SUMMARY: Osteoporosis causes >8.9 million fractures annually worldwide, resulting in a fracture every 3 seconds, a >40% lifetime fracture risk and >20% mortality in the first year after a hip fracture. Osteoporosis is associated with increased bone resorption and decreased bone formation. Current treatments are mostly based on anti-catabolic inhibition of bone resorption but exhibit significant limitations such as moderate efficacy or high cost, as well as side effects including osteonecrosis of the jaw and renal toxicity. Thus, anabolic therapy that boosts bone formation is urgently needed. We have identified two receptors as novel therapeutic targets for the anabolic treatment of bone degenerating diseases such as osteoporosis. Using a series of mouse genetic and pharmacological models, our extensive in vivo and in vitro experiments combining gain- and loss-of-function approaches show that inhibition of one receptor (A) or activation of the other receptor (B) both effectively increase bone formation and bone mass via distinct mechanisms. Importantly, these two receptors have already been intensively investigated by several pharmaceutical companies such as GSK and Merck for the treatment of a completely different disease. Thus, small molecules targeting these two receptors are already available, some of which are currently in Phase III clinical trials. Moreover, the pharmacological properties and toxicity profiles of these drug candidates may have already been investigated. It would be exciting to determine whether these existing drug candidates can prevent and treat osteoporosis, as well as to develop new compounds and delivery strategies to target these two receptors for the anabolic treatment of bone loss.

Please contact the Office for Technology Development for more details:

Phone: 214-648-1888
Email: TechnologyDevelopment@utsouthwestern.edu

Please reference UT Southwestern Case Number: 2717