

Comparison between reflectance confocal microscopy and two-photon microscopy in early detection of cutaneous radiation injury in a mouse model *in-vivo*

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ABSTRACT:

Cutaneous radiation injury (CRI) is a skin injury caused by high dose exposure of ionizing radiation (IR). After the radiation exposure, latent symptom-free phase is present which is followed by various clinical symptoms depending on severity [1]. For proper treatment, early detection of CRI before clinical symptoms is important [2, 3]. In this study, RCM and TPM were compared in the detection of cellular changes caused by CRI in an *in-vivo* mouse model. CRI was induced on the mouse hindlimb skin with various IR doses and the injured skin regions were imaged longitudinally by both modalities until the onset of clinical symptoms. Both RCM and TPM detected the changes of epidermal cells and sebaceous glands before clinical symptoms in different contrasts. RCM detected changes of cell morphology and scattering property based on light reflection. TPM detected detail changes of cellular structures based on autofluorescence of cells. Since both RCM and TPM were sensitive to the early-stage CRI by using different contrasts, the optimal method for clinical CRI diagnosis could be either individual methods or their combination.

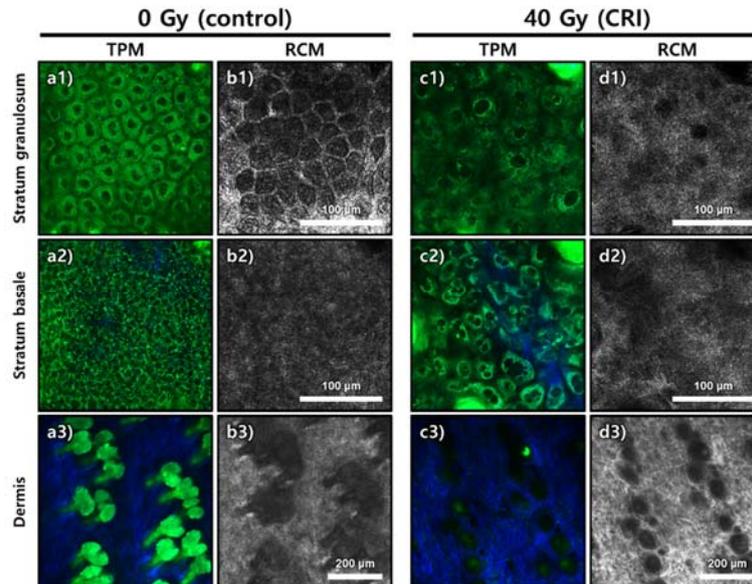


Figure 1. TPM and RCM images of (LEFT) control (0 Gy), and (RIGHT) CRI (40 Gy) mouse hindlimb.

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