

**Mandom discovers that suppressing inflammation caused by ultraviolet (UV) rays using “Paeonia extract” helps to brighten the skin**

**- A new lightening mechanism that focuses on sunburns caused by UV rays -**

Mandom Corporation (Head Office: Osaka, President Executive Officer: Motonobu Nishimura, hereafter “Mandom”), together with the Institute of Biomedical Research and Innovation, have been engaging in research and development of highly fast-acting, lightening ingredients. We determined that sunburn, the trigger for skin pigmentation caused by UV radiation, is a key inflammatory response in the study of fast-acting ingredients. Therefore, we performed a detailed analysis of this phenomenon at the molecular level. From this study, we found that the inflammatory molecule, CXCR3, is key to the elucidation of this fast-acting effect. We also revealed that suppressing CXCR3 and UV-induced sunburns by Paeonia extract subsequently suppresses skin pigmentation. Paeonia extract was demonstrated to exert its lightening effect using a different mechanism than the lightening ingredient, Vitamin C, which suppresses skin pigmentation by inhibiting the production of melanin following sunburns.

Mandom will continue to examine the effects and sensation caused by Paeonia extract from the consumer's point of view and foster technologies to aid in customer satisfaction.

The results of this research was presented at the “Asian Societies of Cosmetic Scientists (ASCS) Conference” held in Seoul in 2011.

\*Sunburn: An inflammatory reaction due to UV radiation that results in erythema.

### 1. Sunburn is a red light towards skin pigmentation

Most lightening agents, to date, have been discovered in studies that aimed to restore skin pigmentation caused by UV rays, to the original color. At Mandom, we referred to the rules set for lightening agents “Prevent spots and freckles due to sunburn.” Instead of preventing skin pigmentation caused by UV rays, preventing UV-induced damage at a far earlier stage would allow the development of a lightening agent that is far more fast-acting than past agents (Figure 1). We, therefore, focused on sunburns that occur at an earlier stage than does skin pigmentation. As the skin affected by sunburns has local inflammation, inflammatory substances that trigger skin pigmentation may be present in these inflammation sites.

### 2. “Paeonia extract” suppresses the generation of inflammatory substances due to UV exposure

Mandom has examined hundreds of substances to find an ingredient that suppresses sunburns caused by UV. Based on the search, “Paeonia extract” was discovered to be highly effective in suppressing sunburns. To elucidate the inflammatory substances that are involved in the sunburn-suppressing effect of “Paeonia extract”, we performed

#### Contact

mandom corp.  
Public Relations Div.  
mail: [press@mandom.co.jp](mailto:press@mandom.co.jp)  
Please contact us in Japanese or English.

URL: <https://www.mandom.co.jp/en/>



analyses using DNA microarray; several tens of candidate genes related to inflammatory responses were discovered. After detailed analysis of each gene, the inflammatory molecule, CXCR3 (chemokine (C-X-C motif) receptor 3), was observed to increase with UV radiation and was suppressed by the Paeonia extract. We also found that reducing the level of CXCR3 resulted in a reduced level of melanin, the origin of pigmentation (Figure 2).

\*DNA microarrays can be used to perform comprehensive analysis of approximately 20,000 genes in skin cells irradiated with UV rays.

### 3. Lightening effect of “Paeonia extract”

We surmised that applying “Paeonia extract”, which suppresses the increase in CXCR3, to skin, would suppress sunburn from UV rays and subsequently suppress pigmentation. Therefore, we evaluated the effects exhibited by “Paeonia extract” against UV rays on human skin. “Paeonia extract” was found to suppress sunburns from UV rays and elevate blood flow associated with sunburn (Figure 3). In addition, this extract significantly suppressed subsequent skin pigmentation (Figure 4).

