

Abstract

Umbilical-cord mesenchymal stem cell (UC-MSC) secretome have been newly developed and analyzed for their role in various therapeutic applications. The use of UC-MSC secretome poses several advantages due to its cell-free composition and minimally invasive sourcing of the UC-MSC. UC-MSC secretome have also been found to have higher concentrations of angiogenesis growth factors alongside other biomaterials such as DNA, microRNA, collagen, and enzymes, which may pose a role in preventing and treating skin aging. Aging refers to a decrease in the structure and function of the skin, and in laboratory setting could be simulated using hydrogen peroxide (H_2O_2) and excessive UVB radiation. One of Indonesia's leading pharmaceutical companies, PT Kalbe Farma, has produced UC-MSC secretome and in this research, the cytoprotective ability of the product was analyzed as a pre-treatment for human keratinocytes (HaCaT) cell exposed to aging inducers, specifically H_2O_2 and UVB radiation. Protein characteristic study was done prior to the cell-based assay through total protein quantification and molecular weight analysis. Result shows that total protein content of the UC-MSC secretome is 9.3 $\mu\text{g/mL}$. Protein bands that were seen in molecular weight migration analysis could indicate presence of collagen and fibronectin, both has the ability in increasing cell proliferation and improved cell survival. Pre-treatment of HaCaT cells with UC-MSC secretome failed to protect the cells from the UVB radiation and was found to reduce the cytoprotective ability of HaCaT upon H_2O_2 treatment .

Keywords: Secretome, umbilical-cord mesenchymal stem cell, aging, hydrogen peroxide, UVB radiation