S1P/S1PR2 signaling pathway promotes bone formation on rat apicoectomy model

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Sphingosine-1-phosphate (S1P) is known as a signaling sphingolipid that regulates many cellular responses, including cellular differentiation. Signaling through the specific cell surface G-protein-coupled receptors (subtypes S1PR1 to S1PR5) mediates most of the biological action of S1P. In this study, we investigated the roles of S1PR2 signaling for bone formation on the rat apicoectomy model.

We used 10 week-old male Wistar rat, and created the apicoectomy model with bone cavity (diameter 2 mm, depth 1 mm) on a mesial root of mandibular left first molar. Then we injected S1PR2 agonist (CYM-5520) mixed with scaffold (atelocollagen). Rat sacrificed after 3 weeks, and then subjected to micro-computed tomography analysis. The handling rats and all procedures were approved by the Animal Committee of Fukuoka Dental College (No. 18014).

Injection of S1PR2 agonist promoted bone properties such as bone volume density, and trabecular number compared with control. Interestingly, we found that S1PR2 agonist showed the osteoinductive effect.

We conclude that S1PR2 signaling accelerate bone formation and induce osteoblast differentiation.