X-band EPR imaging characterization of psoriasis vulgaris skin

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We investigated locations and identification of structural abnormality of the stratum corneum (SC) in patients with psoriasis vulgaris (PV) by using X-band EPR imaging. The X-band EPR spin-probe imaging of PV-SC samples provided a useful image concerning the status of the SC.

The Hirosaki University Internal Review Board approved all protocols used in this study. For EPR imaging, a Bruker E500 ELESYS system was used. Spin probe (5-doxylstearic acid, 5-DSA) solution was used to investigate structural aspects of PV-SC [1, 2]. We measured the thick SC, the outermost layer for PV. The control SC was taken from skin lesions on the forearms.

A small, broad three-line pattern of 5-DSA in PV-SC was observed. The spectral pattern of PV-SC was quite different from those of the control SC. Two-dimensional (2D) imaging using X-band EPR imager showed that radical locations vary between control and PV skin [3]. The results showed that the intense red signal was due to probe penetration into the PV skin. No red lesion region was observed in the control. The EPR images showed various sizes and number distribution concerning the disordered states in the SC. Thus, X-band EPR imaging can be useful for detecting and identifying the location of abnormality of the SC states. In addition, EPR imaging can potentially offer further quantitative insights into skin-lipid states.

Fig. 1. The image shows the psoriasis vulgaris (PV) (top) and control (bottom) samples. The aqueous solution of the spin probe, 5-doxylstearic acid (5-DSA) was used.

Keywords: EPR imaging; skin structure; spin probe; psoriasis vulgaris; ESR

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