Saturday, December 7th, 2024

Hill's®
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Small Animal Clinical Nutrition Symposium

AGING CATS & DOGS

AGENDA

Saturday
Dec. 7th
2024

7:30am — 8:30am	Registration
8:30am — 8:35am	Welcome
8:45am — 9:25am	Managing Common Senior Dog Health Conditions & Comorbidities with Nutrition Camille Torres-Henderson, DVM, DABVP, DACVIM (Nutrition)
9:35am — 10:25am	Managing Common Senior Cat Health Conditions & Comorbidities with Nutrition Camille Torres-Henderson, DVM, DABVP, DACVIM (Nutrition)
10:25am — 10:40am	Break
10:40am — 11:30am	Senior Pet Diets Camille Torres-Henderson, DVM, DABVP, DACVIM (Nutrition)
11:30am — 12:00pm	Morning Session Q&A Camille Torres-Henderson, DVM, DABVP, DACVIM (Nutrition)
12:00pm — 1:00pm	Lunch
1:00pm — 1:30pm	Weighty Matters: Tackling Canine & Feline Obesity In Senior Pets - Insights from the Healthy Weight Clinic & Pet Health Center Katherine Oakes, DVM
1:30pm — 2:20pm	Canine Cognitive Dysfunction Susan Nelson, DVM
2:20pm — 2:40pm	Break
2:40pm — 3:30pm	Nutrition Tips and Tricks for the Senior Patient: Diets and Esophageal Feeding Tubes Ally Sptiz, DVM, (Residency Trained in Small Animal Clinical Nutrition))
3:30pm — 4:00pm	Afternoon Session Q&A

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Managing Common Senior Dog Health Conditions and Comorbidities with Nutrition

CAMILLE TORRES-HENDERSON, DVM, DABVP, DACVIM (NUTRITION)

Managing Common Senior Dog Health Conditions and Comorbidities with Nutrition

CAMILLE TORRES, DVM DABVP DACVIM (NUTRITION)

COLORADO STATE UNIVERSITY

Overview

AGE RELATED CHANGES

NUTRIENTS

PRACTICAL APPLICATION WITH COMORBIDITIES

Introduction

- Senior dogs experience physiological changes as they age.
- These changes impact their nutritional needs.
- Proper nutrition is key to managing common conditions and improving quality of life.

