



CFAO GRADUATE STUDENT POSTERBOARD ABSTRACTS

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Dexamethasone regulates gene expression induced by the mechanosensitive P2X7 receptor in osteoblasts

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Abstract

Orthodontic tooth movement involves activation of osteoblasts and osteoclasts in response to mechanical forces. Extracellular nucleotides, released in response to mechanical stimuli, signal through P2 receptors in osteoblasts. P2X7 receptors are ATP-gated cation channels implicated in mechanotransduction in bone. Corticosteroids such as dexamethasone exhibit anti-inflammatory effects and their chronic use has been linked to serious side-effects such as osteoporosis. We investigated gene expression following P2X7 receptor activation with benzoylbenzoyl-ATP (P2X7 receptor agonist) in osteoblast precursor cells in the presence or absence of dexamethasone. We hypothesized that dexamethasone inhibits the ability of ATP to stimulate the expression of anabolic (bone forming) genes in osteoblasts. We showed that benzoylbenzoyl-ATP stimulation of *Ptgs2* and *Dmp1* expression is indeed inhibited by dexamethasone. Thus, intracellular events following activation of P2X7 may be important in regulating osteoblast differentiation, maturation and eventual bone formation during orthodontic tooth movement. Dexamethasone may adversely affect these processes.