



Behavioral and Health Considerations in our Aging Pets

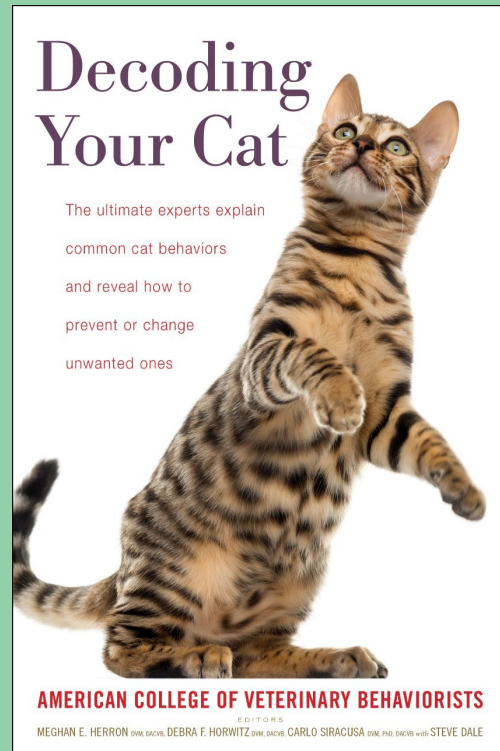
Wailani Sung, MS, PhD, DVM, DACVB



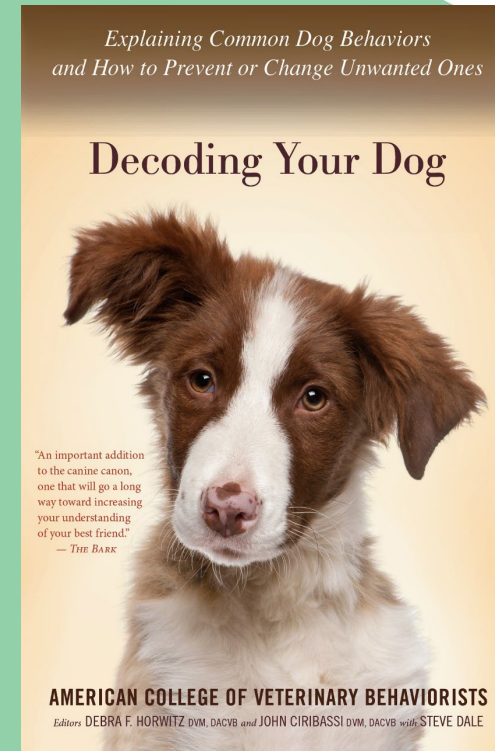
**CVM
Veterinary
Conference**



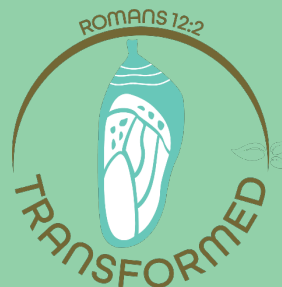
WRITTEN BY THE LEADING EXPERTS FROM THE AMERICAN COLLEGE OF VETERINARY BEHAVIORISTS



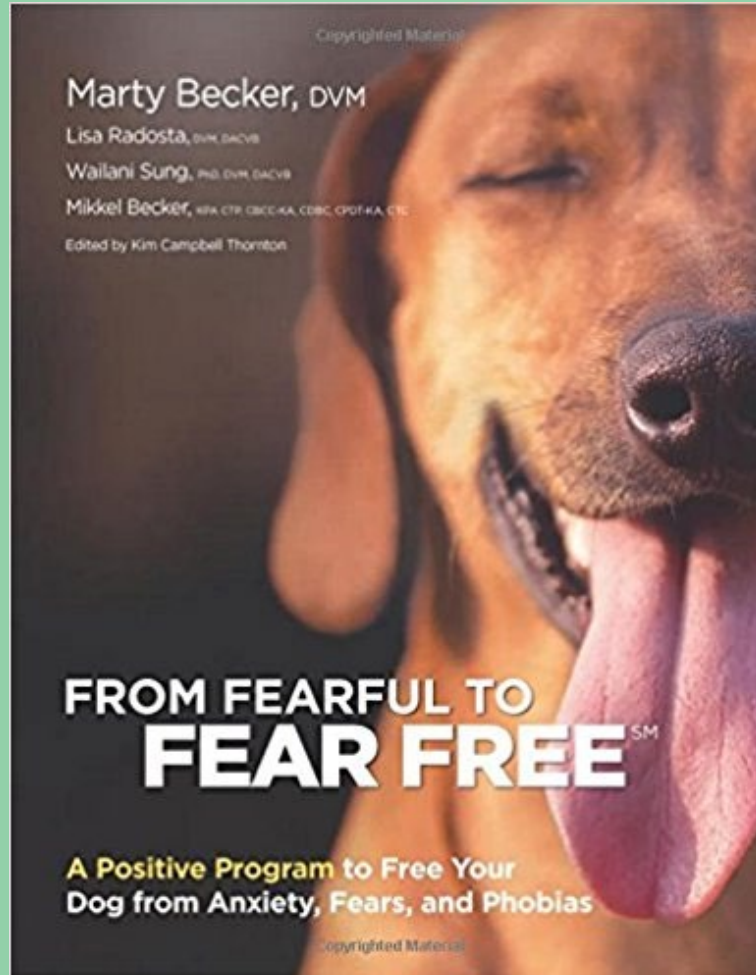
To learn more, visit:
hmhbooks.com/shop/books/Decoding-Your-Cat/9781328489906



To learn more, visit:
hmhbooks.com/shop/books/Decoding-Your-Dog/9780544334601



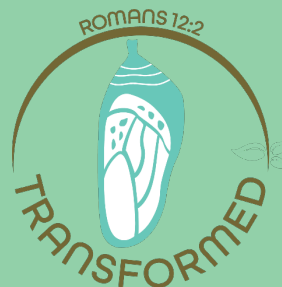
Recommended Reading for Clients & Staff



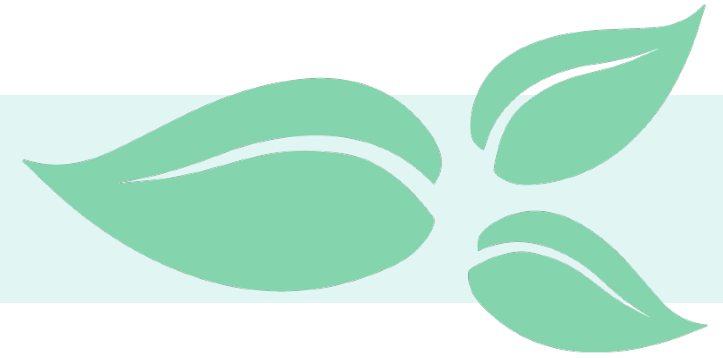
<http://amzn.to/2mCT3ZQ>



Christian
Veterinary Mission



Pet Demographics



- In 2016, 38% of households owned a dog in the U.S.
- 77 millions dogs owned
- Most dogs were obtained from shelters and rescue groups
- Highest pet populations are in CA, TX and FL
- On average, dog owners made 3 visits to their veterinarians per year
- AVMA Pet Ownership & Demographic Sourcebook (2017-18)

What is normal aging in our pets?



- Changes due to aging does not reflect underlying pathology
- There are physical and cognitive changes
- “Successful aging” defined by Salvin et al., 2011 is a rate of cognitive deterioration that does not affect the day-to-day functioning of the individual.

