

Zinc induces the enhancement of phagocytic capacity of canine peripheral blood phagocytes *in vitro*

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Introduction: Zinc is a trace element and plays a central role in the immune system. Zinc can stimulate peripheral blood mononuclear cells (PBMC) to increase the immune function. In the present study, we examined the effect of zinc on the phagocytic capacity of canine peripheral blood phagocytes.

Materials and Methods: Male, clinically healthy three Beagle dogs born from the same mother, ages of approximately 3 years, were used as blood donors. PBMC and polymorphonuclear cells (PMN) were isolated by Histopaque solution (specific gravity, 1.077; Sigma-Aldrich Co.) and 1.5% dextran (molecular weight, 200,000; Wako Ltd., Osaka, Japan) treatment. The phagocytic capacity of phagocytes were analyzed by flow cytometry.

Results: Zinc did not show any direct effect on the phagocytic capacity of polymorphonuclear cells (PMN) and PBMC. But it enhanced directly the phagocytic capacity of monocyte-rich cells fractioned by cell size from dot plot profile of PBMC in flow cytometric cytography. The phagocytic capacity of PMN and monocyte-rich cells but not PBMC was remarkably enhanced by culture supernatant from PBMC but not PMN treated with zinc sulfate. Their capacity was also enhanced by recombinant canine (rc) tumor necrosis factor- α (TNF- α). Anti-rcTNF- α polyclonal antibody (pAb) neutralized the enhanced phagocytic capacity of PMN and monocyte-rich cells by culture supernatant from PBMC treated with zinc.

Relevance: These findings indicate that zinc stimulate PBMC to produce TNF- α , which enhanced the phagocytic capacity of canine peripheral blood phagocytes. Therefore, zinc is able to enhance the immune function on canine peripheral blood phagocytes *in vitro*.

Key words: zinc, phagocytes, peripheral blood mononuclear cells, tumor necrosis factor- α , dog.

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