Senior vs Geriatric

Changes in Aging Dogs

Energy requirements

Physiologic changes

- Stomach
- Intestines

Sensory changes

Musculoskeletal changes

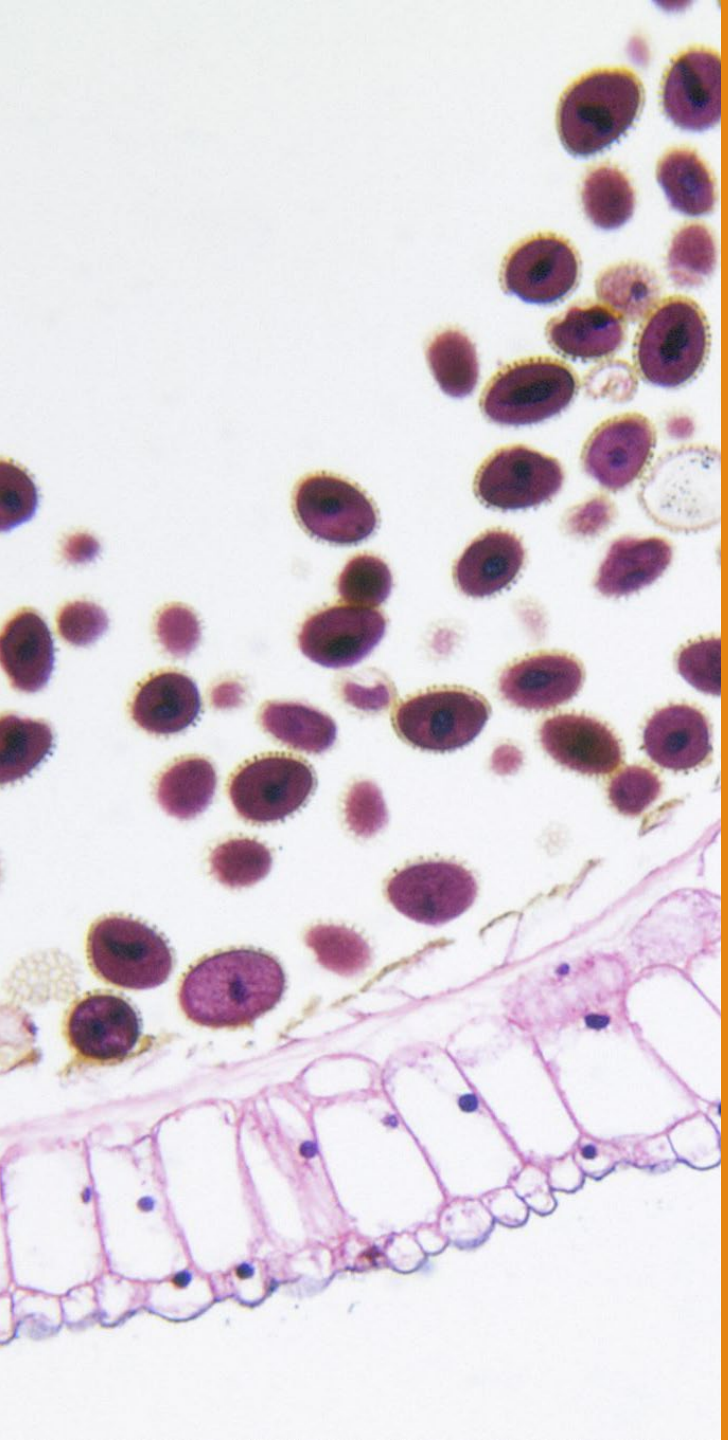
Immune function

Brain health

Physiologic Changes in Aging Dogs

Factors that could influence nutrient absorption

- Reduced duodenal villus surface area
- Shorter villus height
- Decreased HCl production in the stomach
- Decreased bile secretion



Gastrointestinal Changes in Aging People

Stomach

- Altered gastric microbiota
- Reduced mucosal protective mechanisms
- Decreased gastric blood flow
- Compromised repair mechanisms

These changes make older people more susceptible to

- Gastric ulcers
- Atrophic gastritis
- Peptic ulcer disease

Physiologic Changes in Aging Dogs

Delayed **absorption** of glucose after a meal

Serum glucose **takes longer to return to baseline** after a meal

Decreased response to ghrelin (hunger hormone)

Energy requirements

Energy requirements decrease with age, but may increase in geriatric dogs

- Decreased lean body mass

Senior dogs are at increased risk of obesity (7-10 yrs)

Geriatric dogs have a greater risk of being underweight (>10 yrs)

Calculate resting energy requirement:

- (Bodyweight in kg)^0.75 X 70

Digestibility

Studies looking at changes in digestibility are inconsistent

- In general dogs seem to maintain normal digestibility with age

Pelz et al 1968 reported ***decreased*** ability to digest fat, but *unable to replicate findings since*