Normal Aging



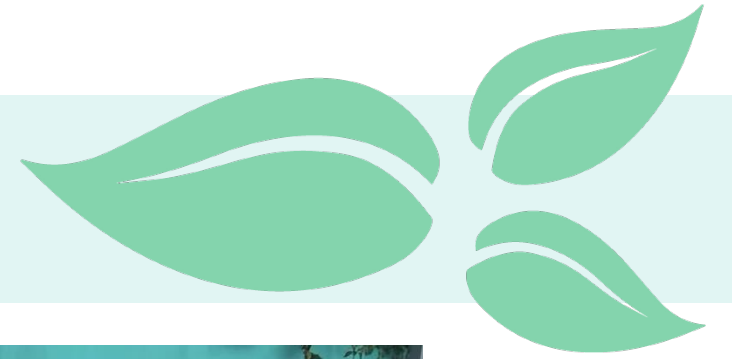
- Changes in ingestive behavior
 - Decreased appetite
 - Periodontal disease
- Musculoskeletal degeneration
 - Decreased activity
- Decrease oral activity
 - Licking/nibbling the owners or companions
 - Decrease interest in social bonds
 - Apathy towards physical stimuli
- Changes in cognition
 - Decline in memory and learning
 - May be related to sensory impairment
- Housesoiling
 - Related to underlying medical condition
 - Being on specific medications



**Christian
Veterinary Mission**



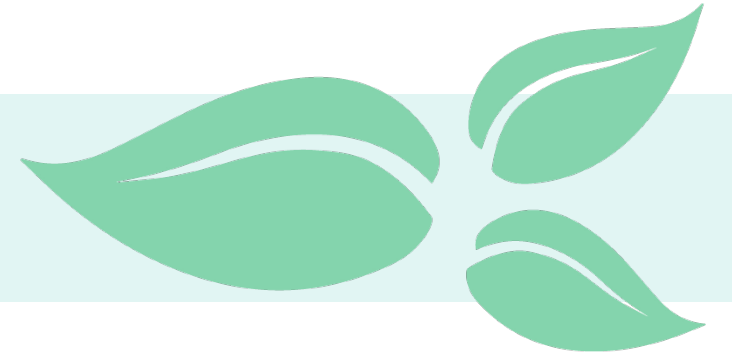
Young dog walking



Christian
Veterinary Mission



Old dog walking



Young cat walking



Christian
Veterinary Mission



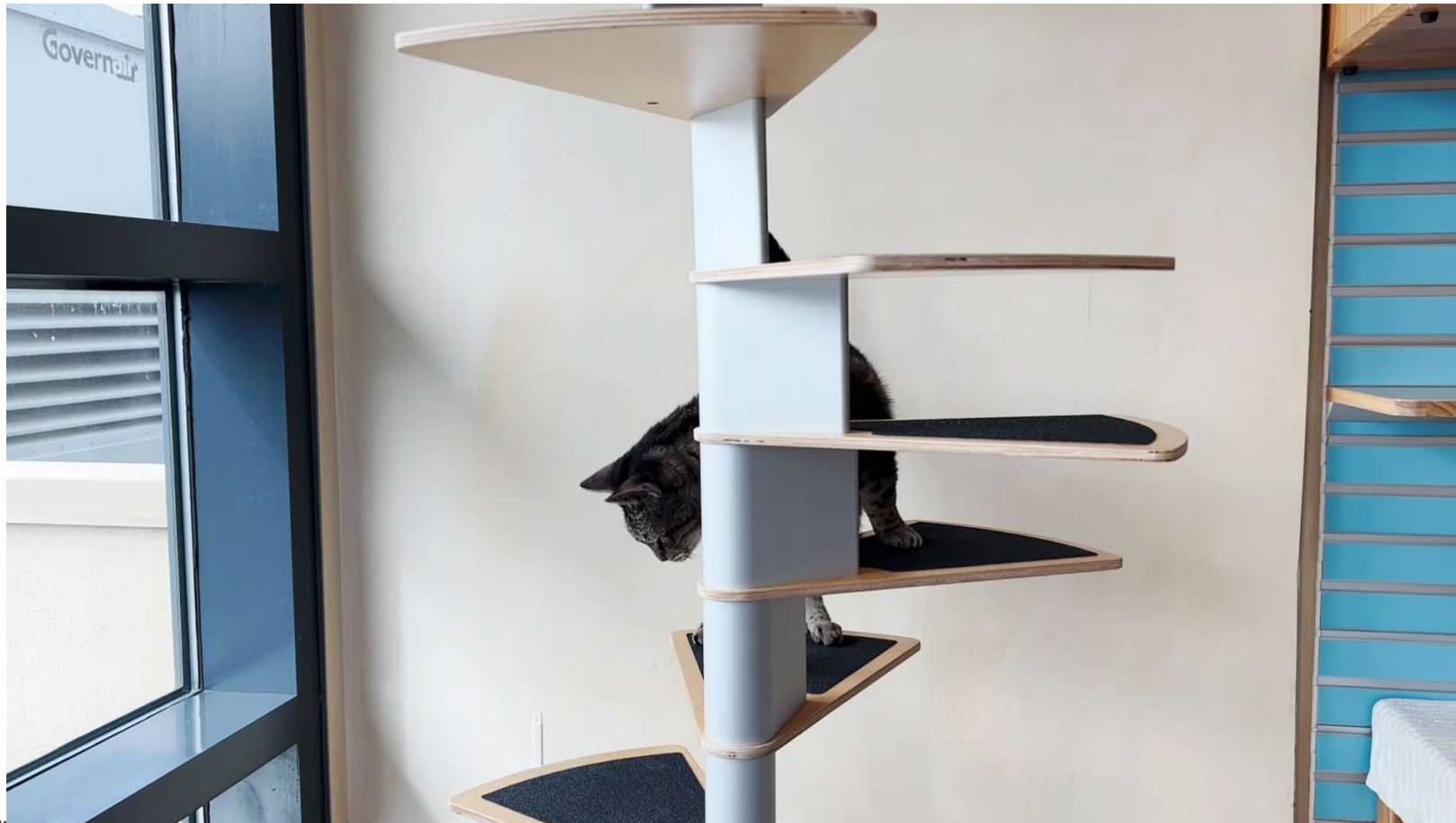
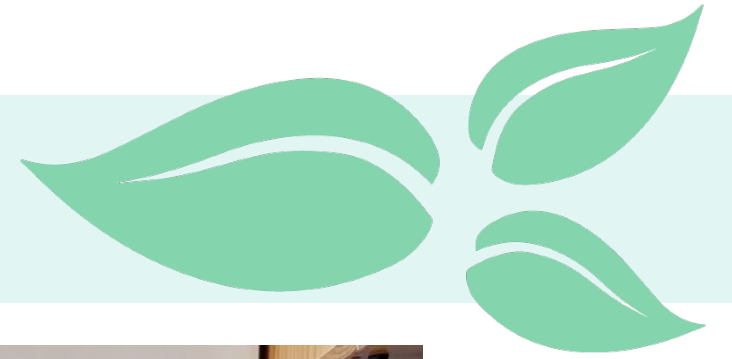
Old cat walking



Christian
Veterinary Mission



Old cat walking

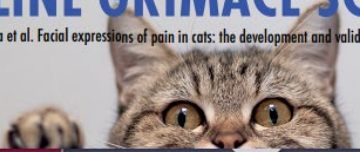


Christian
Veterinary Mission



FELINE GRIMACE SCALE FACT SHEET

Evangelista et al. Facial expressions of pain in cats: the development and validation of a Feline Grimace Scale. Sci Rep 9, 19128 (2019)



WHY?

- Pain-induced behavioral changes are unique in cats and can be subtle

WHAT?

- The Feline Grimace Scale is a simple method of acute pain assessment. It is based on changes in facial expressions and can be easily and quickly performed in the clinical setting
- It differentiates painful and non-painful cats and response to analgesic treatment

HOW?

- There are five action units (AU): ear position, orbital tightening, muzzle tension, whiskers position and head position
- Each unit is scored: 0 (absent), 1 (moderately present) or 2 (present)
- The final score is calculated by the sum of scores divided by the maximum possible scores
- Analgesic treatment is suggested when the final score is 4/10 or 0.4/1.0

WHO?

- The instrument has been developed and validated to be used by veterinarians
- It is currently under testing for use by other veterinary care professionals

WHEN?

- The FGS is used for acute pain assessment in cats with medical, surgical or oral pain, etc.
- Pain assessment should be performed as often as needed and on a case-by-case basis

0 = AU is absent



- Ears facing forward
- Eyes opened
- Muzzle relaxed (round shape)
- Whiskers loose and curved
- Head above the shoulder line

1 = AU is moderately present*



- Ears slightly pulled apart
- Eyes partially opened
- Muzzle mildly tense
- Whiskers slightly curved or straight
- Head aligned with the shoulder line

*The score of 1 can be also given when there is uncertainty over the presence or absence of the AU

2 = AU is markedly present



- Ears flattened and rotated outwards
- Squinted eyes
- Muzzle tense (elliptical shape)
- Whiskers straight and moving forward
- Head below the shoulder line or tilted down (chin towards the chest)

Steagall laboratory
felinegrimacescale@umontreal.ca

Faculté de médecine vétérinaire
Université de Montréal

Access the training manual
bit.ly/FGSmanual



Access the video
bit.ly/FGSvideo

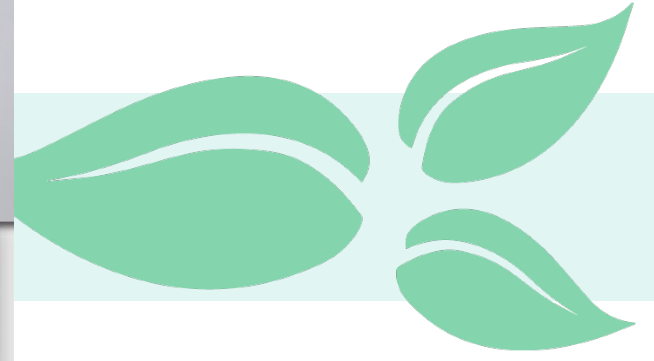


Acknowledgement

zoetis



Christian
Veterinary Mission

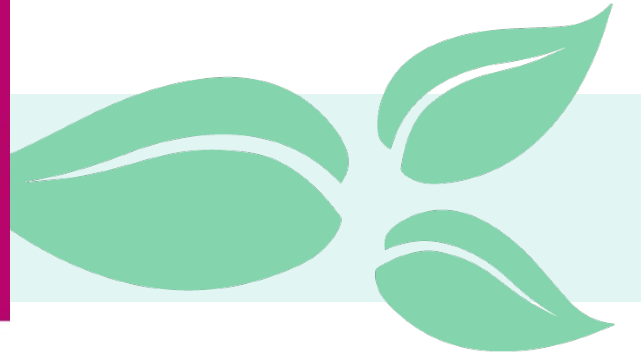




CAT OSTEOARTHRITIS PAIN CHECKLIST

Your Cat's Name: _____

Your Name: _____



Osteoarthritis pain can be a serious health problem for your cat. And cats hide almost everything, especially pain. You know your cat's playful ways and what she loves better than anyone. Changes in these behaviors could be signs of osteoarthritis pain. Your veterinarian relies on you to report changes in your cat's behavior for more accurate diagnoses. If it is found that your cat is showing signs of OA-related pain, helping your cat begins by talking to your vet.

COULD MY CAT HAVE OSTEOARTHRITIS?

This checklist will help your veterinary team identify your cat's activities and behaviors that might be signs of osteoarthritis (OA), a degenerative joint disease that can be painful.

Is your cat showing signs of OA-related pain?

Think about your cat's activity in the past week. Check all of the signs that you've observed in your cat.

JOINT DISEASE

Climbing up stairs: uses 'bunny-hop', with both back legs hopping at same time, and/or stops for a break

JOINT DISEASE

Climbing down stairs: angles body to the side, descends one stair at a time, and/or stops for a break

HEALTHY **JOINT DISEASE**

Chasing moving objects: slows down or takes breaks during play and/or may have thinner frame near the tail

HEALTHY **JOINT DISEASE**

Jumping up: hesitates before jumping up, doesn't clear jumps in one leap, and/or uses arms to pull the legs up

JOINT DISEASE

Jumping down: hesitates before jumping down, makes smaller jumps vs. one big one and/or reaches down towards the ground instead of leaping

HEALTHY **JOINT DISEASE**

Running: moves at a slower speed and alternates between jogging & walking, and/or back feet angle together

If you checked any of these changes in behavior, your cat may have OA-associated pain.¹ Share these with your veterinarian healthcare team. They will fully evaluate your cat to confirm the diagnosis.

This questionnaire is not a medical diagnostic tool and is not intended to replace discussions with an animal healthcare professional. Discuss medical concerns with your veterinarian.



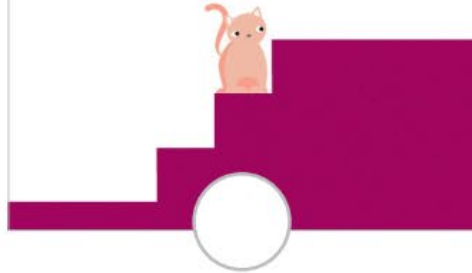
**Christian
Veterinary Mission**



Is your cat showing signs of OA-related pain?

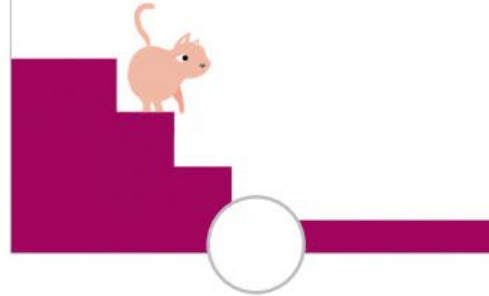
Think about your cat's activity in the past week. Check all of the signs that you've observed in your cat.

JOINT DISEASE



Climbing up stairs: uses 'bunny-hop', with both back legs hopping at same time, and/or stops for a break

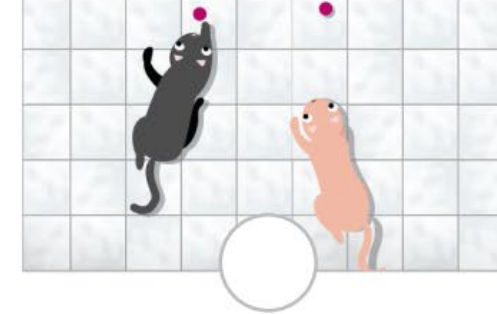
JOINT DISEASE



Climbing down stairs: angles body to the side, descends one stair at a time, and/or stops for a break

HEALTHY

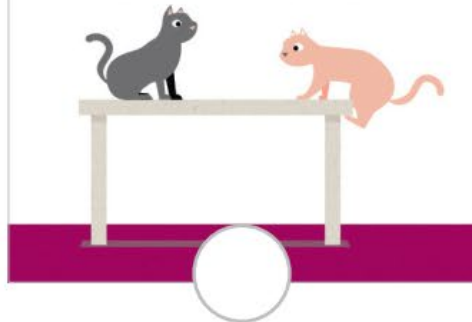
JOINT DISEASE



Chasing moving objects: slows down or takes breaks during play and/or may have thinner frame near the tail

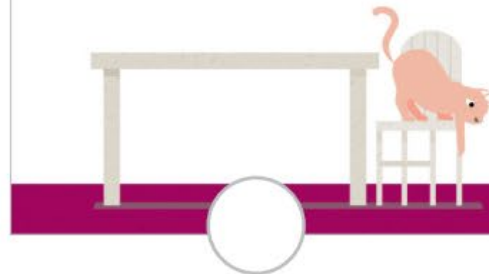
HEALTHY

JOINT DISEASE



Jumping up: hesitates before jumping up, doesn't clear jumps in one leap, and/or uses arms to pull the legs up

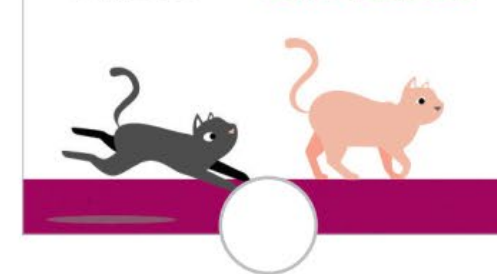
JOINT DISEASE



Jumping down: hesitates before jumping down, makes smaller jumps vs. one big one and/or reaches down towards the ground instead of leaping

HEALTHY

JOINT DISEASE



Running: moves at a slower speed and alternates between jogging & walking, and/or back feet angle together

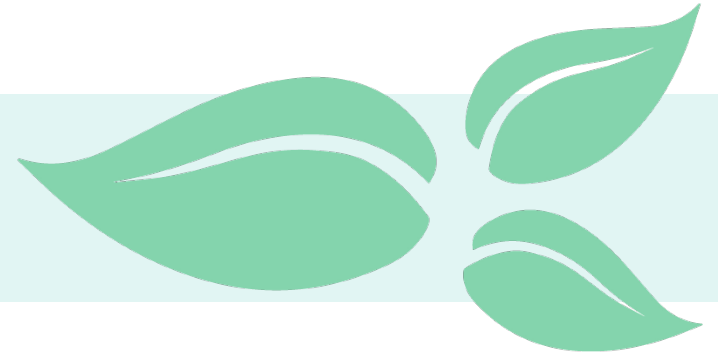
Body Posture



Christian
Veterinary Mission



General Recommendations



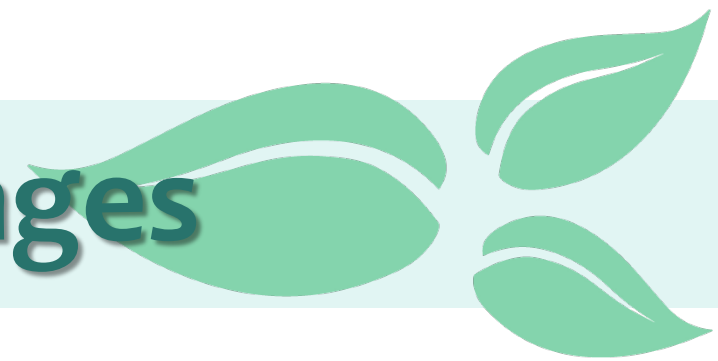
- Regular health checks
 - Every six months
- Treat medical problems
- Control obesity
- Client education
 - What are the signs to look for?
- Control discomfort
 - Pain management
 - Glucosamine supplement



Christian
Veterinary Mission



Causes for Behavioral Changes



- Change in schedule
- Death in family
- Loss of companion
- Frightening experiences
- Pain/discomfort
- Sensory deficits
- Cognitive decline



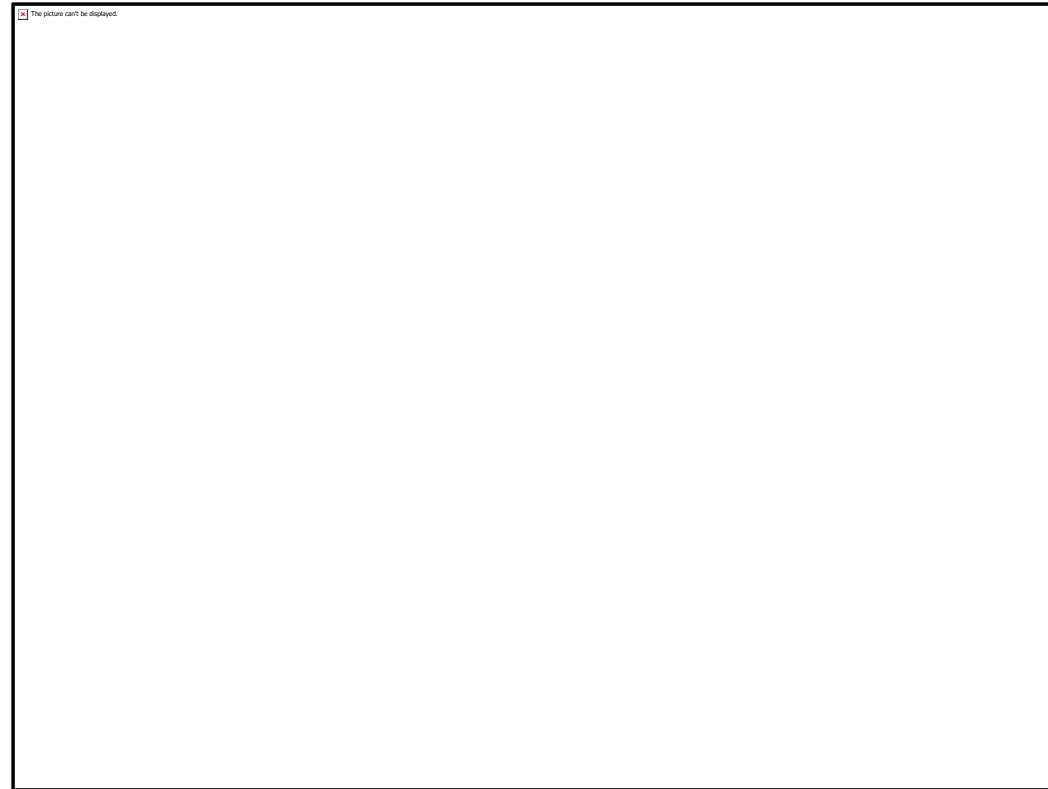
Christian
Veterinary Mission



Important to rule out medical causes



- Destructive behavior
- Housesoiling
- Vocalizations
- Sleep disturbance
 - Medical problems
 - ↓ REM sleep
 - ↑ Elimination needs
 - Physical discomfort
 - Anxiety



**Christian
Veterinary Mission**



Cognitive Dysfunction Syndrome



Prevalence of clinical signs



- A study by Neilson et al., (2001) surveyed 97 spayed female and 83 castrated male dogs aged between 11 and 16 years in a randomly chosen population of dogs.
- 28% (22/80) of 11–12-year-old dogs demonstrated impairment in one or more categories of behavioral signs
 - 10% (8/80) had impairment in two or more behavioral categories
- 68% (23/24) of 15–16-year-old dogs had impairment in one or more categories
 - 35% (12/34) had impairments in two or more categories
-



**Christian
Veterinary Mission**





- Structured interviews indicate that the prevalence of cognitive decline in our dogs range from **22.5%** to **73.5%**.
A survey of owners of aged dogs:
- 75% of dogs had at least one behavioral symptom indicative of cognitive dysfunction
- only 12% of owners had reported the behavior change to their veterinarian.
- Landsberg and Araujo (2005)

Under-diagnosed



- In a study by Salvin et al, 2010 (The Veterinary Journal), the estimated CCD prevalence rate was 14.2%. The veterinary diagnosis rate of only 1.9%.
- A total of 1100 surveys (957 were eligible for inclusion) from 11 countries, predominantly Australia (n = 501), the United States (n = 342), New Zealand (n = 51) and the UK (n = 41).
- 18 dogs were reported as having a formal diagnosis of ‘dementia’ or CCD by a veterinarian
- The mean age of surveyed dogs was 11 years 9 months (8 years–19 years 8 m).

Signs of Cognitive Decline



- 23% of dogs 12 to 14 years old
- 41% of dogs older than 14 years
- Size and breed of dog is not indicative for developing CCD
- 28% of cats 11–14 years of age
- 50% of cats >15 years of age

Cognitive Dysfunction Syndrome



Deficits in:

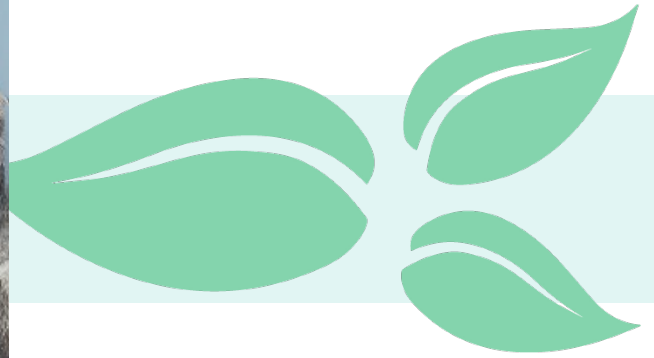
- Memory
- Learning
- Spatial awareness
- Perception
- Social interactions
- Sleeping patterns



Christian
Veterinary Mission



COGNITIVE DYSFUNCTION SYNDROME EVALUATION TOOL



Cognitive Dysfunction Syndrome (CDS) is an irreversible degeneration of the brain similar to Alzheimer's disease in humans, characterized by progressive cognitive impairment beyond that expected to occur with aging. CDS has a slow onset, can be difficult to manage and affects an estimated 14% of dogs 8 years and older.

What is DISHAA?

In order for a dog to be diagnosed with CDS, owners must observe their dog exhibiting specific behaviors. The DISHAA Tool helps owners identify these behaviors, enabling veterinarians and owners to work together to assess a dog's mental acuity.

D	DISORIENTATION	<ul style="list-style-type: none"> • Gets stuck, difficulty getting around objects, goes to hinge side of door • Stares blankly at walls, floor, or into space • Does not recognize familiar people/familiar pets • Gets lost in home or yard • Less reactive to visual (sights) or auditory (sounds) stimuli
I	SOCIAL INTERACTIONS	<ul style="list-style-type: none"> • More irritable/fearful/aggressive with visitors, family or other animals • Decreased interest in approaching, greeting or affection/petting
S	SLEEP/WAKE CYCLES	<ul style="list-style-type: none"> • Pacing/restless/sleeps less/waking at night • Vocalization at night
H	HOUSESOILING, LEARNING AND MEMORY	<ul style="list-style-type: none"> • Less able to learn new tasks or respond to previously learned commands/name/work • Indoor soiling of urine or stool/decreased signaling to go out • Difficulty getting dog's attention/increased distraction/decreased focus
A	ACTIVITY	<ul style="list-style-type: none"> • Decrease in exploration or play with toys, family members, other pets • Increased activity, including aimless pacing or wandering • Repetitive behaviors, e.g., circling/chewing/licking/stargazing
A	ANXIETY	<ul style="list-style-type: none"> • Increased anxiety when separated from owners • More reactive/fearful to visual (sights) or auditory (sounds) stimuli • Increased fear of places/locations (e.g., new environments/going outdoors)

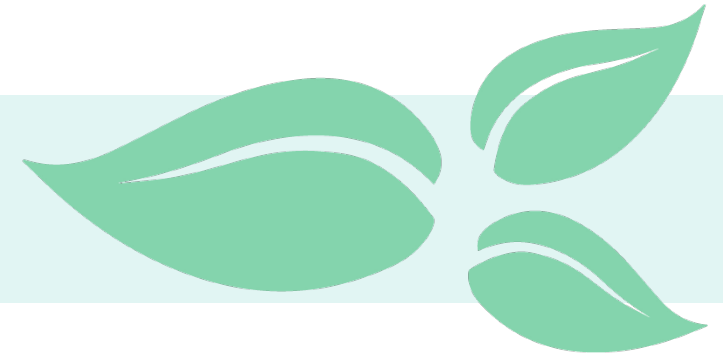
*Salvin, HE, McGreevy, PD, Sachdev, PS, & Valenzuela, MJ (2004). Underdiagnosis of canine cognitive dysfunction: a cross-sectional survey of older companion dogs. *Veterinary Journal (London, England)* : 1997, 164(3), 271-81. doi:10.1016/j.tvjl.2005.11.007



**Christian
Veterinary Mission**

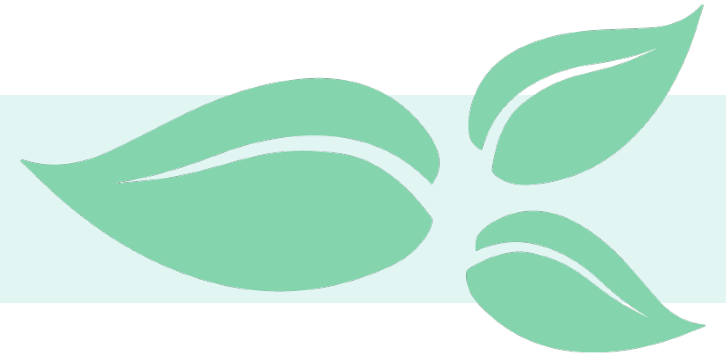


Diagnosis of Exclusion



- ↓ Cognitive abilities with increasing age sufficient to affect function
- No apparent physical cause
- Rule out other medical conditions

Disorientation



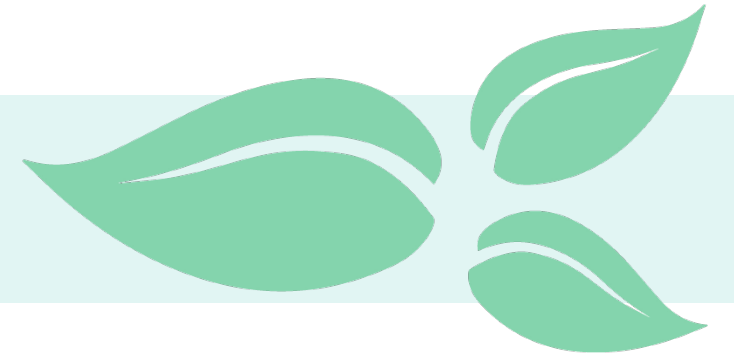
- Appears lost/confused
- Stares at walls
- Does not respond to verbal cues
- Unable to localize sounds
- Unable to recognize familiar people/places



Christian
Veterinary Mission

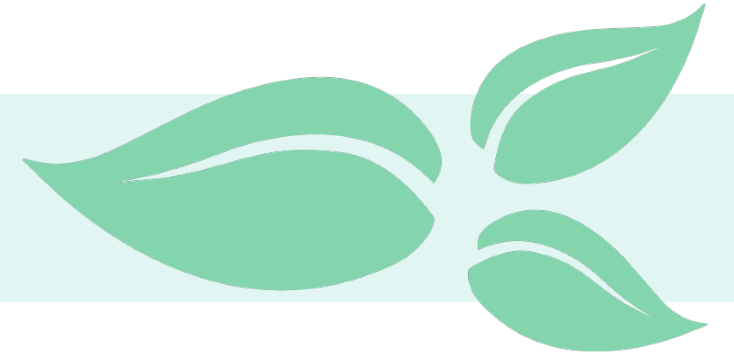


Interactions



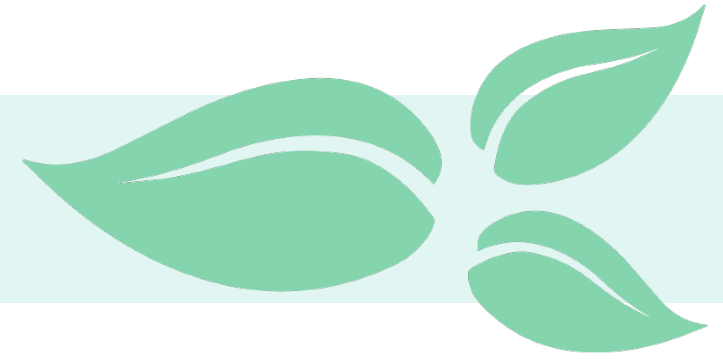
- ↓ Attention to family
- ↑ Irritability
- Intolerant of being alone
- ↓ Greeting behavior

Sleep wake cycle



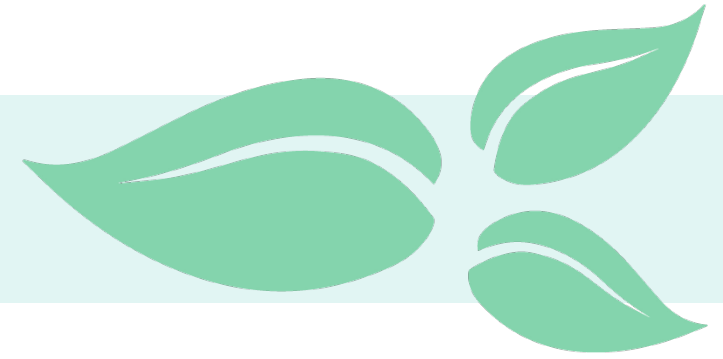
- Overall ↑ in sleep
- Sleep ↓ at night
- Nocturnal vocalizations

Housoiling



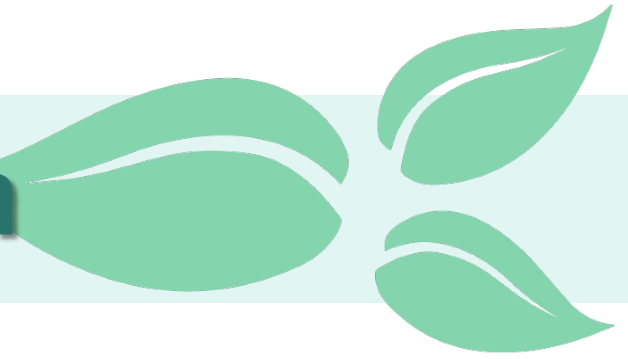
- Inappropriate elimination/loss of housetraining
 - Inconsistent use of the litter box
- Signals less to go outside
- Incontinence
 - Urination
 - Defecation

Activity



- Pacing
- Wandering aimlessly
- ↓ Activity level
- ↓ Exploratory behavior
- Slower to obey commands

Physical Changes in the Brain



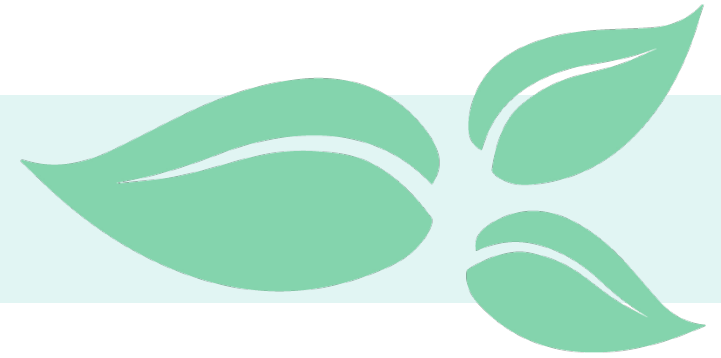
- Ventricle dilation
- ↓ Brain size and mass
- ↓ Blood flow
- ↓ Cell number
- Meningial fibrosis
- Degeneration of white matter
- Glial changes
- Neuroaxonal degeneration
- ↑ in apoptic bodies, lipofuscin, and beta-amyloid load



**Christian
Veterinary Mission**



Neurotransmitter Changes



↓ Neurotransmitter function,
activity or level

- Dopamine
- Norepinephrine
- Serotonin
- Acetylcholine

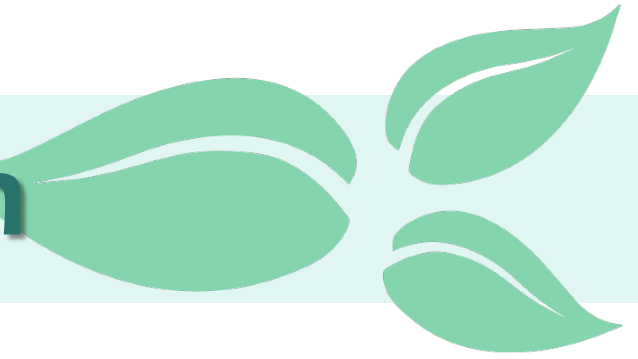
- ↑ MAO-B activity
 - ↑ Dopamine breakdown
 - ↑ Free radical formation
 - Impaired scavenging ability
- ↓ Synaptic function
- ↑ Neuronal death



Christian
Veterinary Mission



Physical Changes in the Brain

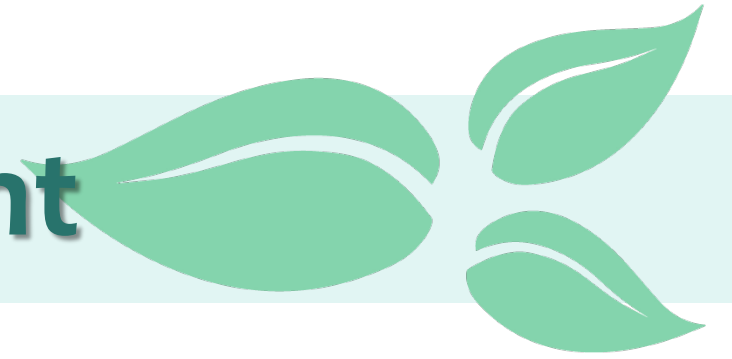


- ↑ β - amyloid in cerebral cortex, hippocampus
 - Plaque formation
 - Interference with nerve conduction (neurotoxic)
- Severity of cognitive decline correlated with extent of amyloid deposition

CDS Treatment



Environmental management



- Frequent outdoor access
- Non-skid surfaces
- Remove obstacles
- Provide ramps
- Avoid major environmental changes
- Separate multiple pets if unsupervised



Christian
Veterinary Mission



Behavioral Management



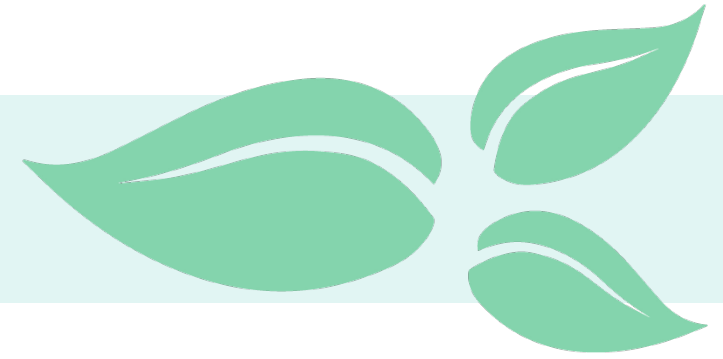
- Reward appropriate behavior
- Avoid punishment
- Provide consistent, moderate exercise
- Provide consistent, predictable daily schedule



Christian
Veterinary Mission



Mental enrichment



- Improve mental and tactile stimulation
 - Increases synaptic development
 - Buffers against cognitive decline
- Provide puzzle toys for them to work on
- Divide their meals in multiple bowls and they can “hunt” for their meals
- Practice basic behavioral cues
- Teach new signals if necessary
 - Visual, auditory or olfactory cues



Christian
Veterinary Mission



Sleep management



- Do not allow the pet to sleep once owner gets home
- Make sure the pet gets exercise (play session, walk, etc.) 30-60 min prior to bedtime

Medication Options

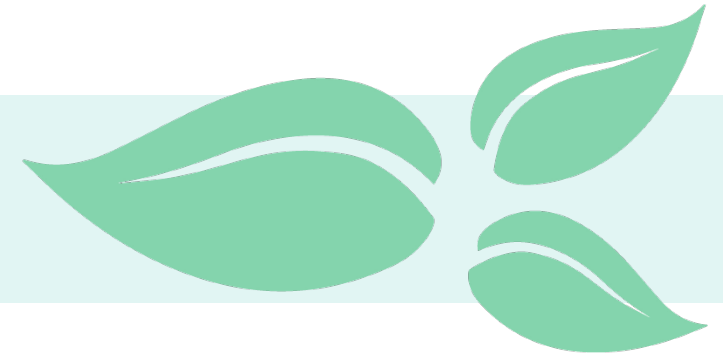


Anipryl® (Selegiline hydrochloride)



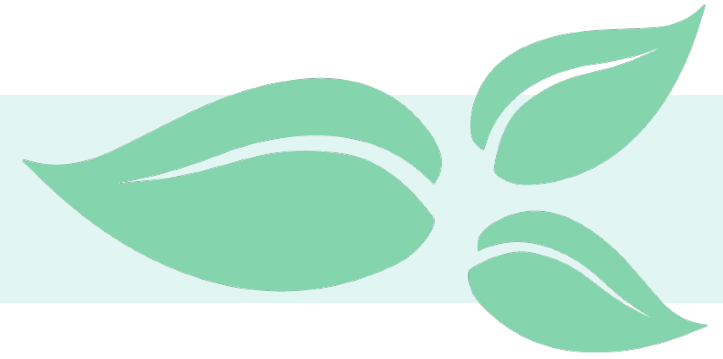
- FDA approved for the control of clinical signs associated with Canine Cognitive Dysfunction Syndrome
- Selective, irreversible MAO-B inhibitor
- MAO-A not inhibited at recommended doses
- ↑ Dopamine levels and function
- Off label usage in cats

Selegiline



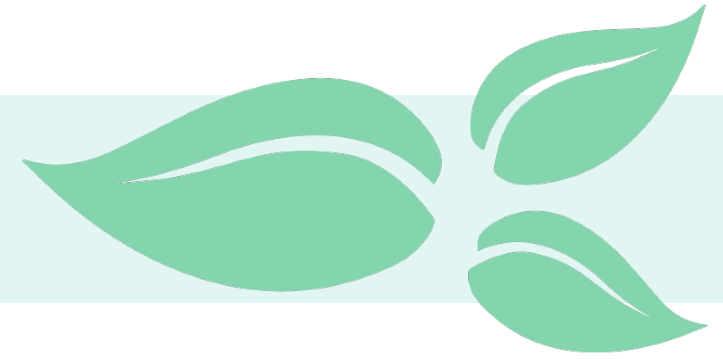
- Inhibition of **MAO-A** is linked to *antidepressant action* and to the side effect of *hypertension*
- Inhibition of **MAO-B** is linked to the *prevention of neurodegenerative processes*, such as those seen in Parkinson's and Alzheimer's disease

Selegiline



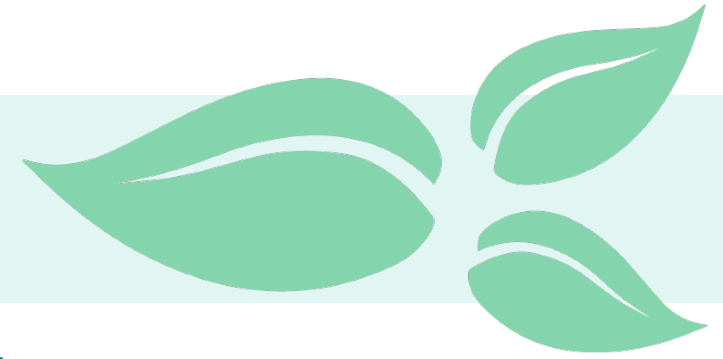
- Enhanced catecholaminergic transmission
 - Effects due to ↑ phenylethylamine (2PE)
 - neuromodulator
 - Modulates and enhances DA function
 - ↑ DA synthesis and release
 - ↓ DA reuptake

Selegiline



- Reduced neurotoxicity
 - ↓ toxic free radical production
 - ↑ free radical removal via increased activity of super oxide dismutase (SOD) and catalase
- Protection of dopaminergic neurons

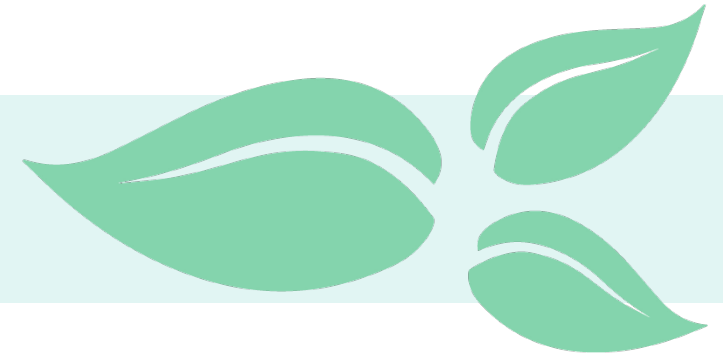
Selegiline



- Canine Dose
 - 0.5 – 1.0 mg/kg/day
- Feline Dose
 - 0.25 – 1.0 mg/kg/day
- Give in the AM
- Round to nearest whole tablet
- Onset is 4–12 weeks
- Treat for life

- Side Effects:
 - Vomiting
 - Diarrhea
 - Restlessness
 - Anorexia
 - Neurologic
 - Lethargy
 - Salivation

Drug interactions



- Opioids
- Alpha-2-agonists (BP fluctuations)
- TCAs or SSRIs (CNS toxicity)
- CNS stimulants
- Phenylpropanolamine
- Amitraz
- Bupropion
- 2 week period between discontinuation of selegiline and initiation of TCA or SSRI
- 5-week washout period for fluoxetine



**Christian
Veterinary Mission**



Other Medication Considerations?



- Antidepressants
 - SSRI's (Selective Serotonin Re-uptake Inhibitors)
 - TCA's (Tricyclic Antidepressants)
- Anxiolytics
 - Benzodiazepines
 - Azapirones



Christian
Veterinary Mission

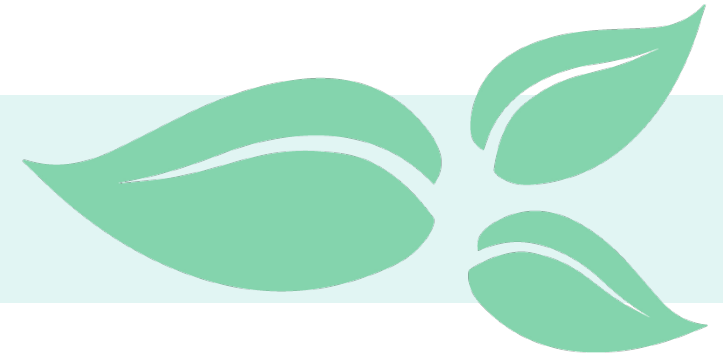


Buspirone



- Partial 5-HT agonist and DA receptor agonist/antagonist
- Side effects:
 - GI upset
 - May disinhibit fear induced aggression
 - Low abuse potential

Benzodiazepines



- Increases binding affinity of GABA receptor for GABA
- Hepatic biotransformation
- Highly protein bound – obesity increased accumulation of drug in fat
- Potential for abuse and dependence
- Side effects:
 - Muscle relaxation
 - Decreased locomotor activity
 - Disinhibition of aggression



Christian

Veterinary Mission

• Paradoxical excitement



Short-Acting Medications



- **Trazodone** - Serotonin 2A antagonist, serotonin reuptake inhibition
 - Canine Dose: 2-7 mg/kg BID(-TID)
 - Feline Dose: 50-100 mg per cat
- **Gabapentin** - Anticonvulsant/Neuropathic Pain Analgesic
 - Canine Dose: 10-30 mg/kg BID-TID
 - Feline Dose: 50 – 100 mg per cat



Christian
Veterinary Mission



Diets



Nutrition



- Reduction in cerebral glucose metabolism is a common feature in aging
- Ketone metabolism provides an alternative pathway, which normally occurs under starvation conditions.
- Ketone bodies are a natural endogenous energy source mainly produced by the liver from mobilization of endogenous body fat and utilized by extrahepatic tissues (brain, heart, kidney, muscle, etc.).
- Dietary supplementation with medium-chain TAG (MCT) can be used to increase levels of ketones in the brain.
- MCT are converted to ketone bodies by the liver and astrocytes in the brain.
- The ketone bodies could then be used by neurons as an alternative energy source to alleviate the deficit in glucose metabolism.



**Christian
Veterinary Mission**



Purina - Pro Plan Bright Minds/Neurocare



- Arginine
- DHA & EPA
- Vitamins E and C
- B vitamins including folic acid and pyridoxine
- Glucosamine
- Vitamin A
- Linoleic Acid, an Omega-6 Fatty Acid



Christian
Veterinary Mission

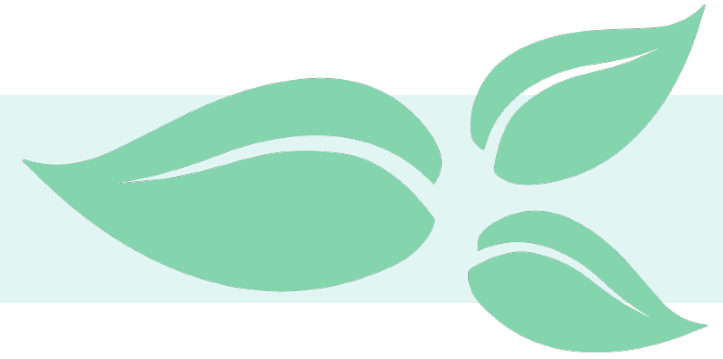


Purina - Pro Plan Bright Minds/Neurocare



- MCTs:
 - Provide an alternative energy source for the brain in cognitively impaired patients.
 - Improves mitochondrial function
 - Increases polyunsaturated fatty acids in the brain
 - Decreases amyloid precursor protein in the parietal cortex of aged dogs

Hill's B/D

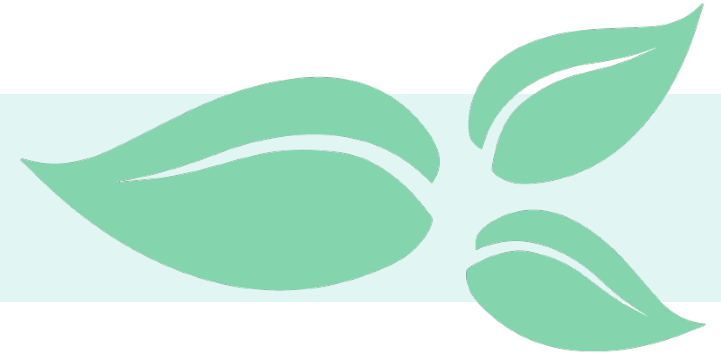


- Carnitine
- Lipoic acid
- Long-chain omega-3 polyunsaturated fatty acids
- Vegetable-based carotenoids
- Vitamin E
- Vitamin C

Supplements



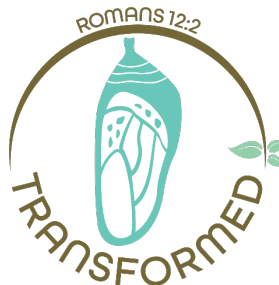
Senilife



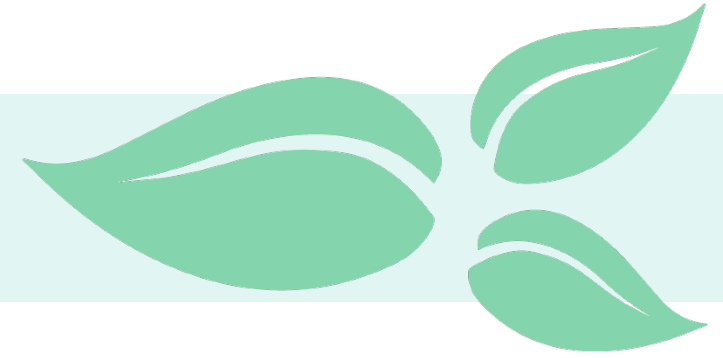
- protect against neuronal cell death
- lessen the symptoms of cognitive decline within 30 days of administration



Christian
Veterinary Mission



Senilife



- **Phosphatidylserine:** Improves nerve cell communication and ensures those processes continue to work effectively.
- **Pyridoxine:** Essential for normal brain development, function, and neuron health.
- **Ginkgo Biloba:** Improves cerebral blood flow, increases glucose metabolism, and has a strong antioxidant effect.
- **Resveratrol:** Antioxidant which protects neurons from toxic substances that can cause cell death.
- **Natural Vitamin E:** Antioxidant with neuroprotective potential and slows functional deterioration observed clinically in patients with cognitive decline.



Christian
Veterinary Mission



S-adenosyl-L-methionine (SAME) tosylate



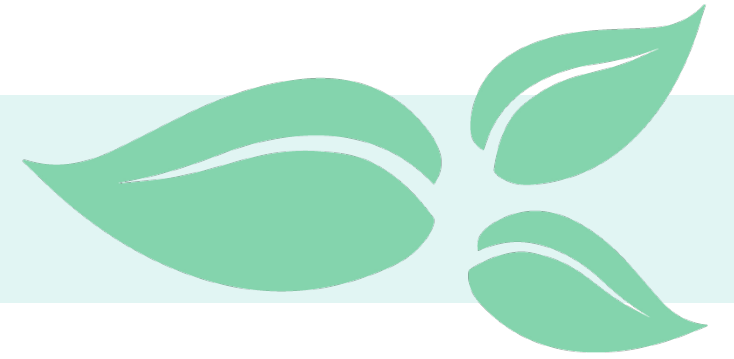
- SAME may help:
 - to maintain cell membrane fluidity
 - receptor function
 - the turnover of monoamine transmitters
 - increase the production of the endogenous antioxidant
- SAME increases central serotonin levels
 - Use with caution with other drugs that increase serotonin
- SAME increased attention and executive function



Christian
Veterinary Mission

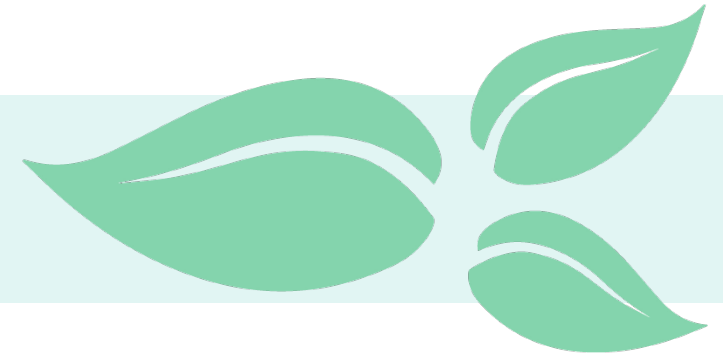


Melatonin



- Produced in pineal gland
- Important for circadian rhythms
- Receptors in hypothalamus, cerebellum, pineal body
- Derivative of 5-HT, shift opposes 5-HT
- DA inhibiting

Pheromones



- Adaptil - Dog Appeasing Pheromone
- Chemical messages via the Vomeronasal organ
- Use of Pheromone spray, diffuser or collar
 - provides the message of constant security, safety, and reassurance.
 - reduced perioperative stress in dogs undergoing routine spay/neuter



wsung@sfspca.org

[Facebook.com/SFVetBehavior](https://www.facebook.com/SFVetBehavior)

[Twitter:@SFVetBehavior](https://twitter.com/SFVetBehavior)