INTRODUCTION

Skin aging is a multifactorial process that is initiated by extrinsic (environmental) and intrinsic (chronological) factors. The appearance of skin aging is influenced by many different biological processes that are initiated by either of these two factors. These biological processes are regulated in part by groups of genes expressed in the different layers of the skin. Salicin (O3H–HO–O) is an alcoholic beta-glycoside that contains D-glucose. The systematic (IUPAC) name of the molecule is 2-(Hydroxymethyl)phenyl-D-glucopyranoside. It is obtained from several species of the white willow bark tree. It occurs as a white, smooth, crystalline, water soluble powder. Previous studies have established salicin as an anti-inflammatory agent when taken orally. Clinical studies of finished topical formulations have shown promising results of its effects on multiple signs of aging. Based on this information, it is proposed that salicin is capable of reducing the appearance of aging on human skin through various mechanisms. This study focuses on one such mechanism: the ability of salicin to induce the expression of groups of genes, such as MnSOD2 and FOXO1, capable of protecting the skin from the damages caused by extrinsic factors.

MATERIALS AND METHODS

Salicin at 0.5% was evaluated on human skin equivalent cultures (MatTek). Salicin at 0.5% was evaluated on human skin equivalent cultures (MatTek). RT-PCR data illustrating an increase in additional antioxidants, such as MT3 (Metallothionein 3) and LOX (Lysyl Oxidase), after 24 hours of stimulation.

RESULTS

Figure 2. DNA microarray data illustrating an increase in MnSOD2 (mitochondrial superoxide dismutase) and FOXO1 (Forkhead box O1), after 24 hours of stimulation.

Figure 4. DNA microarray data illustrating an increase in additional antioxidants, such as MT3 (Metallothionein 3) and LOX (Lysyl Oxidase), after 24 hours of stimulation.

Figure 3. RT-PCR data illustrating an increase in MnSOD2 (mitochondrial superoxide dismutase) and FOXO1 (Forkhead box O1), after 24 hours of stimulation.

Figure 5. RT-PCR data illustrating an increase in additional antioxidants, such as MT2A (Metallothionein 2), LOX (Lysyl Oxidase) and TXNRD1 (Thioredoxin reductase 1), after 24 hours and 48 hours of stimulation.

SUMMARY

• Salicin induces the expression of one of the main environmental stress protectors on human skin, MnSOD2, as well as one of its key regulators, FOXO1.
• Data was obtained with both DNA microarray as well as Real-Time PCR experiments on human equivalent skin.
• Salicin’s effect on the expression of MnSOD2 and FOXO1 is time dependent showing an increase in expression from 24 to 48 hours.
• Salicin induces the expression of other major skin protective genes, including Metallothionein2, Lysyl oxidase, Metallothionein3, and Thio- redoxin reductase1. Lysyl oxidase was validated at 24 and 48 hour time points with PCR, showing a decrease in expression after 24 hours.

CONCLUSION

This study indicates that salicin is capable of reducing the appearance of skin aging caused by extrinsic factors through the induction of many different groups of genes related to youthful skin, which we are terming “functional youth gene clusters.”

LITERATURE CITED


NEW SKIN BENEFITS IDENTIFIED FOR WHITE WILLOW BARK EXTRACT

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