A211 **PPAR β REGULATES BONE-METABOLISM BY FACILITATING WNT-SIGNALLING**

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Background Peroxisome proliferator-activated receptors (PPARs) act as key factors during the regulation of fat and glucose metabolism. In addition, the PPAR γ isoform has been implicated as major catabolic regulator of bone homeostasis in mice and humans.

Materials and methods By using PPAR β -specific agonists and PPAR β -deficient mice, the authors analysed the role of PPAR β in osteoblasts and bone homeostasis in vitro and in vivo.

Results Here the authors describe a novel role of its family member PPAR β as anabolic regulator of bone. In contrast to PPAR γ , PPAR β acted in a permissive manner on Wnt-signalling in osteoblasts. Activation of PPAR β induced expression of the Wnt-co-receptor LRP5, promoted nuclear accumulation of β -catenin and consequently enhanced TCF-driven transcriptional activity. Thereby, PPAR β augmented expression of different Wnt-dependent genes, such as *osterix* and *osteoprotegerin (opg)*, in osteoblasts. Consequently, activation of PPAR β in osteoblasts blocked the differentiation of bone-resorbing osteoclasts. Mice deficient in PPAR β , displayed reduced Wnt-signalling activity and low serum levels of OPG associated with increased differentiation of osteoclasts and osteopenia. Conversely, pharmacological treatment with PPAR β -specific agonist blocked the formation of osteoclasts in vivo and protected mice from ovariectomy-induced bone loss.

Conclusion These data reveal a so far unrecognised role of PPAR β in the crosstalk between energy metabolism and bone homeostasis and highlights its potential to serve as a target for the treatment of osteoporosis.