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Effect of medium chain triglycerides in the cognitive capacity of adult dogs

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The long-life expectancy of dogs has made researchers look for methods to improve dog's cognitive capacity. As well as humans, dogs use glycose as the main substrate for the brain activities. Although, their physiological capacity to use glycose reduces with age. Also, in certain physiological stages (e.g. fasting) the brain uses ketone bodies - which are formed by fat - as an energy source. Medium chain triglycerides (MCT) are the most efficient fat to produce ketosem, and its inclusion in the diet improves the cognitive capacity of old dogs (Pan et al., 2010). The study was conducted in Laboratório de Ensino Zootécnico facilities. Eight adult healthy Beagle dogs (4 male and 4 female) were separated in two treatments (control and MCT) in an incomplete balanced latin square design. Dogs were kept in stainless steel cages with dimensions 80 x 70 x 90 (height x wide x depth) in a temperature and light controlled room Dogs had water provided *ad libitum*. They were fed twice a day according to their daily maintenance energy requirement. During the day, dogs stayed in an interaction lawn area (808.5 m^2). Dogs were fed a commercial diet for adult dogs with 100% of poultry fat as the energy source in control treatment. The second treatment was the control diet with MCT (replacement of 50% poultry fat by 50% MCT). The experiment was conducted in two phases of 30 days with 10 days of adaption before each phase. The cognitive capacity was evaluated using an adaptation on the Wisconsin General Test Apparatus (Fox, 1971), which is a wood box made according to Beagle size with two guillotine doors and a space to leave the treats. On this test, the animal has to choose the correct door to get the treat. If the dog tries the wrong door it closes. The doors are controlled by an evaluator invisible to the dogs. The dogs were evaluated twice a day (8:30 am and 8:30 pm). They had to try ten times to take the treats. Then, we evaluated the frequency of right choices and determine if they had learned. On the last day, four blood samples were collected from each dog every 12 hours (0, 12, 24, 36) to evaluate ketone bodies (BHB) production. The results were analyzed as measures repeated over time using PROV ANOVA on Minitab v. 18. When significant, averages were compared using Tukey's test ($P < 0,05$). Comparing the frequency of right and wrong choices, no significant differences were observed between control and MCT treatments ($P > 0,05$). Also, analyzing the blood samples collected at the end this experiment, it was possible to observe that the quantity of MCT added in the diet was not enough to increase BHB production ($P < 0,05$). Pan et al. have observed significant effects on the cognitive capacity and serum BHB after eight months using MCT diets, which can suggest that MCT may help the cognitive capacity after long periods. We conclude that the addition of MCT in the diet did not affect the quantity of right and wrong choices. Ketone bodies production was not affected as well. The short adaption and experiment time could have contributed to these results. For that, we suggest that long time or higher inclusion experiments may be done to evaluate the MCT effect on the cognitive capacity of adult dogs.