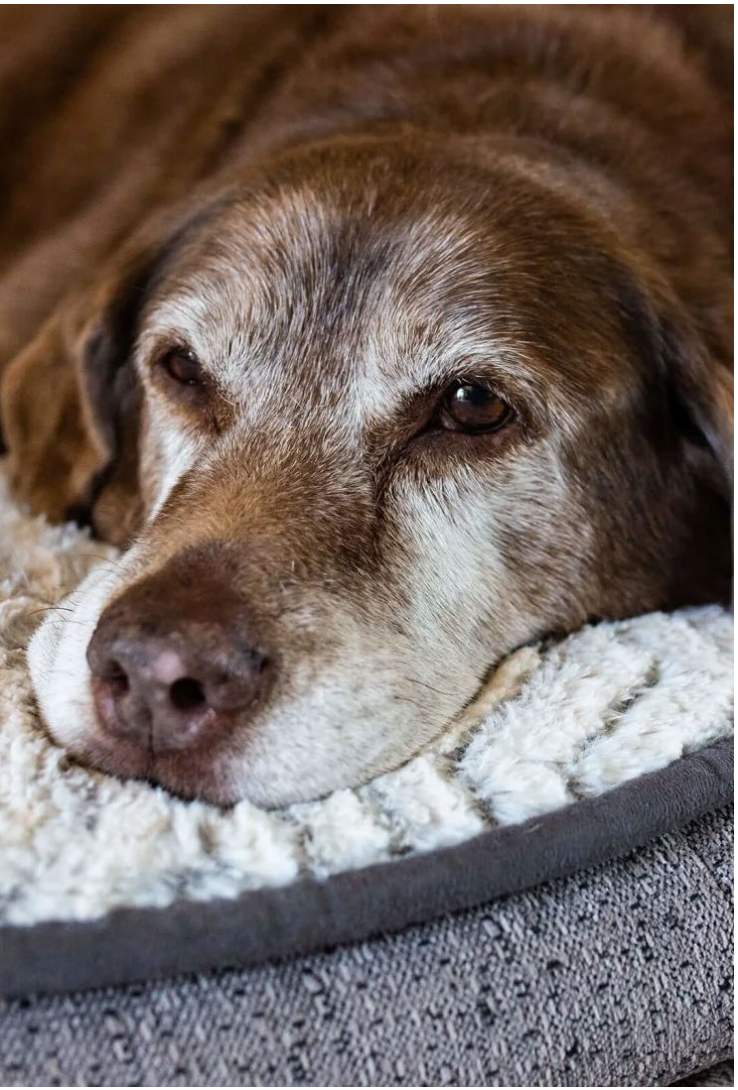
Possible reasons for decreased fat digestion:

- Decreased pancreatic function
- Pancreas is less responsive to hormones
- Decreased pancreatic lipase secretion
- Decreased production, transport and secretion of bile acids

