



## RESEARCH TOPIC DASMEN1

**DIETARY PATTERNS, METABOLOMIC AND MICROBIOTA CHARACTERIZATION, AND METABOLIC CHANGES IN [18]F-FDG-PET/CT: PROFILING OF TOXICITY AND EARLY ACTIVITY OF FIRST-LINE INHIBITORS OF CYCLIN-DEPENDENT KINASES 4 AND 6 (CDK4/6I) PLUS ENDOCRINE THERAPY IN HORMONE RECEPTOR POSITIVE (HR+), HUMAN EPIDERMAL GROWTH FACTOR RECEPTOR 2 NEGATIVE (HER2-) METASTATIC BREAST CANCER (MBC) PATIENTS**

### **Datascience Unit name and address**

Medical Oncology and Hematology Unit  
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### **Laboratory name and address**

Mucosal immunology and microbiota Unit  
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### **Datascience Supervisor**

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### **Research Supervisor**

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### **Abstract**

The project will aim at profiling radiomic, metabolomic, gut microbiota's features and dietary patterns potentially associated with toxicities and early response to first-line treatment with CDK4/6i plus endocrine therapy in luminal mBC. The CDK4/6i have comparable results in terms of efficacy, but they are burdened by unpredictable toxicities which could impair treatment and/or patients' quality of life. Microbiota has been proven to be involved in the modulation of immune response and of glycidic and lipid metabolism.

The main hypothesis is that gut microbiota may serve as a biomarker of toxicity and activity of these drugs.

The main objective is to determine if gut microbiota features, dietary patterns can predict toxicities (i.e. gastrointestinal one) and early response to CDK4/6i, and if they correlate with metabolic textures obtained by advanced image analysis of [18]F-FDG PET/CT scans, through a hypothesized mechanism linking the two by means of immune-metabolomic changes.



### **Main technical approaches**

- Microbiota analysis on fecal samples,
- Intestinal damage biomarkers on fecal and plasma samples; in detail, Fecal Anti-Microbial Peptides (e.g. defensin), fecal calprotectin, fecal sIgA and plasma Zonulin, plasma LPS, sCD14 and lipopolysaccharide-binding protein (LBP) will be measured by specific Elisa kit.
- Radiomic analysis applied to [18]F-FDG PET/CT scan.
- Untargeted metabolomic analysis on fecal samples.
- Unsupervised analysis applied to dietary patterns

### **Scientific references**

- Cardoso F et al, Ann Oncol 2017
- Roy S, Trinchieri G, Nat Rev Cancer 2017
- Tsilingiri K and Rescigno M et al, Benef Microbes 2013
- Tsilingiri K et al, Gut 2012
- Zitvogel L, Science 2018

### **Type of contract**

PhD scholarship of € 18.000 gross per year or equivalent contract.

Borsa di dottorato di € 18.000 annui lordi o forme di sostegno finanziario equivalenti.