Alcohol consumption is associated with high concentrations of urinary hydroxytyrosol1–4

Helmut Schröder, Rafael de la Torre, Ramón Estruch, Dolores Corella, Miguel Angel Martínez-González, Jordi Salas-Salvadó, Emilio Ros, Fernando Arós, Gemma Flores, Ester Civit, Magí Farré, Miguel Fiol, Joan Vila, Joaquín Fernandez-Crehuet, Valentina Ruiz-Gutiérrez, Jose Lapetra, Guillermo Sáez, and María-Isabel Covas for the PRÉDIMED Study Investigators

ABSTRACT

Background: Previously, we reported the presence of hydroxytyrosol in red wine and higher human urinary recovery of total hydroxytyrosol than that expected after a single red wine intake. We hypothesized that the alcohol present in wine could promote endogenous hydroxytyrosol generation.

Objective: The objective was to assess the relation between alcohol consumption and urinary hydroxytyrosol concentrations.

Design: This was a cross-sectional study with baseline data from a subsample of the PREvención con Dieta MEDiterránea (PRE-DIMED) trial, an intervention study directed at testing the efficacy of the Mediterranean diet on the primary prevention of cardiovascular disease. Participants included 1045 subjects, aged 55–80 years, who were at high cardiovascular risk. Alcohol consumption was estimated through a validated food-frequency questionnaire. Urinary hydroxytyrosol and ethyl glucuronide, a biomarker of alcohol consumption, were measured.

Results: Urinary ethyl glucuronide concentrations were directly related to alcohol intake and wine consumption (P < 0.001) as well as to urinary hydroxytyrosol in both sexes (P < 0.001). The degree of alcohol consumption was directly associated with urinary hydroxytyrosol in male alcohol consumers (P < 0.001). Multivariate logistic regression analyses showed a significant linear trend (P < 0.05) for elevated hydroxytyrosol concentrations with an increase in alcohol consumption. Intakes of >20 g (2 drinks)/d and >10 g (1 drink)/d alcohol in men and women, respectively, were associated (P < 0.05) with elevated concentrations of hydroxytyrosol.

Conclusions: We report for the first time a direct association between urinary hydroxytyrosol and alcohol consumption at a population level. These findings reinforce previous work in human and animal models that examines wine as a source of hydroxytyrosol and alcohol as an indirect promoter of endogenous hydroxytyrosol generation. Am J Clin Nutr 2009;90:1–7.

INTRODUCTION

The health benefits of olive oil in humans have been attributed partially to olive oil’s unique composition of polyphenols (1). Polyphenols are found in olive fruits and leaves, mainly in the form of secoiridoids (2). A distinctive characteristic of olive oil is its enrichment in oleuropein, a member of the secoiridoid family, which hydrolyzes in the intestinal tract to catechol hydroxytyrosol, which has shown high antioxidant properties in experimental studies (3, 4).

The presence of hydroxytyrosol in food was considered to be restricted to olive oil. Recently, we reported the presence of hydroxytyrosol in red wine (5). We also reported that the urinary recovery of total hydroxytyrosol in healthy volunteers after a single dose (250 mL) of red wine was higher than expected, taking into account the dose administered. This recovery was also higher than that observed after a single dose of virgin olive oil (25 mL), despite a 5-fold higher hydroxytyrosol dose in the olive oil than in the wine. Hydroxytyrosol is a minor dopamine metabolite also known in the neurochemistry nomenclature as 3,4-DIMED.

1 From the CIBER Fisiopatología Obesity and Nutrition (CIBEROBN), Instituto de Salud Carlos III Spain (HS, RdlT, RE, DC, JS-S, ER, GF, MF, JL, and M-IC); Cardiovascular Risk and Nutrition Research (HS, JV, and M-IC), and the Human Pharmacology and Neurosciences Research Group (RdlT, EC, and MF), Institut Municipal d’Investigación Médica (IMIM-Hospital del Mar), Barcelona, Spain; the Department of Internal Medicine (RE) and Lipid Clinic, Endocrinology and Nutrition Service (ER), Hospital Clinic, Institut d’Investigacions Biomèdiques August Pi Sunyer-IDIBAPS, Barcelona, Spain; the Departments of Preventive Medicine and Public Health (DC) and Biochemistry and Molecular Biology (GS), University of Valencia, Valencia, Spain; the Department of Preventive Medicine and Public Health, University of Navarra, Navarra, Spain (MAM-G); the Human Nutrition Unit, School of Medicine, University Rovira i Virgili, Reus, Spain (JS-S); the Department of Cardiology, Hospital Txanorritxu, Vitoria, Spain (FA); the Primary Health Care Division, Barcelona, Spain (GF); the Institute for Health Sciences Investigation, Palma de Mallorca, Spain (MF); the Department of Epidemiology, School of Medicine of Malaga, Malaga, Spain (JF-C); the Instituto de la Grasa, CSIC, Seville, Spain (VR-G); and the Department of Family Medicine, Primary Care Division of Seville, San Pablo Health Center, Seville, Spain (JL).

2 HS and RdlT contributed equally to the study, and each can be regarded as first authors of this article.

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4 Address correspondence to M-I Covas, Cardiovascular Risk and Nutrition Research Group, Institut Municipal d’Investigación Médica (IMIM-Hospital del Mar), Parc de Recerca Biomèdica de Barcelona (PRBB), Carrer Dr. Aiguader 88, 08003 Barcelona, Spain. E-mail: mcovas@imim.es.

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