



Biomarkers and Nutritional & Food Metabolomics



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GOAL: To study the effect of diet in disease prevention through the identification and monitoring of new biomarkers of food intake and biomarkers of food effect & disease risk, by means of untargeted and targeted metabolomics strategies

Research Lines

□ **Food Composition Tables** to Estimate the Dietary Intake of Bioactive Phytochemical Components

DIETARY Biomarkers

□ **METABOLISM of Dietary Phytochemicals:**

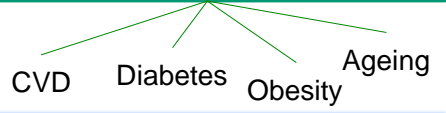
- ✓ Bioavailability studies
- ✓ Gut microbial metabolism
- ✓ Pharmacokinetics studies

NUTRITIONAL Biomarkers

□ **BIOLOGICAL ACTIVITY of Phytochemicals on:**

- ✓ Endothelial Function
- ✓ Inflammation
- ✓ Oxidative Stress
- ✓ Insulin Resistance
- ✓ Adiposity & Metabolism

Biomarkers of FOOD EFFECT & DISEASE RISK

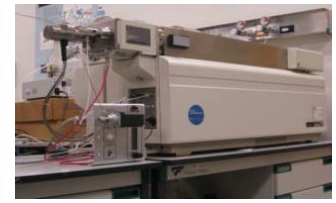


Capacities

- Development of **Humans Intervention Studies & Clinical Trials in Hospitals**
- Diet Analysis & Estimation of **Phytochemical Intake**
- Design & Implementation of **Metabolomics Analysis Protocol**
- High-Throughput **Food & Biological Samples Analysis**
- **Bioinformatics & Biostatistical Tools:** Computational-Assisted **Biomarkers Identification & Biological Interpretation**

High-Throughput Transversal Technologies - Metabolomics Platform -

✓ **UHPLC-DAD/ESI-QqQ MS**
 Targeted Metabolic Profiling



✓ **UHPLC -ESI-q-ToF MS**
 LC-MS-Driven Untargeted Metabolomics Analysis



✓ **UHPLC-LTQ-Orbitrap MS**
 MSⁿ Fragmentations & Compounds Identification



✓ **¹H-NMR**
 NMR-Driven Untargeted Metabolomics Analysis



✓ **LTQ-FT Ultra**



Recent Publications:

- Metabolomics unveils urinary changes in subjects with metabolic syndrome following 12-week nut consumption. *Tulipani et al. J Proteome Res 2011 (in press).*
- Targeted analysis of conjugated and microbial-derived phenolic metabolites in human urine after consumption of an almond skin phenolic extract. *Garrido et al. J Nutr 2010;140(10):1799-1807.*
- Metabolomics study of human urinary metabolome modifications after intake of almond (*Prunus dulcis* (Mill.) D.A. Webb) skin polyphenols. *Llorach et al. J Proteome Res 2010;9(11):5859-5867.*
- Methodological aspects for metabolome visualization and characterization: a metabolomic evaluation of the 24 h evolution of human urine after cocoa powder consumption. *Llorach et al. J Pharm Biomed Anal 2010;51(2):373-381.*
- An LC-MS-based metabolomics approach for exploring urinary metabolome modifications after cocoa consumption. *Llorach et al. J Proteome Res 2009;8(11):5060-5068.*