

〈原 著〉

## *Propionibacterium acnes* 由来ポルフィリンによる 一重項酸素の産生と皮表脂質の過酸化

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### **Peroxidation of Skin Surface Lipids by Singlet Oxygen Produced by *Propionibacterium acnes***

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#### **Abstract**

Singlet oxygen, which is one of reactive oxygen species, plays an important role in biological and chemical processes. Singlet oxygen generated by ultraviolet (UV) irradiation has a possibility to induce the skin photo-damage such as lipidperoxidation, sunburn reaction, phototoxicity and photo-allergy.

We constructed a sensitive near-infrared emission spectrometer with a Ge-detector. We applied this apparatus for detection of singlet oxygen generated by laser-excited coproporphyrin which is produced by *Propionibacterium acnes* (*P. acnes*). We measured the emission intensity at 1268 nm corresponding to the  $O_2(^1\Delta_g) \rightarrow O_2(^3\Sigma_g^-)$  transition of singlet oxygen in coproporphyrin solution.

Only in the presence of coproporphyrin, which moves to the skin surface with sebum, squalene was rapidly peroxidized by UV irradiation depending on the concentration of coproporphyrin. The results showed that lipid peroxidation was occurred by singlet oxygen generated by UV irradiation. The rate constant of the reaction of singlet oxygen with squalene was determined to be  $2.8 \sim 5.6 \times 10^6 M^{-1} s^{-1}$ . Compared with UV-B, UV-A was more effective to produce singlet oxygen and squaleneperoxide.