

# **Effect of EGF on hypersensitivity in the skin and its underlying mechanism**

**Hiroyuki Oshiumi**

*Department of Immunology, Faculty of Life Sciences, Kumamoto University*

Epidermal growth factor (EGF) has been used as a component of many cosmetics. EGF has been believed to promote the turnover of the skin and has an anti-aging ability. Recently, we found that EGF regulates the expression of pro-inflammatory cytokine expression in a DDX60 RNA helicase-dependent manner. Pro-inflammatory cytokines are well known to increase vessels permeability leading to swelling, redness and pain. Our data imply that EGF can suppresses the inflammation in the skin. In this study, we further assessed the role of EGF on the inflammatory immune responses, and found that EGF suppressed delayed type hypersensitivity in mice. However, EGF did not reduce the phagocytosis ability of macrophages required for excluding waste product in the skin. Recently, severe acute respiratory syndrome (SARS) coronavirus-2 (SARS-CoV-2) causes coronavirus disease-2019 (COVID-19). SARS-CoV-2 infects host through mucosal epithelial cells, and thus it is unclear whether EGF within the cosmetics affect the immune response against SARS-CoV-2. Therefore, we investigated the effect of EGF on the antiviral activities of epithelial cells. Interestingly, EGF in the culture medium suppressed vesicular stomatitis virus (VSV)-induced cytopathic effect (CPE) on epithelial cells, although EGF attenuated the IL-6 expression from VSV-infected cells. EGF-promoted antiviral activities were also observed when cells were infected with seasonal influenza A virus. EGF attenuated the CPE of cells infected with influenza A virus, and reduced IL-6 expression levels. Interestingly, moderate reduction of SARS-CoV-2 replication was observed when EGF existed in cell culture medium. These findings elucidated novel useful aspects of EGF within the cosmetics.