PP07

Novel Biomarkers of Bread Intake in Cardiovascular High-Risk Participants. A Mass Spectrometry-Based Metabolomics Approach

*Mar Garcia-Aloy[1], Rafael Llorach[1], Mireia Urpi-Sarda[1], Sara Tulipani[1], Jordi Salas-Salvadó[2,3], Miguel Angel Martínez-González[3,4], Dolores Corella[3,5], Maria Isabel Covas[3,6], Ramon Estruch[3,7], Lluis Serra-Majem[3,8], Cristina Andres-Lacueva[1]**

[1]Nutrition and Food Science Department, XaRTA, INSA, Pharmacy Faculty, University of Barcelona, Spain; and INGENIO–CONSOLIDER Program, Fun-C-Food CSD2007-063, Ministry of Science and Innovation, Spain, [2]Human Nutrition Unit, Hospital Universitari de Sant Joan de Reus, Institut d`Investigació Sanitària Pere Virgili (IISPV), Universitat Rovira i Virgili, Reus, Spain, [3]CIBER Fisiopatología de la Obesidad y Nutrición (CIBERobn), Instituto de Salud Carlos III (ISCIII), Madrid, Spain, [4]Department of Preventive Medicine and Public Health, Medical School-Clinica, University of Navarra, Pamplona, Spain, [5]Department of Preventive Medicine and Public Health, University of Valencia, Valencia, Spain, [6]Cardiovascular Risk and Nutrition Research Group, IMIM-Institut de Recerca del Hospital del Mar, Barcelona, Spain, [7]Department of Internal Medicine, Hospital Clinic, Institut d'Investigacions Biomèdiques August Pi Sunyer (IDIBAPS), Barcelona, Spain, [8]Department of Clinical Sciences, University of Las Palmas de Gran Canaria, Las Palmas, Spain

Bread is a key component of the Mediterranean Diet which provides important amounts of complex carbohydrates, fiber and B vitamins, among other bioactive compounds, especially whole-grain bread (WG-B). Nutrimetabolomics explore the complex relationship between the consumption of dietary compounds and the maintenance of health or disease development with the aim to discover new biomarkers of intake and effect, respectively. On this regard, the study of food metabolome measure diet exposition to food consumption.

In this study, a metabolomics strategy designed to discover new biomarkers of food consumption was applied by classifying participants of the Predimed study according their reported bread consumption (either white bread (WH-B) or WG-B).

Bread intake was defined according to FFQ which was previously completed by the free-living elderly Mediterranean population at high cardiovascular risk. Subjects of the Predimed study were stratified at baseline by their consumption of bread: 2 groups of Regular-bread consumers (≥1 portion of bread/day either WH-B or WG-B) or non-bread consumers (NBC) (≤3 portions of bread/month). Urine samples of subjects were analyzed by HPLC-Q-TOF-MS followed by multivariate data analysis (OSC-PLSDA and HCA).

Urinary metabolome showed differences between both regular-bread consumers and NBC. The metabolite furosine was tentatively identified showing no differences between both types of bread consumption. This metabolite has been related to roasting bread processing. Furthermore, regular-consumers of WG-B showed significantly higher levels of 2,8-dihydroxyquinoline-β-D-glucuronide than NBC and WH-B. This metabolite has been associated with PPAR-alpha activity.

The results reinforce the capacity of metabolomics to explore the metabolism impact of dietary components and the ability to obtain new biomarkers of intake and effect combining epidemiological nutritional data and metabolomics.

PP08

Polyphenols from Raisins Have Similar Bioavailability to those from Grapes and White Wine: A Human Intervention Study

Ariana Carughi[1], Damon Murphy[2], Gary Williamson[2]

[1]SunMaid Raisins, USA, [2]School of Food Science and Nutrition, University of Leeds, United Kingdom

The polyphenol composition of raisins is not as simple to measure as it is for grapes and white wine owing to changes occurring during the drying process and the high sugar and fibre content. Extraction efficiency was improved (78+6.7% to 125+5% recovery of spiked compounds) when extracting a dried powder of raisins. Caftaric acid was present at comparable levels to those in the literature (31.2 μg/g of raisin) whilst rutin, protocatechuic acid, epicatechin and catechin were at levels lower than reported. Grapes and non-alcoholic white wine generally had higher levels of measured polyphenols apart from caftaric acid. A cross-over intervention study (n = 9) was carried out involving consumption of 100 g raisins, 400 g grapes and 300 ml non-alcoholic white wine. Despite the differences mentioned above, raisins ($p = 0.002$) and grapes ($p = 0.005$) resulted in a significantly higher level of dihydroferulic acid (DHFA) in the urine compared to non-alcoholic white wine. Other metabolites were present at comparable levels for all three treatments, showing that raisins, white wine and grapes give similar levels of polyphenol metabolites in humans despite substantial differences in processing of the grapes.