

Proteomic approach to describe cytoprotective action of natural antioxidants against UV induced damages in human skin cells

Agnieszka Gęgotek

Medical University of Białystok, Poland



Abstract

UV radiation contained in sunlight, as well as used in phototherapies, causes oxidative modifications to cellular components and biomolecules in cells forming various layers of human skin. These changes to a great extent concern on proteins involved in the metabolism and cytoprotection of skin fibroblasts and keratinocytes. As a result, occurred modifications can contribute to the disruption of cell function and the development of skin disorders. Therefore, there is still a need for highly active cytoprotective compounds with antioxidant properties. However, only the description of the exact changes induced by UV, as well as the mechanism of action of individual cytoprotective compounds would allow for the selection of an appropriate and safe method of skin cell protection. The proteomic approach, showing not only the profile of expressed proteins in experimental cells, but also the structures, conformations, localizations and interactions between these molecules, ensures complex look at this issue. Examples of compounds with a protective effect are known natural antioxidants: ascorbic acid, known as a vitamin C; polyphenol – rutin; and phytocannabinoid – cannabidiol. All of these compounds significantly affect the proteomic profile of skin cells, but according to the differences in their structure, they act in a various pathways. However, the proteomic analysis clearly indicate how mentioned compounds protects skin cells against UV induced upregulation of proteins involved in the proinflammatory signaling, DNA reorganization/expression, catalytic processes, antioxidant pathways and apoptosis, and downregulation of proteins with binding activity. Moreover, ascorbic acid, rutin as well as cannabidiol protect proteins against modifications by lipid peroxidation products and carboxymethylation/carboxyethylation, what is important in the level of their activity as well as signal transduction. Analysis of the data obtained through proteomic approach may create a potentially effective protective system against skin damages caused by UV radiation, taking into account various aspects of this factor action.

Biography

Agnieszka Gęgotek has completed her PhD during Interdisciplinary Doctoral Studies in English at the Medical University of Białystok, Poland. Special distinction for her doctoral dissertation, as well as numerous of cooperation with Europe's leading research laboratories point to her experience and well-developed research workshop towards proteomic analyzes of the skin cell profile. She has over 40 publications that have been cited over 500 times, and her publication H-index is 14. Currently she is continuing her research work as an assistant professor at the Medical University of Białystok, Poland.