

Treatment with r-irisin prevents and recovers disuse-induced bone loss and muscle atrophy

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Irisin is a hormone-like myokine secreted from skeletal muscle in response to exercise. We previously showed that treatment with recombinant Irisin (r-Irisin) in healthy mice improved cortical bone mass and geometry, supporting the idea that Irisin recapitulates some of the most important benefits of physical exercise on the skeleton and plays protective role on bone health (1). Here we show that treatment with r-Irisin prevented bone loss in hind-limb suspended mice when administered during suspension and induced recovery of bone mass when mice were injected after bone loss due to a suspension period of 4 weeks. MicroCT analysis of femurs showed that r-Irisin preserved both cortical and trabecular bone mineral density, and prevented the dramatic decrease of the trabecular bone volume fraction. Moreover, r-Irisin inhibited muscle mass decline during unloading, keeping proper fiber cross-sectional area. Notably, the decrease in myosin type II expression (MyHC II) in vastus lateralis of unloaded mice treated with r-Irisin was completely prevented. Our data reveal that r-Irisin treatment protects from disuse induced bone loss and muscle atrophy in mice. If these results will translate to humans, they may support a promising clinical strategy for the prevention and treatment of both osteoporosis and sarcopenia, particularly applicable to those patients who cannot perform physical activity, as occurs during aging, immobility and microgravity during space flight missions.

References

[1] Colaianni G et al. Proc Natl Acad Sci U S A. 2015 Sep 29;112(39):12157-62.