

UNIVERSITY: University of Navarre (UNAV)

WIT PROGRAMME'S RESEARCH LINE NAME: Cellular and molecular mechanisms linking excess adiposity and colon cancer

DOCTORAL PROGRAMME: Doctoral program of applied medicine and biomedicine <https://www.unav.edu/web/programa-de-doctorado-de-medicina-aplicada-y-biomedicina>

COMPLETE DESCRIPTION OF THE LINE

Colon cancer (CC) has become a major public health problem. A huge body of knowledge supports the link between cancer and obesity, or more specifically with excess adiposity. It is widely accepted that adipose tissue from individuals with obesity exhibits a sustained chronic and unresolved inflammation with an altered adipose tissue secretory profile that is associated with an imbalance of adaptive homeostatic mechanisms that leads to the development of obesity-associated comorbidities. **In this regard, our group is focused on analyzing inflammation and extracellular matrix remodelling as plausible mechanisms linking dysfunctional adipose tissue excess with increased risk of CC development, progression and mortality. Our line of research also aims to study the role of gut barrier dysfunction and intestinal permeability in patients with obesity in the modulation of the immune response and the inflammatory profile favouring CC development.**

RESEARCH GROUP NAME: Obesity & Adipobiology

COORDINATOR:

- Last and first name; link to the "Portal of scientific production":
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MEMBERS OF THE LINE RESEARCH:

Prof. Gema Frühbeck

Prof. Javier Gómez-Ambrosi

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Dr. Victor Valentí

Dr. Amaia Rodríguez

Dr. Sara Becerril

Dr. Camilo Silva

Dr. Rafael Moncada

OTHER RESEARCH LINES OF THE GROUP:

- **Study of changes in body composition, energy expenditure and metabolism after bariatric surgery.** The exact molecular, cellular and physiological mechanisms for metabolic improvements in patients who undergo bariatric surgery remain unclear. For this reason, we aim to identify the mechanisms that occur across different biological systems after bariatric surgery including changes in adipocyte-derived factors, gut-derived hormones, bile acids and gut microbiota.
- **Role of adipokines, myokines, hepatokines and osteokines in the development of obesity and its comorbidities.** Adipose tissue is considered one of the largest endocrine organs in the body as well as an active tissue for cellular reactions and metabolic homeostasis rather than an inert tissue for energy storage. The functional pleiotropism of adipose tissue relies on its ability to synthesize and release a large number of hormones, cytokines, extracellular matrix proteins, growth and vasoactive factors, collectively termed adipokines that influence a variety of physiological and pathophysiological processes. The study of the cross-talk between adipose tissue and other metabolically relevant organs in the development of obesity-associated comorbidities constitutes an important line of research of our group.

- **Importance of biomechanical properties and remodelling of the extracellular matrix of adipose tissue in obesity and its comorbidities.** The extracellular matrix of the adipose tissue is a complex structure that holds key functions, serving not only as a mechanical support for cells but also as a place of synthesis and interaction of molecules responsible for mechanotransduction and cell adhesion signalling pathways. Our line of research is focused on the analysis of the alterations in the biomechanical and tensile properties of the extracellular matrix of the adipose tissue during obesity and its role in the development of obesity-associated comorbidities.
- **Influence of cells of the immune system in the development of inflammation associated with obesity.** Extensive experimentation in humans and animal models demonstrates that adipose tissue expansion induces a complex and broad immune response involving both, the innate and adaptive arms of the immune system, playing critical roles in the regulation of glucose metabolism and inflammation. This observation prompts an increased interest in the study of the interplay between immune cells and metabolism as well as the interaction between immune cells and adipocytes in the development of inflammation, adipose tissue dysfunction and obesity-associated comorbidities.

- Entities involved in research lines and contact person:

✓ Academic entities:

School of Medicine, University of Navarra – Prof. Secundino Fernández
CIBEROBN – Prof. Carlos Diéguez

- Joint supervision of doctoral thesis with international universities or non academic institutions:

Prof. Karine Clément: Sorbonne University, INSERM, Paris, France

Prof. Matthias Blüher: University of Leipzig, Germany

Prof. Kirsi Pietiläinen: University of Helsinki, Finland

Prof. Ellen Blaak: Maastricht University; The Netherlands

Prof. John Wilding: University of Liverpool, UK

Prof. Piero Portincasa: University of Bari, Italy

Prof. Susan Jebb: University of Oxford, UK

Prof. Andrew Prentice: London School of Hygiene & Tropical Medicine; UK
Prof. Patrick Stover: Texas Agriculture and Life Sciences, Texas A&M AgriLife, College Station, USA
Prof. Sanjay Kumar: University of Berkeley, USA

- Group review

The group is a multidisciplinary team with broad complementarity (Endocrinology, Body Composition Techniques, Metabolism, Nutrition, Surgery, and Molecular Biology, among others) which combines professionals with clinical-care and basic research profiles that provide an important translational approach. The group belongs to the European Association for the Study of Obesity Centres of Obesity Management (EASO COMs) and is also part of CIBEROBN, the Spanish Network of Centers of Excellence in Obesity & Nutrition. The research team has a consolidated trajectory within the obesity field supported by international publications in prestigious peer-reviewed journals. In fact, the group has been working for decades in the study of the pathophysiology of obesity, the factors involved in the regulation of energy metabolism and the direct involvement of the multitude of adipokines synthesized and secreted by adipose tissue in the development of comorbidities associated with obesity such as inflammation and T2D.

- Link of the group to the “Portal of scientific production”

<https://www.ciberobn.es/grupos/grupo-de-investigacion?id=2166>
<https://www.cun.es/nuestros-profesionales/profesionales/gema-fruhbeck-martinez>
<https://www.cun.es/nuestros-profesionales/profesionales/javier-gomez-ambrosi>
<https://www.cun.es/nuestros-profesionales/profesionales/amaia-rodriguez-murueta-goyena>
<https://www.cun.es/nuestros-profesionales/profesionales/victoria-catalan-goni>

- Pictures, links... to academic or industrial partners (if any)



