1 CFU (4 hours + 4 hours on 27 March 2025)*

SEMINARS

Date 24 March 2025 – Room B Polo Geologia Time: 11-13

25 March 2025 – Room medicina sperimentale Time: 09-11

Bone Appétit: How Nutrition Shapes Bone Development and Quality from Body Stats to Omics

The Skeleton: Development, Structure, and Nutritional Influences

The lectures will provide an exploration of the skeleton, focusing on its development, structure, and the critical role nutrition plays in bone health. The course will begin by establishing a foundation in skeletal biology, followed by discussion of key questions surrounding the skeleton as a model for studying nutrition. The topics will include:

Utilizing Animal Bones as Models to Study Physiological and Pathological Processes

Animal models have been crucial in advancing our understanding of bone biology and the effects of nutrition on bone health. This section will focus on the use of animal bones to study both normal skeletal physiology and disease processes. We will discuss the limitations and advantages of using animal models to investigate human bone health, as well as how findings in animal studies can be translated to human nutrition and medical practices.

Nutritional Factors Affecting Growth: Much More Than Calcium and Vitamin D

We will go beyond the basics of calcium and vitamin D to examine a broader range of nutrients that influence bone health throughout the lifecycle. The discussion will also cover the impact of malnutrition and nutrient deficiencies on skeletal development, with particular attention to critical windows in early development and adolescence when bone growth is most active.

The Impact of Ultra-Processed Foods (UPFs) on Skeletal Health

Ultra-processed foods (UPFs) are a significant part of modern diets, and their potential effects on bone health are an emerging area of research. We will explore how these foods, often rich in additives, sugar, and unhealthy fats, may negatively impact bone quality and growth. We will cover the biochemical mechanisms through which UPFs may disrupt bone metabolism and alter the gut microbiome which can impair bone health.

The Role of the Microbiome and Metabolome in Skeletal Growth and Development

Recent research has shown that the gut microbiome and metabolome play significant roles in bone health. We will explore how the composition of gut bacteria influences nutrient absorption and bone metabolism. We will delve into the emerging field of "bone-microbiome interactions," exploring how disruptions to the gut ecosystem may contribute to bone-related diseases. Additionally, we will look at how metabolites produced by the microbiome affect bone remodeling and growth. Top of FormBottom of Form

*3° anno dei CdS in Scienze Gastronomiche e Informazione Scientifica sul Farmaco e Scienze del Fitness e dei Prodotti Della Salute e per gli iscritti al 3°, 4° e 5° anno dei CdS in Farmacia e Chimica e Tecnologia Farmaceutiche

About the speaker

Prof. Efrat Monsonego-Ornan: Professor of Nutrition

Institute of Biochemistry and Nutrition, Faculty of Agricultural, Food and Environmental Sciences, The Hebrew University, Israel.

The broad aim of my research is to understand the mechanisms governing biological processes regulating bone elongation, with an emphasis on the interrelation of genetic and environmental factors. The project includes different hormones (GH, leptin, adiponectin etc), metabolic states (growth, malnutrition, obesity, diabetes) and nutrients (omega-3, vitamin D) using various models (clinical, pre-clinical and *in-vitro* set ups) and methods. We further developed our pre-clinical model for post-natal development, to study the effect of whole diets (ultra-processed food, unbalanced diet) rather than a specific component on development and metabolism. This resulted in over 70 research papers. Currently my lab is focusing on verifying the effects of alternative proteins on growth and metabolism, as well as supplementing diets with mushrooms and algae to improve growth based on non-optimal diets and malnutrition. In these and previous studies, we are utilizing the power of 'omics' analyses along with bioinformatic approaches to examine the transcriptome, proteome, and metabolome of each experiment alone or in combination with various models.