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Inhibitory Effects of Skin Permeable Glucitol-core Containing Gallotannins from Red Maple Leaves on Elastase and their Protective Effects on Human Keratinocytes

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Inhibitory effects of skin permeable glucitol-core containing gallotannins from red maple leaves on elastase and their protective effects on human keratinocytes

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ABSTRACT

Glucitol-core containing gallotannins (GCGs) from the red maple (*Acer rubrum*) species have been reported to exhibit skin beneficial activities but their inhibitory effects on elastase remain unclear. Herein, we evaluated a series of GCGs for their anti-elastase activity, skin permeability, and cytoprotective effects in human keratinocytes HaCaT cells. GCGs' anti-elastase effects were enhanced as their number of galloyl groups increased, which may be attributed to the formation of more stable protein–ligand complexes. In addition, GCGs were predicted to have moderate skin permeability and ginnalin A (GA) showed favorable permeability in the PAMPA model and cell uptake assay. Moreover, GA, ginnalin B, and maplexin F (at 50 μM) reduced H₂O₂-induced reactive oxygen species in HaCaT cells by 70.8, 92.8, and 84.6%, respectively. In conclusion, red maple GCGs are skin permeable elastase inhibitors with antioxidant activity, which may contribute to their overall skin beneficial effects and support their potential for cosmeceutical applications.

