Severe obesity is a complex chronic relapsing condition, and the single greatest contributing factor to disease burden in our society. Our group performs clinical studies in moderately and severely obese participant groups aimed at better understanding:

1) the pathophysiological pathways linking obesity with cardiovascular and metabolic conditions, and
2) the effects of weight loss on clinical, cardiometabolic and psychosocial aspects of health.

Research Brief

Obesity is associated with changes in multiple interrelated systems, including blood pressure and lipid regulation, glucose metabolism, hepatic function, the activity of the sympathetic nervous system, reproductive function, and mental health. The focus of our group is the mechanisms through which obesity alters these functions, to allow the development of more effective weight loss methods and treatments for those who suffer obesity-related diseases. Studies in hypertension aim to identify the driving factors in the highly variable hypertensive effects of obesity, and in the possible benefits of weight loss. We also investigate the impact of obesity and significant weight loss (induced through diet or bariatric surgery) on sympathetic dysfunction, psychological comorbidity (depression, anxiety) and sexual function. We utilise intensive clinical investigations, broad survey-based studies and retrospective analyses of large clinical data sets to address our research questions. Our program also includes studies in young obese subjects, and we are initiating clinical trials with central sympathetic suppression in patients with polycystic ovary disease and in patients medicated with antipsychotic drugs who are subject to weight gain.

Methodologies

- Assessment of sympathetic activity (microneurography)
- Standard blood and urine biochemistry and measures of insulin sensitivity (euglycaemic-hyperinsulinaemic clamp, OGTT)
- Human physiology (BP, HR, HRV, baroreflex & endothelial function, DEXA, polysomnography)
- Psychometric evaluation (patient interviews for depression, anxiety etc)
- Dietary weight loss interventions (very low calorie diets, DASH diets)
- Analysis of epidemiological/clinical datasets

Selected Publications

First Australian experience with an oral volume restriction device to change eating behaviours & assist with weight loss

A pilot study of a novel custom-made oral device designed to slow eating rate, hence enhance satiety and assist with adherence to a low-calorie diet. The SMART device (A) is worn in the upper palate (B) while eating. Participants were highly compliant and reported feeling greater satiety and control over their eating rate. Weight loss was also successful.

Mechanisms of action of bariatric surgery

Several forms of bariatric surgery are performed to achieve significant, sustained weight loss, with the adjustable gastric band (b) the most common in Australia. The procedures differ slightly in expected weight loss outcomes, but differences in other physiological aspects, including glucose homeostasis, may be more significant and so relevant for the management of diabetes and metabolic disease.

The complex links between the pathophysiological consequences of central obesity and disease outcomes