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Trans-10, *Cis*-12 Conjugated Linoleic Acid Modulates Phagocytosis of Canine Peripheral Blood Polymorphonuclear Cells Immunosuppressed by Methylprednisolone Sodium Succinate

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We previously reported that *trans*-10, *cis*-12 conjugated linoleic acid (t10c12-CLA) has an immunostimulating effect on peripheral blood mononuclear cells and macrophages *in vitro*. Glucocorticoids especially result in impaired neutrophil function in humans, but this has not been documented in dogs. In the present study, we examined whether *in vitro* treatment with *trans*-10, *cis*-12 conjugated linoleic acid (t10c12-CLA) restores the phagocytic capacity and oxidative burst activity (OBA) of polymorphonuclear cells (PMNs) exposed to methylprednisolone sodium succinate (MPSS). The design of the experimental protocol involved the application of a high dose of MPSS, which is the recommended protocol for patients with acute spinal cord injury. To evaluate PMNs function, blood was collected before (0 hour) and 2, 12, and 24 hours after intravenous infusion of MPSS. The isolated PMNs were incubated with t10c12-CLA alone or t10c12-CLA in combination with *N*-acetylcysteine (NAC), an anti-oxidant agent. The carboxylate-modified polysterene fluorescent microspheres were used to evaluate phagocytic capacity. Assays for OBA were based on the conversion of nonfluorescent dihydrorhodamine 123 into fluorescent rhodamine 123 under the influence of reactive oxygen species. The phagocytic capacity and OBA were measured simultaneously by a flow cytometry. The phagocytic capacity and OBA of PMNs were suppressed by intravenous infusion of MPSS, and recovered 12 hours after the completion of dosing. *In vitro* treatment with t10c12-CLA enhanced the phagocytic capacity and OBA of both MPSS-suppressed and naive PMNs. The effects of t10c12-CLA on OBA were observed only when phagocytosis was stimulated by the microspheres. NAC attenuated the stimulatory effects of t10c12-CLA. These results suggest that t10c12-CLA can directly enhance the phagocytic capacity and OBA of both immunosuppressed and naive PMNs, and that this effect may involve t10c12-CLA-induced generation of reactive oxygen species.

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