such as inflammation, cancer, obesity, diabetes and poor wound healing. Management responsibility for chronic disease is given increasingly to the patient and consequently patient behaviour impacts significantly on treatment success. Research at Aston University aims to improve understanding of the biological processes that control chronic diseases including inflammation, fibrosis, cancer and metabolism; to develop improved methods of disease prevention, management and therapy through nutritional, medicinal and behavioural intervention; to advance understanding of cognitive processes that influence the development, management and self-management of chronic disease.

The approaches adopted by an interdisciplinary team of biochemists, physiologists and health psychologists include:

- Cellular imaging (confocal microscopy, flow cytometry);
- Chemical analysis of proteins, nutrients, natural products (proteomics, chromatography);
- Pre-clinical and clinical trials;
- Qualitative behavioural research (longitudinal interviews, systematic reviews).

► Sponsors and funders

BBSRC, ESRC, FSA, Wellcome Trust, a number of hospital trusts, the pharmaceutical industry, US Dept of Agriculture, Unilever, the British Academy and the UK Chief Scientist's office. Members of the group are lead investigators in multi-centre, multi-disciplinary and international grants awarded by the EU in FP7, PPP Health Care Trust, the NHS Health Technology Assessment Programme, CRUK, the West Midlands SHA, Diabetes UK.

► Key projects

- Signalling and metabolic pathways involved in muscle atrophy, obesity, cardiovascular disease and diabetes; manipulation of these pathways using novel, targeted drugs;
- Biochemistry, molecular biology and physiology of transglutaminases; their roles in inflammation, scarring and their novel application in tissue engineering/regenerative medicine;
- Molecular mechanisms underlying recognition and clearance of apoptotic cell and pathogens for therapy of inflammatory disorders and cancers;

- Biomarkers of chronic disease and ageing;
- Patient self-management and self-diagnosis in chronic disease, particularly diabetes;
- Identification of psychological factors in key preventative health behaviours during ageing, weight management and pregnancy; effects of parental health behaviour in the prevention and management of chronic disease in children;
- Effective, safe and appropriate use of medicines in chronic diseases within vulnerable patient groups, particularly paediatrics and end of life care; impact of medicines waste and non-use in chronic disease management.

► Key significant findings

1. Development of temozolamide, marketed as Temodal®, a chemotherapy medicine to treat brain tumours.
2. Identified CD14 as a molecule with a role in inflammatory and autoimmune diseases. *The Journal of Cell Biology* 2004, 167; 1161-1170.
3. Described Zinc₂-glycoprotein as a potential mediator of weight loss. *Proceedings of the National Academy of Sciences* 2004, 101; 2500-2505.
4. Studied negative health behaviours and suggested tailored interventions for the prevention of smoking among asthmatic adolescents. *British Journal of Social Psychology*, 2004, 43, 159-186.
5. Shown that inhibiting an enzyme called TG2 can prevent immune activity in celiac disease (2005) *Gastroenterology* 129(5):1400-1413.

► Recent publications can be viewed in the following journals

- *BMJ* 2007, 335, 493-498.
- *Accident Analysis and Prevention* 2007, 39 (2) 224-237.
- *International Journal of Psychophysiology* 2007, 62, 152-158.
- *American Journal of Physiology-Endocrinology & Metabolism* 2007, 293 (4) E923-E931.
- *Diabetic Medicine* 2007,24, 618-25.
- *J American Soc Nephrology* 2007,18, 3078-3088.

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