

Modulation of microbioma and antiangiogenic effect of a new nanoformulation of calcium phosphate associated to natural compounds

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Abstract

The use of amorphous calcium phosphate nanoparticles (ACP NPs) allows the incorporation of different molecules including some of natural origin such as esculetin and euphorbetin extracted from *Euphorbia lathyris* seeds. The use of these nanocomplexes *in vivo* not only has an antitumor effect but also appears to have a preventive effect on colon cancer. *In vivo* studies with mouse models in which cancer was induced by chemical methods demonstrated a significant reduction in tumor generation and polyp size. Interestingly, the use of nanoformulations demonstrated a potent effect on the development of tumor vasculature and invasion of normal tissue. This finding may be very interesting since it is related to tumor angiogenesis, a phenomenon that induces tumor growth. Furthermore, treatment increased the bacterial population of *Akkermansia* by restoring antioxidant systems in the colonic mucosa of mice. This effect indicates that the use of the nanoformulation could modify the microbiome *in vitro* which could induce a protective effect in patients. At present, tests are being carried out to determine their genotoxicity and possible effect on micronuclei. These results show a promising pathway to design innovative and more efficient therapies against CRC based on biomimetic calcium phosphate NPs loaded with natural products..

References

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Figures

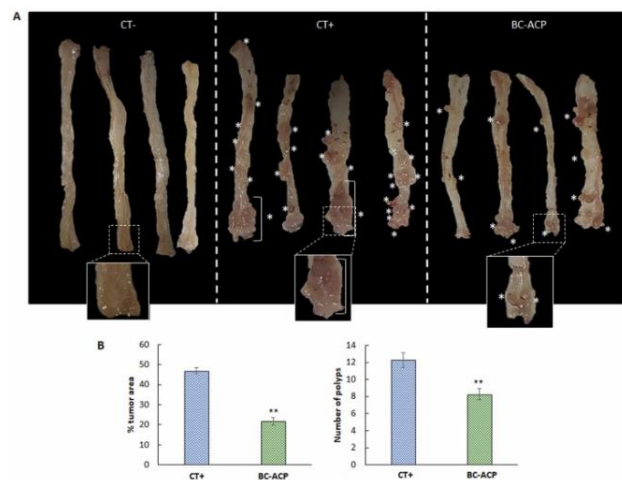


Figure 1. *In vivo* treatment with BC-ACP using the AOM/DSS model of CRC. (A) Representative macroscopic images of dissected colon (four mice) after complete treatment with BC-ACP. Polyp formation is marked with asterisks. (B) Graphical representation of the number of polyps and percentage of tumor area in the colon of the groups treated with BC-ACP and the untreated group (CT+). Data are presented as mean \pm standard deviation ($n = 14$). (**) Significant inhibition of tumor growth, treatment vs control ($p < 0.01$).

