Small Proline-rich Proteins in Hair Follicles

Sir,

Transglutaminase 1 (TGase l TGK, TGM) of about 92 KDa is membrane-associated keratinocyte transglutaminase, first discovered in keratinocytes, but is now known to be widely expressed in epithelial and nonepithelial tissues. TGase 1 is thought to be a critically important enzyme involved in the formation and assembly of the cornified cell envelope (CE) of terminally differentiating epidermis.

Recently, we have raised a new anti-human TGase 1 antibody in goats against a purified active recombinant protein expressed in bacteria (1). This antibody reacted with high specificity with only TGase 1 in the epidermis and cultured keratinocytes by Western blotting and immunoprecipitation. It reacted with all epidermal layers, with some potentiation of the granular layer in normal human epidermis. However, these stainings are very different from those of a widely used TGase 1 monoclonal antibody (B.C1), which labels upper spinous and granular layers of normal epidermis. By Western blotting, B.C1 antibody recognized a group of bands of 15–20 KDa. Amino acid analysis and amino acid sequencing revealed that these bands represented the small proline-rich (SRP) 1 and 2 proteins. Also with a series of blocking experiments with TGase 1 proteins and synthetic peptides, it is now considered that the main epitope of the B.C1 antibody resided on the amino-terminus of these two SPR proteins.

In a recent report in this journal, Tamada et al. (2) reported the expression of TGase 1 in human anagen hair follicles, by using B.C1 antibody. B.C1 antibody decorated the hair cuticle and the three layers of the inner root sheath in the bulbar and suprabulbar portion. Subsequently, the translocation of the B.C1 epitope occurred to the inner site of the outer root sheath in the middle part of the hair follicle. In the distal portion of the isthmus and the infundibulum, the epitope was seen in the internal part of the outer root sheath and upper spinous and granular layers of epidermis.

There are several reports (3–5) of immunocytochemistry of hair follicles using antibodies of SPR1 and/or SPR2 (see Fig. 8 in (3), Fig. 3 in (4) and Fig. 6 in (5)). The distribution of SPR1 and/or SPR2 proteins is similar to the B.C1 epitope of hair follicles observed by Tamada et al. (2). We observed TGase 1 expression at hair follicles, our antibody stained outer root sheath and inner root sheath cells, with potentiation of the cuticle of the inner root sheath and hair in the bulbar and suprabulbar portion (6). The work conducted by Tamada et al. is thorough and may be a valuable report of SPR proteins, which are expressed and served as CE precursor proteins at hair follicles.

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