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Potential of pomegranate and its derivatives for the prevention of bone loss in a preclinical mice model of postmenopausal osteoporosis

Mélanie Spilmont\textsuperscript{1,2,3,6}, Laurent Léotoing\textsuperscript{1,2,3}, Marie-Jeanne Davicco\textsuperscript{1,2,3}, Patrice Lebecque\textsuperscript{1,2,3}, Elisabeth Miot-Noirault\textsuperscript{4,5}, Laurent Rios\textsuperscript{6}, Yohann Wittrant\textsuperscript{1,2,3}, Véronique Coxam\textsuperscript{1,2,3*}

\textsuperscript{1}INRA, UMR 1019, UNH, CRNH Auvergne, F-63009 Clermont-Ferrand, France
\textsuperscript{2}Equipe Alimentation, Squelette et Métabolismes
\textsuperscript{3}Clermont Université, Université d'Auvergne, Unité de Nutrition Humaine, BP 10448, F-63000 Clermont-Ferrand, France
\textsuperscript{4}Clermont Université, Université d’Auvergne, Imagerie moléculaire et thérapie vectorisée, BP 10448, F-63000 Clermont-Ferrand, France
\textsuperscript{5}Inserm, U 990, F-63000 Clermont-Ferrand, France
\textsuperscript{6}GREENTECH SA Biopôle Clermont-Limagne 63360 Saint-Beauzire – France

PURPOSE: Recently, nutritional and pharmaceutical benefits of pomegranate (PG) have raised a growing scientific interest. Since PG is endowed with anti-inflammatory and antioxidant activities, we hypothesized that it may have beneficial effects on osteoporosis.

METHODS: We used ovariectomized (OVX) mice as a well-described model of postmenopausal osteoporosis to study the influence of PG consumption on bone health. Mice were divided into five groups as following: two control groups sham-operated and ovariectomized (OVX CT) mice fed a standard diet, versus three treated groups OVX mice given a modified diet from the AIN-93G diet, containing 5.7 % of PG lyophilized mashed totum (OVX PGt), or 9.6 % of PG fresh juice (OVX PGj) or 2.9 % of PG lyophilized mashed peel (OVX PGp).

RESULTS: As expected, ovariectomy was associated with a decreased femoral bone mineral density (BMD) and impaired bone micro-architecture parameters. Consumption of PGj, PGp, or PGt induced bone-sparing effects in those OVX mice, both on femoral BMD and bone micro-architecture parameters. In addition, PG (whatever the part) up-regulated osteoblast activity and decreased the expression of osteoclast markers, when compared to what was observed in OVX CT animals. Consistent with the data related to bone parameters, PG consumption elicited a lower expression of pro-inflammatory markers and of enzymes involved in ROS generation, whereas the expression of anti-inflammatory markers and anti-oxidant actors was enhanced.

CONCLUSION: These results indicate that all PG parts are effective in preventing the development of bone loss induced by ovariectomy in mice. Such an effect could be partially explained by an improved inflammatory and oxidative status.