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TRIC Channel and Bone Ossification

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Summary

TRIC channel subtypes, namely TRIC-A and TRIC-B, are mainly localized to the endoplasmic reticulum (ER) and nuclear envelope, and likely support Ca^{2+} release from intracellular stores by mediating K^{+} flux in various cell types. Recently, deletion and point mutations in the *TRIC-B/TMEM38B* gene were identified in autosomal recessive osteogenesis imperfecta pedigrees. However, the mechanisms by which the mutations cause the human disease have yet to be addressed. In this study, we found that *Tric-b*-knockout mice exhibit poor bone ossification. The knockout bones maintained bone-related cell types in a near normal state, but collagen matrix contents were obviously decreased. Several lines of evidence suggested that weakened Ca^{2+} release induces store overloading and ER swelling, thus leading to impaired collagen production in *Tric-b*-knockout osteoblasts. On the other hand, no significant abnormality was suggested in *Tric-b*-knockout osteoclasts. The TRIC-B channel, therefore, is essential for the intensive collagen production in active osteoblasts towards bone mineralization.