ADENOSINE 2A RECEPTOR STIMULATION ACTIVATES WNT/BETA-CATENIN SIGNALLING IN BONE

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Bone homeostasis is regulated by different pathways including adenosine signalling (Mediero et al., 2013). In recent years the attention is focused on the possible role of Wnt/β-catenin signalling on bone homeostasis and it has been demonstrated that β-catenin promotes the differentiation of mesenchymal stem cells from osteoblast precursor cells into mature osteoblasts (Regard et al., 2012). The aim of this study was to investigate the interaction between Wnt/β-catenin signalling and adenosine 2A receptor on bone.

In a preliminary step, β-catenin expression was determined in primary mice osteoblasts by western blot analysis and fluorescence microscopy after stimulation by the A2A receptor-selective agonist CGS21680. Subsequently, both wild-type and Adenosine 2A receptor knockout (A2ARKO) mice were used to show β-catenin expression in long bones.

CGS21680 stimulation rapidly (10 min) increased β-catenin expression ($p<0.05$ vs untreated controls) in primary osteoblasts. CGS21680 administration activated β-catenin expression by A2AR activation in long bones of wild-type mice whereas A2ARKO mice showed a strong decrease of β-catenin expression.

These results indicate that A2A receptor stimulation promotes Wnt/β-catenin signalling activation in osteoblasts and in long bones, consistent with the role of A2A receptors in bone homeostasis.

Mediero et al. (2013). Trends Endocrinol Metab. 24:290–300.

Regard et al. (2012). Cold Spring Harb Perspect Biol, 4.