# Summary of: Dietary countermeasure mitigates simulated spaceflight-induced osteopenia in mice

Key findings and quantitative results:

**Bone Loss Induced by Spaceflight:** - **Hindlimb Unloading (HU):** HU caused significant bone loss in both cancellous and cortical cancellous bones of the tibia and L4 vertebrae. - **Total Body Irradiation (IR):** IR caused a 20% decrease in BV/TV and a 7% increase in Tb.Sp in cancellous bone. - **Combined HU and IR:** HU and IR caused a 5% decrement in BV/TV and a 9% increase in Tb.Sp.

**Dried Plum Diet (DP) Effects:** - **Prevention of Bone Loss:** DP prevented most of the simulated spaceflight-induced damages to both the appendicular and axial skeleton. - **Bone Loss Mitigation:** DP prevented HU-induced bone loss in the tibia and L4 vertebrae. - **Trabecular Thickness:** DP prevented HU-induced trabecular thinning. - **Trabecular Separation:** DP prevented HU-induced trabecular separation. - **Trabecular Thickness:** DP prevented HU-induced trabecular thickness reduction. - **Trabecular Number:** DP prevented HU-induced trabecular number reduction. - **Total Vertebral Body Bone Volume Fraction (Tt.BV/TV):** DP prevented HU-induced Tt.BV/TV reduction. - **Total Vertebral Body Trabecular Thickness (Tt.Tb.Th):** DP prevented HU-induced Tt.Tb.Th increase. - **Total Vertebral Body Trabecular Number (Tt.Tb.N):** DP prevented HU-induced Tt.Tb.N increase. - **Total Vertebral Body Trabecular Separation (Tt.Tb.Sp):** DP prevented HU-induced Tt.Tb.Sp increase.

**Mechanical Properties:** - **Maximum Load:** DP prevented HU-induced decrease in maximum load. - **Stiffness:** DP prevented HU-induced decrease in stiffness.

**Osteoblastogenesis:** - **Osteoblast Colony Counts:** DP prevented HU-induced decrease in osteoblast colony formation. - **Osteoblast Mineralization:** DP prevented HU-induced decrease in osteoblast mineralization.

**Conclusion:** - **Dried Plum Diet (DP) as a Countermeasure:** DP effectively mitigates the detrimental effects of HU and IR on bone microarchitecture and mechanical properties. - **Mechanisms:** DP's protective effect is attributed to its antioxidant capacity, which prevents oxidative stress, inhibits osteoclastogenesis, and promotes osteoblastogenesis. - **Long-term Effects:** Further studies are needed to determine the efficacy of DP for long-term space missions beyond LEO.