IMPACT OF MICROBIAL TRANSFORMATION METABOLOME OF ASIATICOSIDE ON WOUND HEALING

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1.0 Introduction

Biotransformation is a mix of biochemical reactions to transform the construction of phytochemicals and organic compounds by exploiting microorganism, isolated enzyme, plants and animals, to develop the variety of usable and useful natural products. Microbial transformation has been extensively used, to create new and useful metabolites. Microbial transformations can primarily be used in engineering and altering the effective constituents of the phytomedicine, increasing the natural products collection, and to draw the routes of drugs’ synthesis (1).

Wound healing process normally starts with three subsequent actions that may be shared in period and area; these complicated stages include the inflammation phase, proliferation or tissue formation phase and remodeling phase. Asiaticoside was isolated from Centella asiatica and exposed to the microbial catalysis and then the metabolites were extracted. The effects of asiaticoside and its transformed products were investigated on human skin cells using human keratinocyte Hacat cell line as the in vitro model. In wound scratch assay on Hacat cells, asiaticoside and its microbial metabolome was shown to increase the migration rates of the cells. By tracking the area occupied by the cells and the number of cells attached, we could conclude that asiaticoside with its biocatalysed components increased the initial Hacat cell migration and adhesion. It was observed that the microbial metabolome demonstrated its effect with minimal concentration than its original compound. In cell proliferation assays, asiaticoside and the metabolome showed their efficacy in inducing the increase of cell behaviors. It can be assumed that the bioactivity on artificial skin, might suggest them to have pharmaceutical values in addition to the healing significance.

**Keywords**

Asiaticoside, Wound Healing, Biotransformation, Centella asiatica

**Summary**

Microbial transformation has been extensively used, to create new and useful metabolites. Microbial transformations can primarily be used in engineering and altering the effective constituents of the phytomedicine, increasing the natural products collection, and to draw the routes of drugs’ synthesis. Wound healing process normally starts with three subsequent actions that may be shared in period and area; these complicated stages include the inflammation phase, proliferation or tissue formation phase and remodeling phase. Asiaticoside was isolated from Centella asiatica and exposed to the microbial catalysis and then the metabolites were extracted. The effects of asiaticoside and its transformed products were investigated on human skin cells using human keratinocyte Hacat cell line as the in vitro model. In wound scratch assay on Hacat cells, asiaticoside and its microbial metabolome was shown to increase the migration rates of the cells. By tracking the area occupied by the cells and the number of cells attached, we could conclude that asiaticoside with its biocatalysed components increased the initial Hacat cell migration and adhesion. It was observed that the microbial metabolome demonstrated its effect with minimal concentration than its original compound. In cell proliferation assays, asiaticoside and the metabolome showed their efficacy in inducing the increase of cell behaviors. It can be assumed that the bioactivity on artificial skin, might suggest them to have pharmaceutical values in addition to the healing significance.
proliferation or tissue formation phase and remodeling phase (2).

Asiaticoside, considered as the major triterpenes in Centella asiatica are presumed to have favorable outcomes on wound healing development (3).

2.0 Materials and Methods

Asiaticoside was isolated from Centella asiatica through different experimental stages started with soxhelt, column chromatography and HPLC purification, and exposed to the microbial catalysis by feeding the asiaticoside to the A. niger fungus liquid culture, and then the metabolites were extracted by liquid liquid extraction (4). The effects of asiaticoside and its transformed products were investigated on human skin cells using the in vitro model according to the methodology reported in literature (5).

2.0 Results

In wound scratch assay, asiaticoside and its microbial metabolome showed to increase the migration rates of skin cells. By tracking the area occupied by the cells and the number of cells attached we could conclude that asiaticoside with its biocatalysed components increase the initial skin cell migration and adhesion.

4.0 Discussion and Conclusion

It was observed that the microbial metabolome demonstrated its effect with minimal concentration than its original compound. In cell proliferation assays, asiaticoside and the metabolome showed their efficacy in inducing the increase of cell behaviors. Nevertheless, the microbial metabolome showed to have high cytotoxicity. It can be assumed that the bioactivity on artificial skin, might suggest them to have pharmaceutical values in addition to the healing significance.

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References


