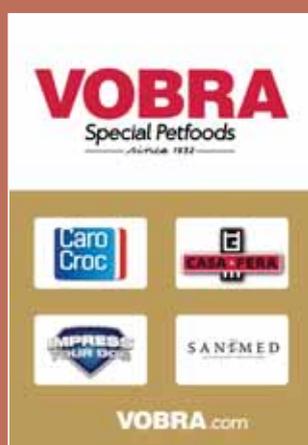




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Brain food for aged dogs

Aging in dogs is associated with a decline in cognitive abilities, including learning and memory. Many animals over 7 years of age develop degenerative brain disease. The resulting aberrant behavior includes five categories: impaired sense of direction, loss of interaction with family members, disturbances in sleep, inappropriate toileting and restlessness.

The package of a health food reads: “With enhanced botanical oils shown to promote alertness and mental sharpness in dogs 7+, with visible results within 30 days.” For a medical food, available through veterinarians, the manufacturer claims that it “is clinically proven nutrition to help fight age-related behavior changes in older dogs.” The two brain foods contain distinctive ingredient blends that are thought to oppose oxidative damage and enhance energy supply in brain cells.

The impact of dietary ingredients and supplements on cognitive function in aged dogs has been evaluated with the use of various laboratory tests. All tests use a food reward to motivate dogs to learn the tasks. Diet-induced learning makes dogs push sooner, with their snouts, objects away from a well that contains palatable food.

A laboratory study supports the claim on the health food, but reproducibility is unknown. In aged laboratory dogs, diets comparable to the medical product were effective in about two thirds of the broad span of tests. In pet dogs with clinical cognitive dysfunction, the medical food decreased the severity of only four out of 16 symptoms, while the effect sizes were small.

The studies suggest that current brain foods reduce aging-associated cognitive decline in dogs without symptoms of disease. However, these foods only partly rejuvenate the cognitive level of aged dogs, while brain stimulation by social interaction and environment can be more effective.

Cohort study: design

Milgram et al. (1-7) have performed a series of cognitive tests in a cohort of aged beagles that were housed in pairs and received toys, exercise and regular cognitive testing. Based on baseline tests, two cognitively equivalent dietary groups with mean age of about 10 years were formed. The test food was enriched with antioxidants and mitochondrial cofactors: vitamin E, L-carnitine, DL-alpha-lipoic acid and vitamin C, and flavonoids and



carotenoids in the form of spinach, tomato, grape, carrot and citrus preparations.

All cognitive tests involved a box with front of vertical bars and a sliding tray. Lifting the bars gave the dog inside access to the tray. The experimenter was separated visually by a screen with one-way mirror and a hinged door on the bottom, to be opened for presentation and removal of the tray. The dog's task was to learn and remember which object covered the food reward in one of the three wells in the tray. Outcome was the number of errors to meet a pre-set criterion level of success.

Tests and results

Upon dietary intervention, the dogs were followed for about three years by successive

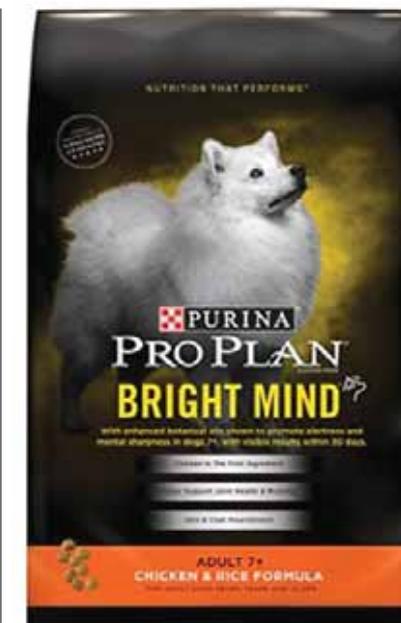
testing. In various types of landmark discrimination tests, the reward was always under the object closest to the landmark. In oddity discrimination tests, the odd object was baited. Other tests rewarded successful distinguishing of size, color (black or white) or contrast, or responding to the object in a non-matching location. In some tests, the mock objects were scented with the reward to exclude olfactory cues.

The aged beagle dogs underwent learning tasks that were acquired more rapidly by young dogs and thus appear sensitive to age-dependent cognitive impairment. This concerns 22 tasks of six types. A meaningful dietary effect on learning may be put arbitrarily at more than 25% lowering of the group-mean number of errors to the test's success criterion. The test diet was then found effective in 15 tasks.

Shorter studies

Aged dogs were fed a diet without or with extra vitamins E and C, carnitine and lipoic acid for up to 40 days (8). The enriched food improved performance in two out of three landmark tasks. In a blinded study, aged dogs received capsules with methylcellulose or acetyl-L-carnitine plus lipoic acid for two months (9). The latter substances reduced errors in two landmark tests, but not in a non-matching location task. Cognitive testing (8, 9) was done as described above.

Feeding a dry diet containing 5.5% medium-chain triglycerides (MCT) instead of tallow reduced the mistakes made by aged dogs in landmark and reversal learning tasks (10). Ingestion of whole-cell micro-algae improved both oddity and contrast discrimination in aged dogs (11, 12). Reproducibility of the MCT and algae effects remains to be shown. A cross-over study involved a preparation containing phosphatidyl serine (13), but the data were improperly analysed.



Clinical studies

A double-blind efficacy study (14, 15) compared a consumer brand with a prescription diet similar to the formula used in the cohort study. Cognitively-impaired, aged dogs with clinical signs in at least two of the five categories were enrolled. Owners scored the severity of 16 attributes on a 1-4 scale. The score changes over 60 days for test (n = 61) and reference (n = 64) dogs differed only significantly (P<0.05) in four attributes and the mean, placebo-corrected amelioration was only 0.26 units.

In a double-blind, placebo-controlled trial, a multicomponent supplement improved two out of six owner-assessed behaviors in dogs with clinical cognitive dysfunction (16). Another preparation was used in open, non-controlled trials (17, 18).

List of references is available on request from the author (beynen@freeler.nl)

Dr Anton C Beynen writes this exclusive column on dog and cat nutrition every month. He is affiliated with Vobra Special Petfoods.