

The Protective Effect of L-fucose on HSF Cells and the Anti-inflammatory Mechanism of THP-1 Macrophages

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Abstract

Skin oxidative stress injury and local chronic inflammation are important core causes of skin barrier damage and inflammatory skin diseases. It is of great research value to find safe and efficient natural active substances to repair skin damage and regulate inflammation. The purpose of this study was to investigate the anti-apoptotic protective effect of L-fucose on human skin fibroblasts (HSF), and its anti-inflammatory effect and molecular mechanism on PMA-induced differentiated THP-1 macrophages. In the experiment, HSF cells cultured in vitro were used to construct an oxidative damage model, and the protective effect of L-fucose on cells was verified by detecting cell viability, apoptosis level and Caspase family apoptosis-related protein expression. At the same time, PMA-induced THP-1 monocytes were used to differentiate into mature macrophages to construct an in vitro inflammatory model, and the secretion of pro-inflammatory factors and the expression of key proteins in the inflammatory pathway were detected. The results showed that L-fucose could significantly up-regulate the activity of HSF cells, effectively inhibit the activation of Caspase apoptosis pathway, reduce the apoptosis damage of human skin fibroblasts, and had good cell protection effect. At the same time, it can significantly inhibit the excessive inflammatory response of THP-1 macrophages, effectively reduce the release of pro-inflammatory factors such as TNF- α , IL-6, and IL-1 β , and inhibit the abnormal activation of inflammatory signaling pathways. In summary, L-fucose can not only effectively protect skin cells and reduce apoptosis, but also significantly inhibit the inflammatory response of immune cells, and can simultaneously regulate apoptosis and inflammatory response, which provides an important experimental theoretical basis for its application in skin inflammatory injury repair and functional skin care raw materials development.

Keywords

L-fucose, hSF Cells, Caspase, tHP-1 Macrophages, Cell Apoptosis, Anti-inflammatory