

Branched-chain amino acids (BCAAs) exhibit many physiological functions. However, the potential link and mechanism between BCAA and skin function are unknown. We examined the effects of deletion of branched-chain α -keto acid dehydrogenase kinase (BDK), a key enzyme in BCAA catabolism, on type I and III tropocollagen syntheses in mice. Leucine and isoleucine levels were significantly lower in the skin of BDK-KO mice compared with wild-type mice. No changes in valine concentrations were observed. The levels of type I and III tropocollagen proteins and mRNAs (*COL1A1* and *COL3A1*) were significantly lower in the skin of BDK-KO mice compared with wild-type mice. The phosphorylation of p70 S6 kinase, which indicates mammalian target of rapamycin (mTOR) activation, was reduced in the skin of BDK-KO mice compared with wild-type mice. These findings suggest that deficiencies of leucine and isoleucine reduce type I and III tropocollagen syntheses in skin by suppressing the action of mTOR.

The skin levels of type I and III tropocollagen proteins and *COL1A1* and *COL3A1* mRNAs were significantly lower in BDK-KO mice compared with WT mice.