

Evaluation of MHB3TM on the Development of Osteopenia

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Background: Osteopenia is a common bone loss condition preceding frank osteoporosis, and is often associated with estrogen depletion. N-terminal collagen peptides in serum are increased with osteopenia. Elisa analysis of elevated collagen peptide levels using monoclonal antibodies to detect the peptides is used clinically to measure response to bone building medications and is an accepted measure of osteopenia. Endogenous hyaluronan with particular molecular characteristics is now considered to play a role in the regulation of bone physiology. The effects of oral MHB3 (modified hyaluronan) supplementation on bone loss were investigated in an established model of osteopenia using ovariectomized (OVX) female rats.

Methods: Female Sprague Dawley rats (N=25) were purchased from Charles River Laboratories. Three (3) rats served as untreated weight controls. Seventeen (17) rats received bilateral OVX and were randomized into 2 groups. The OVX placebo (PBS) group (N=5) was gavaged with physiological saline 5 days/week, the OVX treatment group (N=12) was gavaged with 1.0 mg MHB3/kg 5 days/week. Five (5) rats received sham surgeries and were gavaged 1 x PBS 5days/week. Blood (0.3 ml) was drawn from rats' tail veins 3 days prior to commencing gavage and at D26 and D54. Blood was centrifuged and the resulting sera was immediately stored at -20°C. Peptide levels were measured using a competitive-inhibition enzyme-linked immunosorbent assay for qualifying serum collagen N-terminal peptides (Osteomark NTx kit). Assays were performed according to the manufacturer's instructions.

Results: No animals were lost during the study and no clinical signs of morbidity were observed. By D14, PBS OVX animals had gained significantly more weight than PBS Sham animals. MHB3 treated animals exhibited the same weight gain as PBS control animals. Serum collagen levels in PBS sham, PBS OVX, and MHB3 OVX animals were analyzed at D26 and D54. Serum collagen peptide levels at D26 were similar in all three groups suggesting that significant bone loss had not yet occurred. However by D54 serum collagen peptide levels had significantly increased in PBS OVX animals compared to PBS sham. Micro-CT scans confirmed that significant bone loss had occurred at this time. MHB3 OVX animals also exhibited serum peptide levels that were significantly less than PBS-OVX animals suggesting a protective effect of MHB3 in osteopenia.

Conclusion: MHB3 administered 5 days/week by oral gavage significantly reduces the development of osteopenia associated with estrogen depletion, as detected by levels of N-terminal collagen peptides in serum.

Disclosures: Authors have no disclosures to declare.