

Evaluation of MHB3™ hyaluronan's Effects on Molecular Weight of Circulating Hyaluronan

E. A. Turley Phd., Department of Biochemistry; Department of Oncology, London Health Sciences Centre, University of Western Ontario, London, Ontario, Canada

Background: High molecular weight (HMW) hyaluronan plays a vital role in many biological processes such as tissue hydration, proteoglycan organization, cell differentiation, proliferation and angiogenesis. Hyaluronan plays a fundamental role in tissue repair processes, especially in the first stages of the process of granulation tissue, by stabilizing the coagulation matrix and controlling its degradation, favoring the recruitment of inflammatory cells, such as polymorphonucleocytes and monocytes of mesenchymal cells such as fibroblasts and endothelial cells, and directing the subsequent migration of epithelial cells. The effects of an orally administered exogenous hyaluronan biopolymer (MHB3, Cogent Solutions Group) on the molecular weight of serum hyaluronan were investigated.

Method: Sprague Dawley rats (n=16) purchased from Charles River Laboratories were randomized into 2 groups. The placebo (PBS) group (n=8) were gavaged with physiological saline 5 days/week, the treatment group (n=8) were gavaged with 1.0 mg/kg 5 days/week with MHB3. Blood (0.3 ml) was drawn from tail veins at day 26, centrifuged and the sera immediately stored at -20C. Serum fractions and molecular weight standards were applied to a Sephadex G-200 column and .5 ml fractions collected. The void volume was detected using dextran blue (10⁶ Daltons) and the included volume was determined using methylene blue (200 Daltons). Serum albumin (60,000 Daltons) and Dextran blue (200,000 Daltons) were also used as reference standards. Two separate columns were used. Hyaluronan present in the fractionated serum was detected using an Echelon Hyaluronan Enzyme-Linked Immunosorbent Assay Kit (HA ELISA, Echelon). Assays were conducted according to the manufacturer's instructions.

Results: No animals were lost during the study and no clinical signs of morbidity were observed. Treatment had no effect on appetite, weight gain, or activity level.

Conclusion: MHB3 administered 5 days/week by oral gavage increased the size distribution of hyaluronan in the plasma. Specifically, the proportion of hyaluronan that is high molecular

weight – anti-inflammatory – is increased, and the proportion of hyaluronan that is low molecular weight – pro-inflammatory – is decreased. The fundamental mechanism underlying these findings remains to be elucidated, but the findings are consistent with earlier studies showing similar benefits with injected hyaluronan. This is the first controlled study of an oral biomacromolecule demonstrating an increase in circulating high molecular weight hyaluronan.

Disclosures: Author has no disclosure to declare.