Sensory changes that influence nutritional status

Decreased sensory capability could influence the cephalic stage of feeding

- Hearing
- Olfaction
- Taste



Musculoskeletal changes

Decrease lean body mass

- Decreased energy requirement
- Weakness and frailty

Osteoarthritis

Decreased ability to prehend and swallow food

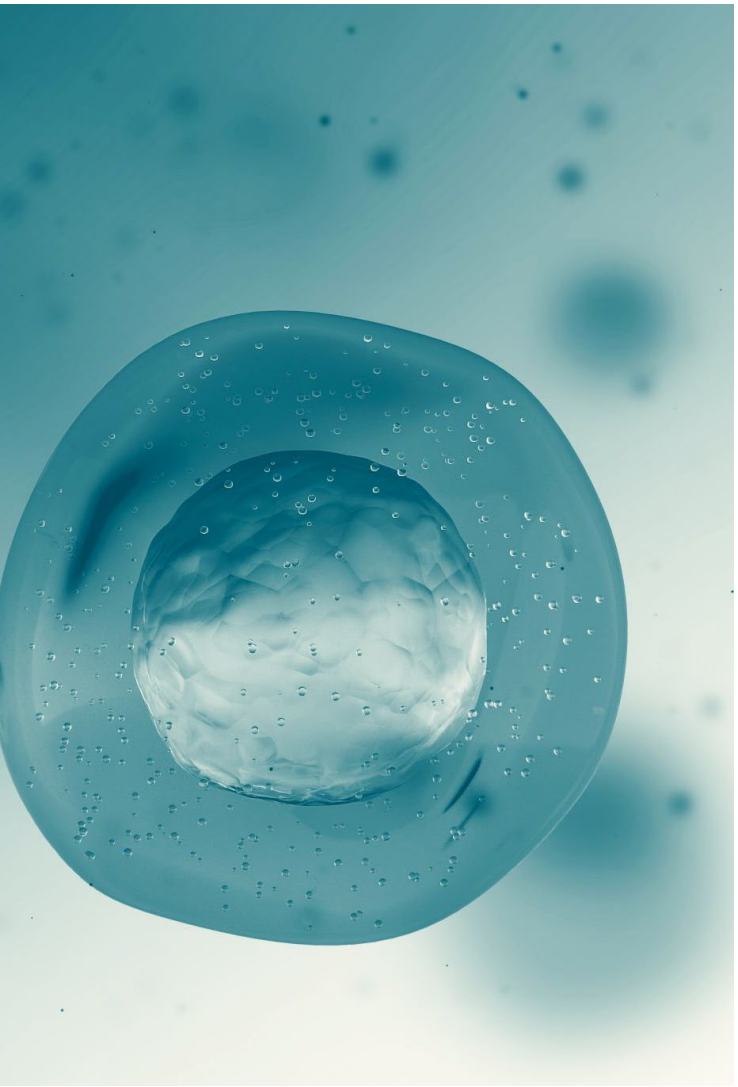
Brain Health

28-68% of dogs older than 9 yrs show clinical signs of cognitive dysfunction

Oxidative damage to the brain

- High metabolic rate of the brain produces reactive oxygen species
- High lipid content- increase susceptibility to oxidative damage
- Limited regenerative capacity

Glucose metabolism within the brain becomes less efficient with age



Immune function

Decreased total white blood cells and immature neutrophils and lymphocytes

Increased number of mature neutrophils

Mononuclear cells of older dogs are less responsive to stimuli

Decreased ability to respond to injury an illness

Summary of Physiological Changes in Senior Dogs

- Changes occur to the gastrointestinal system that could influence nutrient absorption.
- Reduced energy requirements due to lower lean body mass.
- Cognitive decline and reduced sensory functions.
- Increased susceptibility to chronic conditions.

Diets Formulated for Senior Dogs

Ideal nutritional profile for senior dogs **has not been established**

There is a wide variation in senior diets due to a lack of regulatory guidelines

Common trends in senior dog food

- Higher fiber
- Lower fat/ lower energy density
- Protein similar to maintenance formulas

Fiber can reduce digestibility

- Consider type of fiber (soluble, insoluble, fermentable, non-fermentable)

Project: *Evaluation of nutritional content in senior vs adult dog food*

61 diets evaluated (30 Adult diet and 31 Senior diets)

Fat was statistically lower in senior diets (p value: 0.0003)

Fiber was trending higher in senior diets (p value: 0.05)

Nutrients to Consider in Aging Dogs

Protein

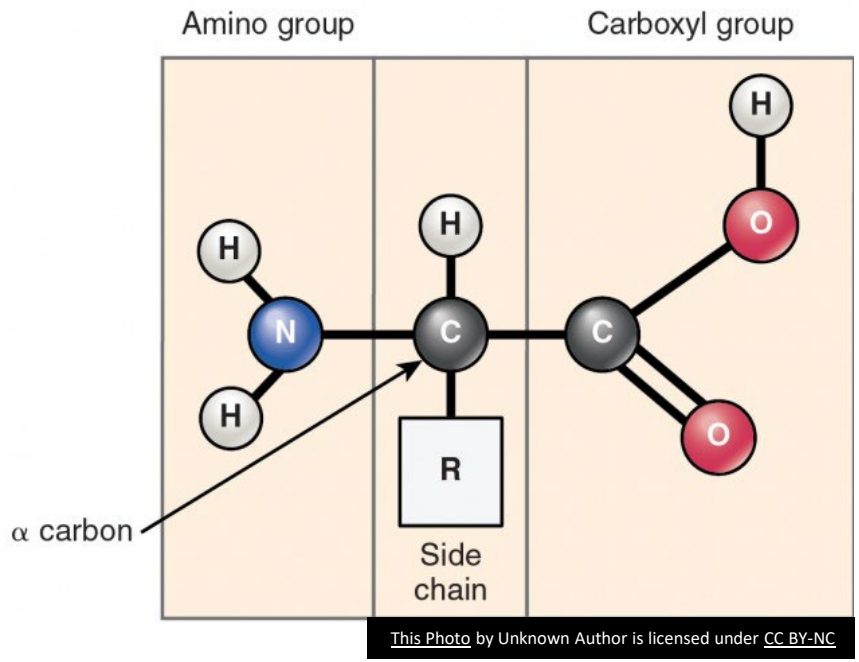
Phosphorus

Fat- energy density

Omega 3 fatty acids

Fiber

Digestibility



Protein

Synthesis and repair of tissue

Nitrogen and amino acids

Energy metabolism

- Converted to glucose by gluconeogenesis

Protein malnutrition

- Muscles
- Organ function
- Immune function

Dietary Protein & Phosphorus for Senior Dogs

Protein requirement **increases with age** due to **increased protein turnover**

- Not related to loss of digestibility
- **Sarcopenia** is age related muscle loss that is not associated with disease
- **Cachexia** is muscle loss that is related to disease

Decreased **rate of protein synthesis**

Protein restriction is not necessary unless medically indicated

Phosphorus restriction is not necessary unless medically indicated

McKenzie BA. Comparative veterinary geroscience: mechanism of molecular, cellular, and tissue aging in humans, laboratory animal models, and companion dogs and cats. *American Journal of Veterinary Research. 2022;83(6):ajvr.22.02.0027.*

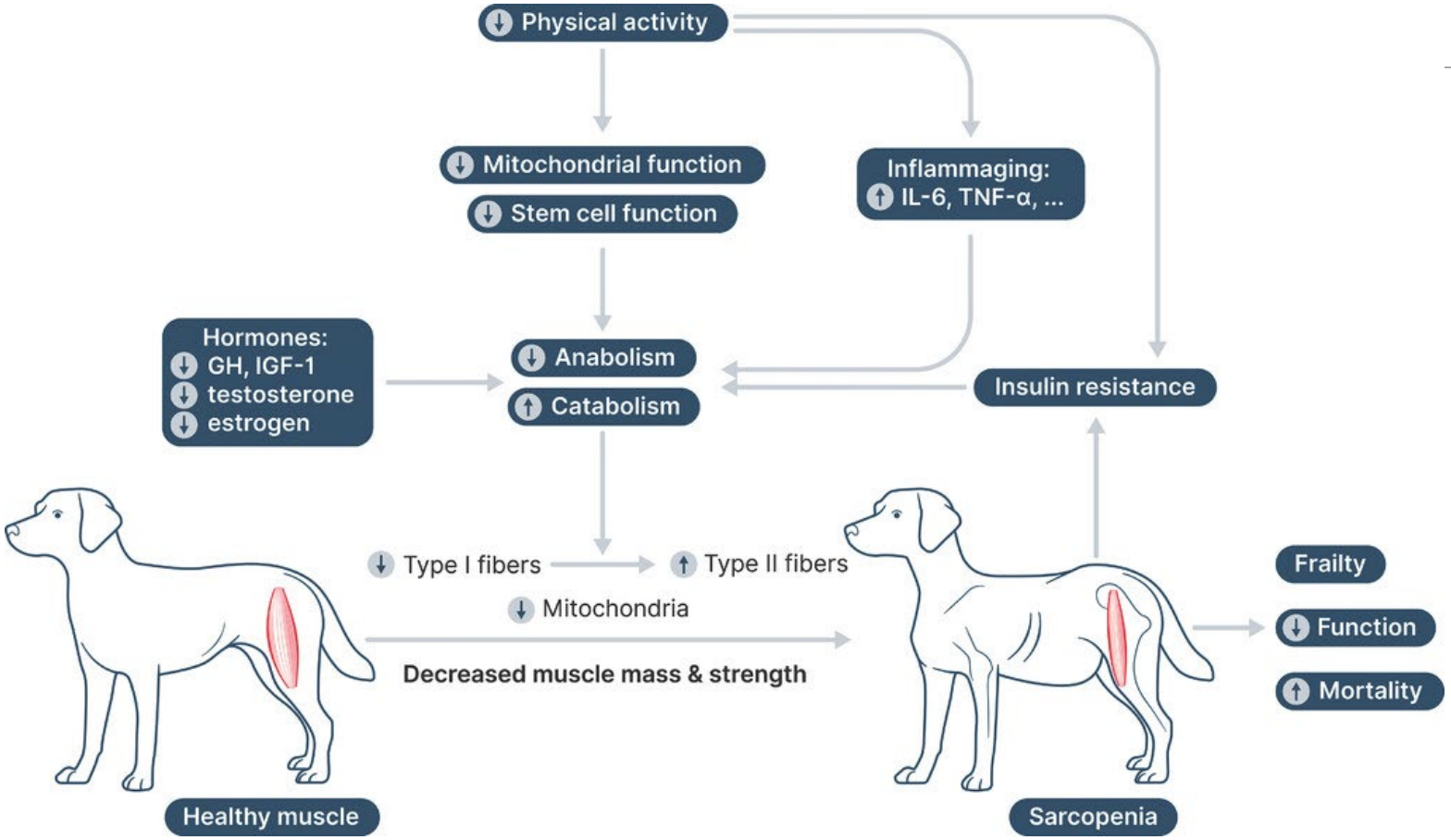
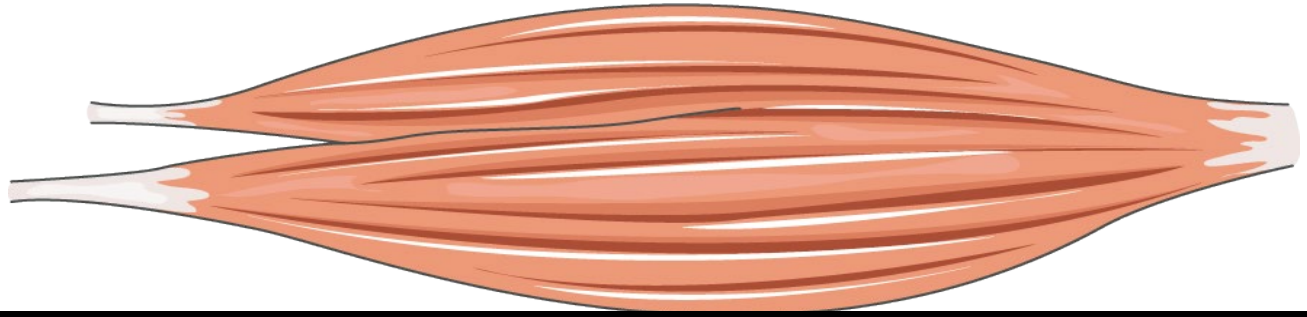
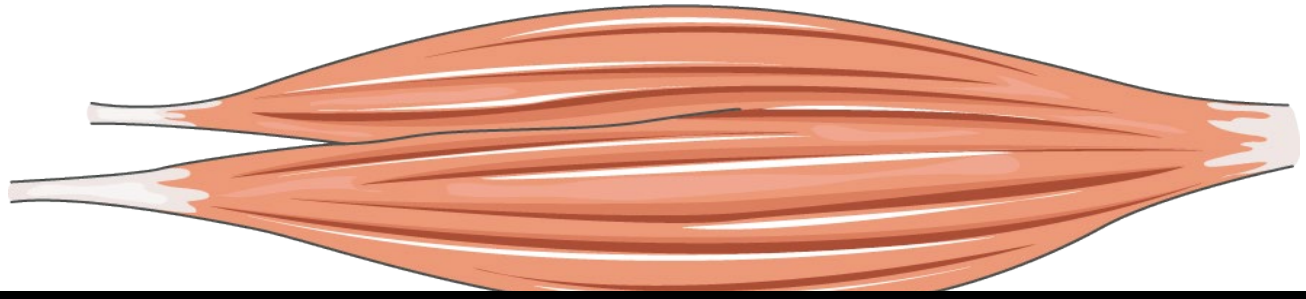
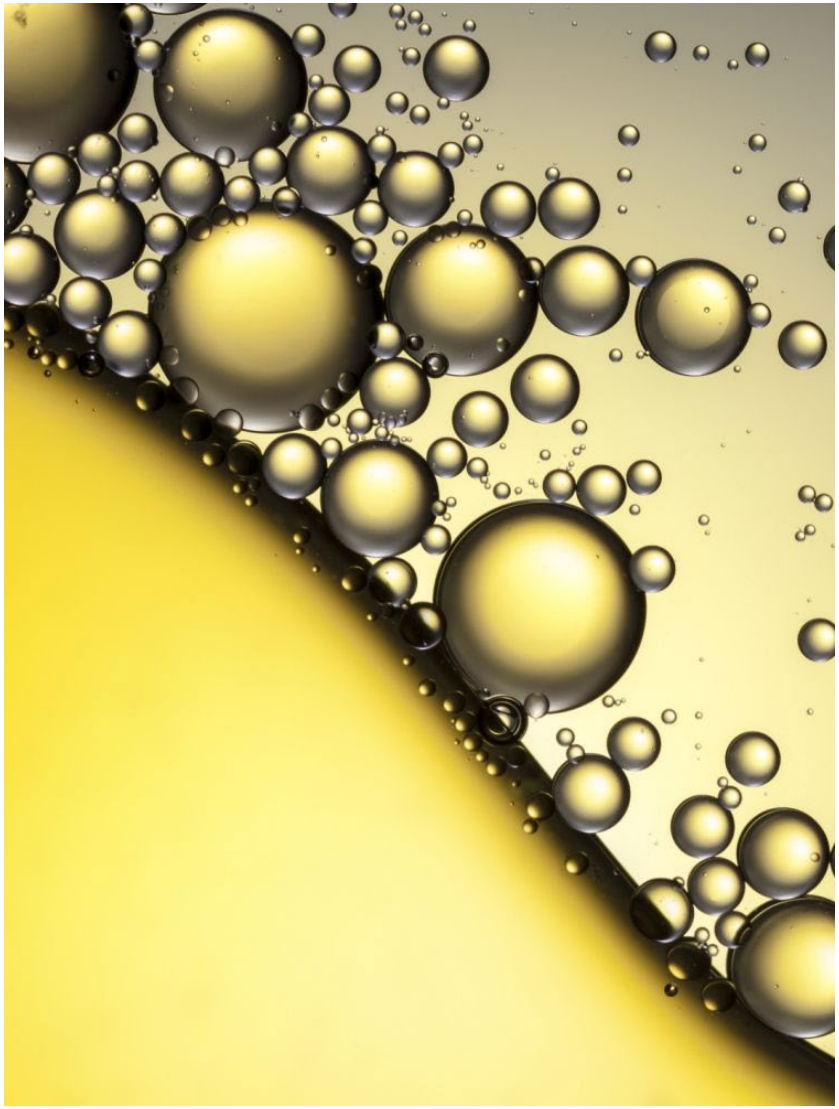


Figure 1 Key mechanisms and manifestations of muscle tissue aging. GH = Growth hormone. IGF-1 = Insulin-like growth factor-1. IL-6 = Interleukin-6. TNF-α = Tumor necrosis factor-α.

DOI: https://doi.org/10.2460/ajvr.22.02.0027







Fat

Fat provides more energy than protein or carbohydrates (per gram basis)

Required for the absorption of fat-soluble vitamins (A, D, E, K)

Essential fatty acids

- Linoleic Acid
  - Vegetable oil, corn oil, fat from animals that eat corn
- Alpha Linolenic Acid
  - Flaxseed
  - Canola oil
  - Walnut oil

Physiologic Effects of Dietary Fat

Fat stimulates increased secretion of cholecystokinin (CCK) and Peptide YY

- CCK stimulates gall bladder contraction, increase pancreatic secretion, and inhibits gastric emptying
- Peptide YY **Slows intestinal motility and slows gastric emptying**

Fat **digestion and absorption can be compromised** in dogs with gastrointestinal disease

Dietary Fat for Senior Dogs

High fat diet will increase the energy density of the diet

- Good for geriatric pets that are underweight
- Not ideal for pets at risk for obesity

Improves palatability

Physiologic changes may warrant a lower fat diet in patients with gastrointestinal signs

Consider ***individual patient needs***

(Shana Novak/DigitalVision, Getty Images)

Type of Fat

Long chain omega 3 polyunsaturated fatty acids

- Diets higher in omega 3 fatty acids may reduce inflammation
- May delay the onset and progression of physiologic aging changes (inconclusive)
- Improve appetite
- Improve cachexia
- Arthritis
  - Decrease inflammation
  - Improved clinical signs

