

Protecting Cognition in Aging Cats

As cats age, changes take place in the brain that may impair memory, learning and other cognitive functions. Physical changes include loss of neurons, deterioration of myelin, and atrophy of some brain regions¹⁻³. Other changes include chronic inflammation, decreased vascular perfusion, oxidative damage by free radicals, and reduced energy metabolism¹⁻³.

Some of these changes, such as atrophy and neuronal loss, are irreversible. Cognitive impairments have been detected in apparently normal cats as early as 6-7 years using standardized, validated cognitive tests^{2,3}. Because these changes in the brain begin long before the behavioral consequences are observed by owners, early intervention can mitigate the damage done by aging¹⁻⁹.

The behavioral changes observed by owners are initially subtle, but can worsen with time and may eventually interfere with day-to-day function and quality of life for both the cat and the owner^{1-3,10}. Behaviors that may be observed include increased anxiety and reduced coping ability; increased vocalization, particularly at night; repetitive behaviors; confusion; social withdrawal, altered social interactions and decreased social flexibility; wandering; reduced ability to navigate environments; changes in sleeping patterns; decreased response to learned commands; reduced ability to predict feeding time; and changes in toileting and feeding behaviors^{1-3,7,11}.

Protecting cognitive function in aging cats can improve the quality of life for cats and preserve the human-animal bond. Environmental enrichment, such as play and food puzzles, can provide mental challenges to keep cats stimulated. Nutrition plays a key role in a holistic approach to protecting the brain from cognitive decline and cognitive dysfunction¹². Dietary modification can mitigate many of the adverse changes associated with an aging brain¹³, particularly when begun at the early, non-symptomatic phases of disease^{7,14}. Feeding the aging pet to preserve brain function involves a number of strategies targeted at the physical and functional changes that take place with age.

Omega-3 Fatty Acids

In particular, the omega-3 fatty acids docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) play critical neuroprotective and anti-inflammatory roles^{12,14-16}. Fish oil provides an excellent source of DHA and EPA¹⁷.

Antioxidants

Vitamin C and Vitamin E are common examples of common antioxidants. Antioxidants include a wide range of substances that scavenge free radicals by either preventing their formation or removing them before they can cause damage¹³. The body produces its own (endogenous) antioxidants^{13,18}; however, endogenous antioxidant capacity decreases with age and the production of free radicals increases with age, causing a dangerous imbalance (oxidative stress). Providing dietary antioxidants may help reestablish the balance and reduce oxidative damage.

B vitamins

Certain B vitamins, especially thiamine (B1), pyridoxine (B6), folate (B9), and cobalamin (B12) are particularly important to neurodevelopment and cognitive function¹⁹⁻²¹. B vitamin deficiency can lead to elevated blood levels of the amino acid homocysteine²¹⁻²⁴, which is a risk factor for cognitive

impairment^{14,19,21,24-26}. B vitamin supplementation reduces the risk of deficiencies and homocysteine accumulation, thereby reducing one of the risk factors for cognitive impairment.

L-Arginine

L-arginine is an amino acid that is metabolized in cells, including neurons, to form nitric oxide (NO). Neural activity during cognitive tasks is highly associated with increases in regional blood flow, which is primarily mediated by NO¹⁴. L-arginine is also metabolized to agmatine, a neurotransmitter²⁷.

Combining nutrients for cognitive health

Combinations of nutrients may provide additive benefits beyond those gained from supplementation with a single nutrient^{24,28-30}. Pan et al²⁸⁻³⁰ investigated the effects of a blend of fish oil, antioxidants, arginine and B vitamins on the cognitive function of aged cats. Cats fed the supplemented diet performed significantly better on three out of four cognitive tests compared to the controls. Cats showed signs of improvement within 30 days of starting the diet and performed significantly better at the end of the nearly one-year study compared to their baseline assessments, whereas the control cats did not. These findings led the investigators to conclude that the combination of nutrients had significant cognitive benefits and may slow age-related decline in cognitive function in normal middle-aged and older cats.

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