

The impact of *Akkermansia muciniphila* on bone health

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Keywords: Intestinal microbiota, Bone mineral density, Probiotic

Background: Osteoporosis is characterized by a slow deterioration in bone mass and disruption of its structure and metabolism, leading to an increased risk of bone fractures. The microbiota plays an important role in the transport and absorption of nutrients needed for bone growth and regeneration. Studies have shown that *Akkermansia muciniphila* has an important role in metabolic disorder preventing, through variety of biological activities. The aim of current study was the evaluation of *A.muciniphila* abundance in osteoporosis and healthy controls.

Methods: A total of 36 subjects including 8 with osteoporosis, 8 with osteopenia, and 20 normal controls were selected. Fresh stool samples were collected and microbial genome was extracted. The bacterial loads in the fecal sample was determined by real-time PCR using 16S rRNA specific primers. Finally, the bacterial load of *A.muciniphila* was calculated using standard curves at different concentrations of standard *E.coli*.

Results: There were significant differences in terms of age, T-score, Z-score and menopause among groups (P -value < 0.05). The results showed that the presence of *A.muciniphila* was higher in the healthy group and the lowest in the Osteopenia group but this difference was not significant (P -value = 0.596, 0.930).

Conclusion: The results of the present study showed that the rate of *A.muciniphila* may related to bone health and could be considered as a next generation probiotic for the prevention or treatment of osteoporosis and bone health. Further *in vivo* and *in vitro* studies are needed to investigate the immunological, biochemical, and metabolic pathways that *A.muciniphila* may be associated with bone health.