Pomegranate polyphenols and urolithin A inhibit α-glucosidase, dipeptidyl peptidase-4, lipase, triglyceride accumulation and adipogenesis related genes in 3T3-L1 adipocyte-like cells

Francisco Les, José Miguel Arbonés-Mainar, Marta Sofía Valero, Víctor López

www.elsevier.com/locate/jep

PII: S0378-8741(17)34588-9
DOI: https://doi.org/10.1016/j.jep.2018.03.029
Reference: JEP11283

To appear in: *Journal of Ethnopharmacology*

Received date: 18 December 2017
Revised date: 16 February 2018
Accepted date: 23 March 2018

Cite this article as: Francisco Les, José Miguel Arbonés-Mainar, Marta Sofía Valero and Víctor López, Pomegranate polyphenols and urolithin A inhibit α-glucosidase, dipeptidyl peptidase-4, lipase, triglyceride accumulation and adipogenesis related genes in 3T3-L1 adipocyte-like cells, *Journal of Ethnopharmacology,* https://doi.org/10.1016/j.jep.2018.03.029

Pomegranate polyphenols and urolithin A inhibit α-glucosidase, dipeptidyl peptidase-4, lipase, triglyceride accumulation and adipogenesis related genes in 3T3-L1 adipocyte-like cells

Francisco Les[a,b], José Miguel Arbonés-Mainar[b,c], Marta Sofía Valero[d], Víctor López[a,*]

[a]Department of Pharmacy, Faculty of Health Sciences, Universidad San Jorge, Villanueva de Gállego (Zaragoza), Spain.

[b]Adipocyte and Fat Biology Laboratory (AdipoFat), Unidad de Investigación Traslacional, Hospital Universitario Miguel Servet, Instituto Aragonés de Ciencias de la Salud (IACS), Instituto de Investigacion Sanitaria (IIS) Aragon, Zaragoza, Spain.

[c]CIBER Fisiopatología Obesidad y Nutrición (CIBERObn), Instituto Salud Carlos III, Madrid, Spain

[d]Departamento de Farmacología y Fisiología, Universidad de Zaragoza, Spain

[*]Corresponding author, Víctor López, Department of Pharmacy, Faculty of Health Sciences, Universidad San Jorge, Villanueva de Gállego (Zaragoza), Spain. E-mail address: ilopez@usj.es

Abstract

Ethnopharmacological relevance

pomegranate fruit is considered an antidiabetic medicine in certain systems of traditional medicine. In addition, pomegranate polyphenols are known as powerful antioxidants with beneficial effects such as the reduction of oxidative / inflammatory stress and the increase of protective signalling such as antioxidant enzymes, neurotrophic factors and cytoprotective proteins.

Aim of the study

this work evaluates the effects of pomegranate juice, its main polyphenols known as ellagic acid and punicalagin, as well as its main metabolite urolithin A, on physiological and pharmacological targets of metabolic diseases such as obesity and diabetes.

Materials and methods

for this purpose, enzyme inhibition bioassays of lipase, α-glucosidase and dipeptidyl peptidase-4 were carried out in cell-free systems. Similarly, adipocytes derived from 3T3-L1 cells were employed to study the effects of ellagic acid, punicalagin and urolithin A on adipocyte differentiation and triglyceride (TG) accumulation.

Results

pomegranate juice, ellagic acid, punicalagin and urolithin A were able to inhibit lipase, α-glucosidase and dipeptidyl peptidase-4. Furthermore, all tested compounds but significantly the metabolite urolithin A