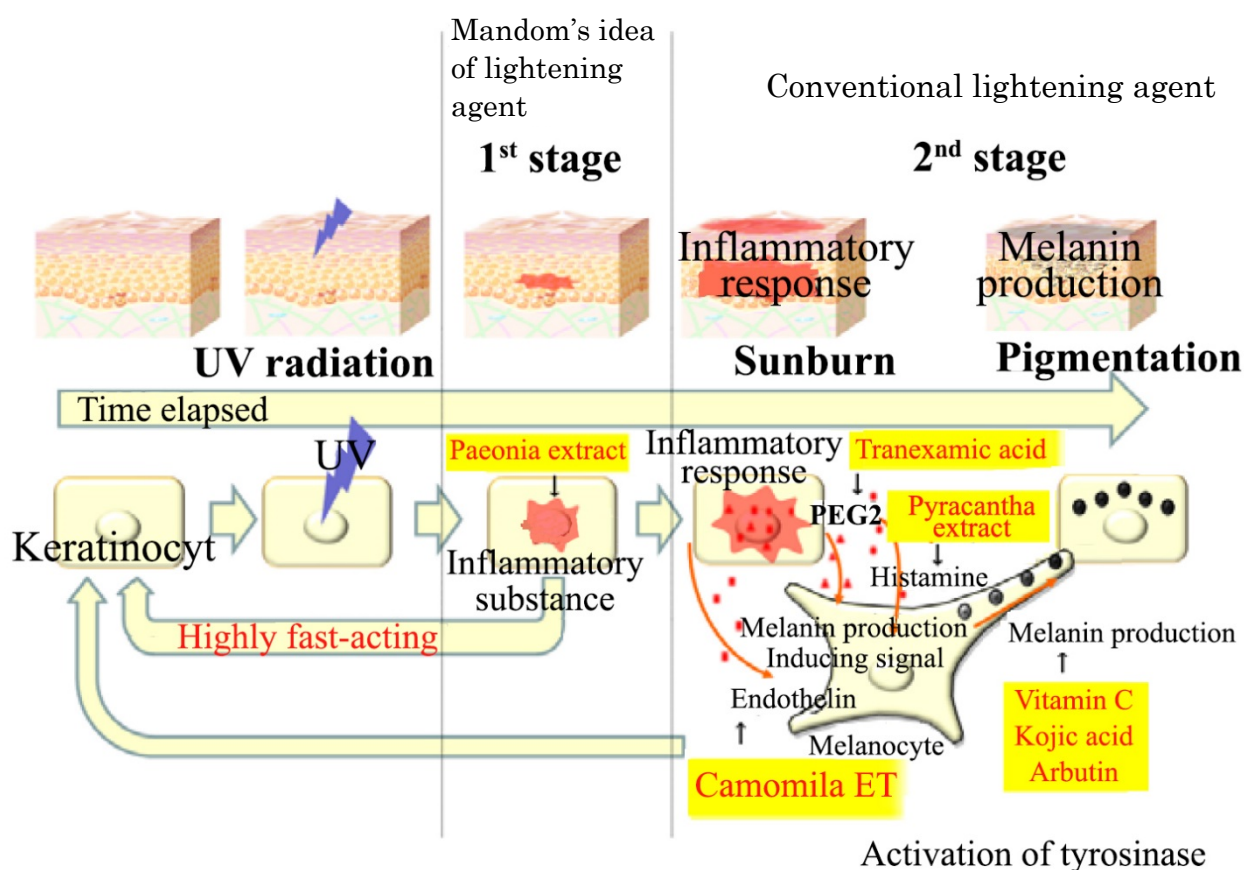
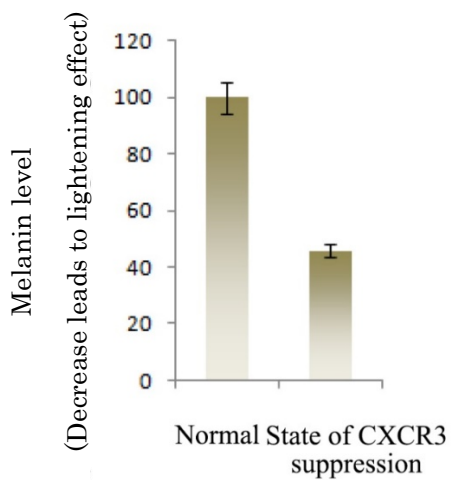
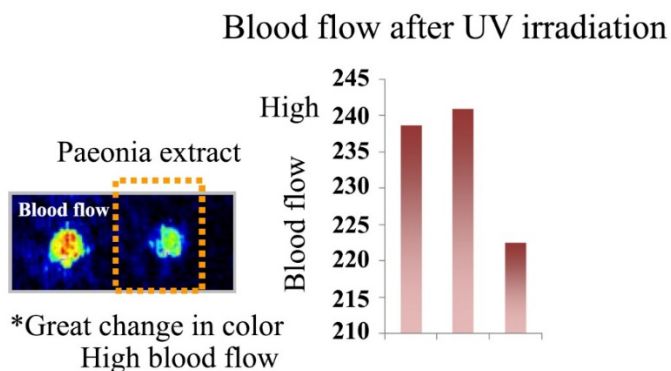


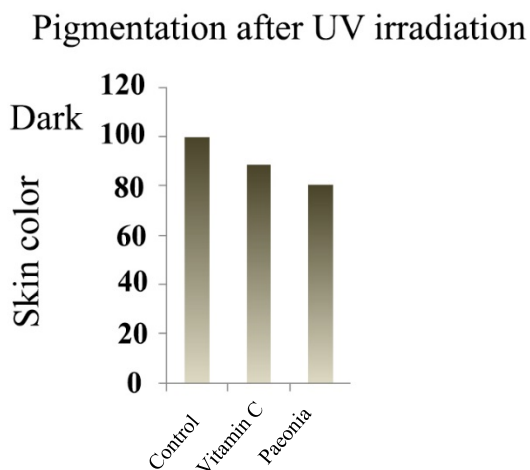
Figure1. Concept of Mandom's new lightening agent.



**Figure2. Lightening effect by suppressing CXCR3.**



**Figure3. Suppression of inflammation by "Paeonia extract.**



**Figure4. Lightening effect of "Paeonia extract.**