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Atomic hydrogen surrounded by water molecules, H(H2O)m, modulates basal and UV-induced gene expressions in human skin in vivo

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Abstract

Recently, there has been much effort to find effective ingredients which can prevent or retard cutaneous skin aging after topical or systemic use. Here, we investigated the effects of the atomic hydrogen surrounded by water molecules, H(H2O)m, on acute UV-induced responses and as well as skin aging. Interestingly, we observed that H(H2O)m application to human skin prevented UV-induced erythema and DNA damage. And H(H2O)m significantly prevented UV-induced MMP-1, COX-2, IL-6 and IL-1β mRNA expressions in human skin in vivo. We found that H(H2O)m prevented UV-induced ROS generation and inhibited UV-induced MMP-1, COX-2 and IL-6 expressions, and UV-induced JNK and c-Jun phosphorylation in HaCaT cells. Next, we investigated the effects of H(H2O)m on intrinsically aged or photoaged skin of elderly subjects. In intrinsically aged skin, H(H2O)m application significantly reduced constitutive expressions of MMP-1, IL-6, and IL-1β mRNA. Additionally, H(H2O)m significantly increased procollagen mRNA and also decreased MMP-1 and IL-6 mRNA expressions in photoaged facial skin. These results demonstrated that local application of H(H2O)m may prevent UV-induced skin inflammation and can modulate intrinsic skin aging and photoaging processes. Therefore, we suggest that modifying the atmospheric gas environment within a room may be a new way to regulate skin functions or skin aging.

Figures

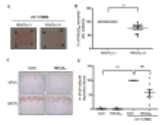

Figure 1. $H(H_2O)_m$ prevents...

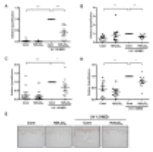

Figure 2. $H(H_2O)_m$ prevents...

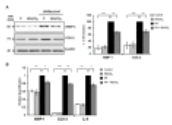

Figure 3. $H(H_2O)_m$ prevents...

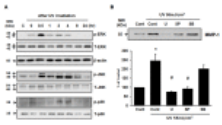

Figure 4. UV-induced MMP-1 expression is mediated...

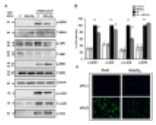

Figure 5. UV-induced SEK1/JNK activation and c-Jun...

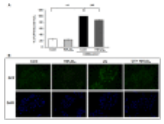

Figure 6. $H(H_2O)_m$ reduces...

All figures (7)

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