Established in 2005, the Obesity Immunology Research group’s work focuses on the effects of obesity, smoking, sex hormones, gut peptide hormones and colorectal cancer on the immune system, specifically innate immune cells; the invariant Natural Killer T cell, Natural Killer cells and Dendritic cells amongst others. The research findings have established that these outlined conditions/factors impair the immune responses, potentially increasing susceptibility to infection, cancer and autoimmunity.

The group, based on the St Vincent’s University campus, coordinates international, collaborative, translational research in Obesity and its complications. The group comprises researchers with laboratory, statistical and clinical research expertise and is funded through the Health Research Board, the National Children’s Research Centre and a number of industry supporters.

Current studies include:

1. Investigating the effects of GLP-1 and other Type 2 Diabetes medications on innate immune cells and inflammation: Obesity and obesity related co-morbidities have been found to negatively impact innate immune cells. A novel clinical finding uncovered the positive effect that a GLP-1 analogue elicited on the psoriatic inflammatory condition. This gave rise to a number of in vitro studies attempting to uncover the mechanism by which GLP-1 reduces inflammation.

2. Investigating the effects of chronic inflammation and innate immune cell dysregulation in obese children and adolescents: The innate immune system in a paediatric cohort (mean age 12 years) displays the same pattern of dysregulation seen in adults patients (mean age 46). This paediatric cohort exhibit worrying patterns of gene expression involved in tumour suppression and metabolic control.

3. Enumerating invariant Natural Killer Cells (iNKT) in Obese patients with obstructive sleep apnoea: The iNKT cell plays an important role in tumour defence, prognosis and may play a role in weight management. A cohort of obese patients attending the Sleep Apnoea. It was found that patients suffering with severe sleep apnoea had reduced numbers of iNKT cells with reduced functionality.

4. Adipose Tissue iNKT cells Protect against Diet Induced Obesity and Metabolic Disorder through Regulatory Cytokine Production: This study was performed using a mouse model and the main finding of this work highlights the potential of iNKT cell targeted therapies previously proven to be safe in humans, in the management of obesity and its consequences.

A number of pilot clinical studies are underway also;

5. A pilot study to determine the effects of Vitamin D Supplementation on physical function and inflammatory markers in the severely Obese.

6. Assessing the role of 11 ß-Hydroxysteroid Dehydrogenase Type 1 (11ß-HSD1) in obesity: Tissue cortisol metabolism is controlled by 11ß-HSD1 and is postulated to be involved in the pathogenesis of obesity and its complications.

7. Effects of Normalising Testosterone and Oestradiol Levels on Cardiovascular and Bone Health in Men with Severe Obesity: A Randomized Clinical Trial.

The group have had a successful year with a number of publications and conference presentations.
The Obesity Immunology group’s research is focused on dysregulation of the immune system in obesity and the effect of gut hormones and diabetes medication on innate cell function. The innate immune cells, invariant natural killer T cells (iNKT cells), are implicated in the pathogenesis of psoriasis, an inflammatory condition associated with obesity and other metabolic diseases, such as diabetes and dyslipidemia. We have also found that Dendritic cell function is hindered by the obese state.

We have published the below papers in these areas:
- Adipose Tissue Invariant NKT Cells Protect against Diet-Induced Obesity and Metabolic Disorder through Regulatory Cytokine Production.
- Changes in human dendritic cell number and function in severe obesity may contribute to increased susceptibility to viral infection.

I am also affiliated with UCD Conway Institute of Biomolecular and Biomedical Research, where I have forged close ties with Prof Carel Le Roux and am in active collaboration with Prof Helen Roche and Dr Fiona McGillicuddy.

Grants:

- Title: Expression and clinical relevance of the somatostatin sst receptors in GastroEnteroPancreatic NeuroEndocrine Tumours (GEP NETs), an Irish-Italian population-based study. 
  Funder: Ipsen
  Start/End Dates: June 2011 - May 2013
  Amount: €90,000
- Title: The interaction between steroid hormones and immune cells in metabolically healthy obese (MHO) & metabolically unhealthy obese (MUO) patients and the response to weight loss following bariatric surgery (BARI-CORT). 
  Funder: Sanofi
  Start/End Dates: June 2011 - May 2013
  Amount: €90,000
- Title: The Effect of Sex Hormones on Lymphocyte, Adipose Tissue and Vascular Tissue Inflammation in men with Obesity or cardiovascular disease. 
  Funder: Irish Heart Foundation
  Start/End Dates: March 2010 – February 2013
  Amount: €156,000
- Title: Chronic inflammation and innate immune cell dysregulation in obese children and adolescents. 
  Funder: National Children’s Research Centre Obesity Consortium Project Grant
  Start/End Dates: 2011-2014
  Amount: €354,876

Publications: