Synopsis of Original Research Paper

How does zinc signaling control the skin barrier functions?

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Zinc is an essential trance element for life, and zinc deficiency causes numbers of symptoms including dermal inflammation and immune deficiency, so that zinc homeostasis must be tightly fine-tuned via zinc transporters, however, the investigations for the involvement of zinc transporters in skin and immunological homeostasis have not been conducted in detail so far.

Previously, we have demonstrated that zinc transporter SLC39A10/ZIP10 plays important roles in early B cell development and B cell-mediated immune responses. Further, we have found that ZIP10 is highly expressed in the hair follicles, which is required for skin and hair follicles formation, however, there is limited information on ZIP10-expressing cells about their physiological roles, their fate determining, and the molecular events controlled by zinc transporter ZIP10.

To clarify the physiological functions of ZIP10 and the profiles of ZIP10 expressing cells in vivo, we have generated *Zip10-IRES-GFP* knock-in (*Zip10-GFP*-KI) mouse, which was further crossed with Rosa26 *Tomato*-KI mouse to generate *Zip10-GFP/Tomato*-KI mouse. The GFP expression was detected in the hematopoietic stem cell and ZIP10-expressing pre-/pro-B cell populations in the bone marrow cells from the *Zip10-GFP*-KI mice. Tomato expression was also detected in part of the ZIP10-expressing pre-/pro-B cell populations, indicating that Tomato expressing pre-/pro-B cells were derived from ZIP10-expressing progenitor cells. In skin of the mice, GFP and Tomato were detected around the lower and upper bulge regions, respectively. The hair follicle stem cell populations also contained GFP and GFP/Tomato expressing cells.

These findings indicated that both *Zip10-GFP*-KI and *Zip10-GFP/Tomato*-KI mice are valuable tools to investigate the functions of ZIP10 and the fate of the ZIP10-expressing cells in vitro and *in vivo*, which will bring us numbers of opportunities for better understanding of the dermatology and the cosmetology in the future.