The epigenetically active small chemical N-Methyl Pyrrolidone (NMP) prevents estrogen depletion induced osteoporosis

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Results
- NMP reverses OVX-induced weight gain
- The changes in bone markers were reversed by NMP
- NMP induces bone mineral apposition in OVX
- NMP treatment decreases ovariectomy-induced bone resorption
- NMP treatment prevents trabecular architecture modifications induced by ovariectomy

Background
Osteoporosis is a chronic, skeletal disease highly prevalent in post-menopausal women influenced by hormonal factors causing a huge burden on health care in an aging society. We previously demonstrated that NMP is a bioactive drug which enhances bone regeneration in vivo and acts as an enhancer of bone morphogenetic protein (BMP) in vitro. NMP also inhibits osteoclast differentiation and attenuates bone resorption.

Conclusions
NMP has a remarkable anti-osteoporotic activity, and may be a promising candidate for treatment of postmenopausal osteoporosis induced by estrogen deficiency.

Methods
We want to show in vivo relevance of NMP by studying bone markers, inflammatory cytokines and bone quality in a preclinical osteoporosis model (ovariectomized rat mode). Female Sprague-Dawley rats with an approximate weight of about 230g were randomly divided into sham-operated group (Sham) and three ovariectomized subgroups as OVX (control) and NMP-treated OVX. Rats were treated weekly by i.p. injections.