日本香粧品学会誌　Vol. 40, No. 3, pp. 163−169（2016）

〈一般論文〉

紫外線によるトランスポゾンの活性化に着目した皮膚老化研究

村上祐子*, 足立浩章, 田中　浩, 八代洋一, 中田　悟

Skin Aging Research Focused on Ultraviolet Rays Induced Activation of Transposon

Yuhko MURAKAMI*, Hiroaki ADACHI, Hiroshi TANAKA, Youichi YASHIRO, Satoru NAKATA

（Accepted: April 11, 2016）

Abstract

In living organisms, there are small pieces of DNA called transposons that can jump to different locations within a genome. Movement of transposons around the genome can damage genes or change their expression levels. Transposons are the key factor causing aging, while they have been involved in biological evolution. Therefore, there are a number of systems which regulate the movement of transposons. In this study, we investigated whether UV irradiation changed the movement of transposons and its regulatory mechanism in human dermal fibroblasts. We also considered the relationship between transposons and skin aging. UVB irradiation on fibroblasts increased the mRNA expression of LINE1, a kind of transposons, while it decreased the mRNA expression of DNMT3A, a kind of DNA methyltransferases, which inhibit transcription of transposons. Both the mRNA expression of type I collagen, COL1A1, and the protein level declined. In addition, when treating fibroblasts with 6-formylindolo[3,2-*b*]carbazole（FICZ）, which is a photoproduct from tryptophan and involved in the enhancement of transposon movement, the changes in the mRNA expression levels of LINE1, DNMT3A and COL1A1 in the fibroblasts were similar to those observed in the UVB-irradiated fibroblasts. These results suggest that transposon movement might be enhanced by UV irradiation on the skin owing to the change of transposons regulatory factors, followed by the decrease of collagen production in human dermal fibroblasts. Therefore, UV-induced activation of transposons was considered to be a novel cause of skin aging.

Key words:　transposon, LINE1, DNMT3A, collagen, UVB.