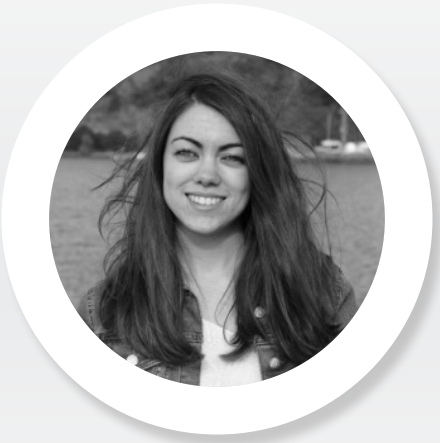
Vanesa Cepas et al., J Nutr Food Sci 2018, Volume:8
DOI:10.4172/2155-9600-C8-074

Antioxidants prevent keratinocyte death by dietary advanced glycation end products



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Introduction: In the last 40 years, diet compositions has changed in developed countries, and are nowadays characterized by an elevated glucose and fructose intake, mainly due to the increased consumption of processed sweetened foods and drinks. Fructose intake increases circulatory advanced glycation end products (AGEs) and their tissue accumulation. These compounds are formed during the Maillard reaction initiated by a nucleophilic addition between the carbonyl group of a saccharide and the free amino group of a protein, aminophospholipid or nucleic acid. Protein glycation takes place both *in vivo*, in tissues and fluids under physiological conditions, and *ex vivo*, during food preparation such as baking, cooking or frying as well as during storage. AGEs are involved in the pathogenesis of diet-related diseases such as diabetes, insulin resistance, cardiovascular diseases, kidney injury, age-related and neurodegenerative diseases.

Methods: We tested the toxicity of two independent compounds: 3-deoxygalactosone (3-DGal) and 3,4-dideoxyglucosone-3-ene (3,4-DGE) synthesized by SALIVAGES group. We incubated human keratinocytes (HaCaT) with several concentrations of each compound and/or well-known antioxidants for 48 hours. Furthermore, we treated HaCaT cells with ferrostatin-1,3-methyladenine and necrostatin-1 to assay cell death performing a trypan-blue staining.

Results: 3-DGal reduces cell viability to 80% and cell concentration to 22%. N-acetylcysteine reverts 3-DGal effect by increasing cell viability and concentration to 100% and 68% respectively. Interestingly, we found that neither ferrostatin-1, nor 3-methyladenine, nor necrostatin-1 prevented cell death, therefore these AGEs induce a form of cell death such as necrosis or apoptosis.

Conclusions: N-acetylcysteine reverts the effect of 3-DGal. These AGEs could induce cell death through apoptosis or necrosis.

Biography

Vanesa Cepas has completed her Bachelor's degree in Biology at University of Oviedo and Master's degree in Biomedicine and Molecular Oncology from the same university. Now, she is pursuing her PhD from the University Institute for Oncology of Principality of Asturias (IUOPA) and is a Researcher in JPI-HDHL project "SALIVAGES". Her research interests are redox biology, stem cells and cell differentiation.

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