Fish Oil Dosing

Clinical Disorder	Dose (MG/KG/DAY)	Approximate EPA + DHA (MG) Dose for a 20 KG Dog/DAY
Idiopathic hyperlipidemia	57	1135
Kidney disease	66	1324
Cardiovascular disorders	54	1088
Osteoarthritis	147	2932
Inflammatory or immunologic (atopy or IBD)	59	1182
NRC recommended allowance	14	284
NRC safe upper limit	175	3499

Raditic, D., & Gaylord, L. ***Fish Oil Dosing in Pet Diets and Supplements.*** Today's Veterinary Practice, May/June 2020.

https://www.medicalnewstoday.com/articles/320251#overview

Type of Fat

Medium chain triglycerides (MCT)

- Metabolized to ketones by the liver
- Ketones are able to cross the blood-brain barrier and can result in up to 20% sparing of glucose
- Supplementation resulted in improved cognitive performance in older dogs compared to control

Fiber

Definition: Type of carbohydrate with limited digestibility

Maintains functional integrity of the gastrointestinal tract- supports microbiome

Classification

- Soluble vs Insoluble
- Fermentable vs Nonfermentable

Types of fiber

SOLUBLE FIBER SOURCES	INSOLUBLE FIBER SOURCES	PREBIOTIC FIBER SOURCES
•Beet pulp •Fruit pectins •Psyllium- mixed •Carrageenan •Resistant starch	•Bran •Cellulose •Lignin •Hemicellulose-mixed	•Fructooligosaccharides •Inulin (chicory)

Gut Brain Axis and Aging

Age and Microbiome: Older dogs show reduced Fusobacteria in their gut microbiome.

Memory and Microbiome: Better memory correlates with lower Actinobacteria levels.

Cognitive Health: The gut microbiome may influence aging and cognitive function in dogs.

▸ Animals (Basel). 2020 Aug 24;10(9):1488. doi: 10.3390/ani10091488

Gut Microbiome Composition is Associated with Age and Memory Performance in Pet Dogs

Eniko Kubinyi [1,*,†], Soufiane Bel Rhali [1,2,†], Sára Sándor [1], Attila Szabó [2], Tamás Felföldi [2]

Summary of nutrients…

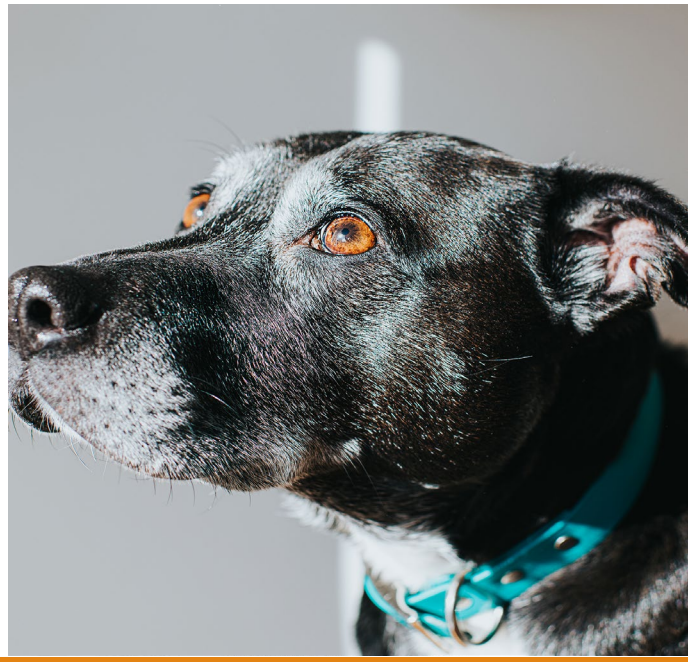
Senior diets are not standardized but tend to be lower in fat and may be higher in fiber

Adequate dietary protein intake helps support lean body mass but increasing dietary protein may not increase muscle mass in dogs with sarcopenia or cachexia.

Senior dogs do not require a low protein diet unless they have a medical condition that warrants less protein

Fat can help increase the energy density and the type of fat also has benefits.

Fiber can help support the microbiome and the gut brain axis has a connection with aging



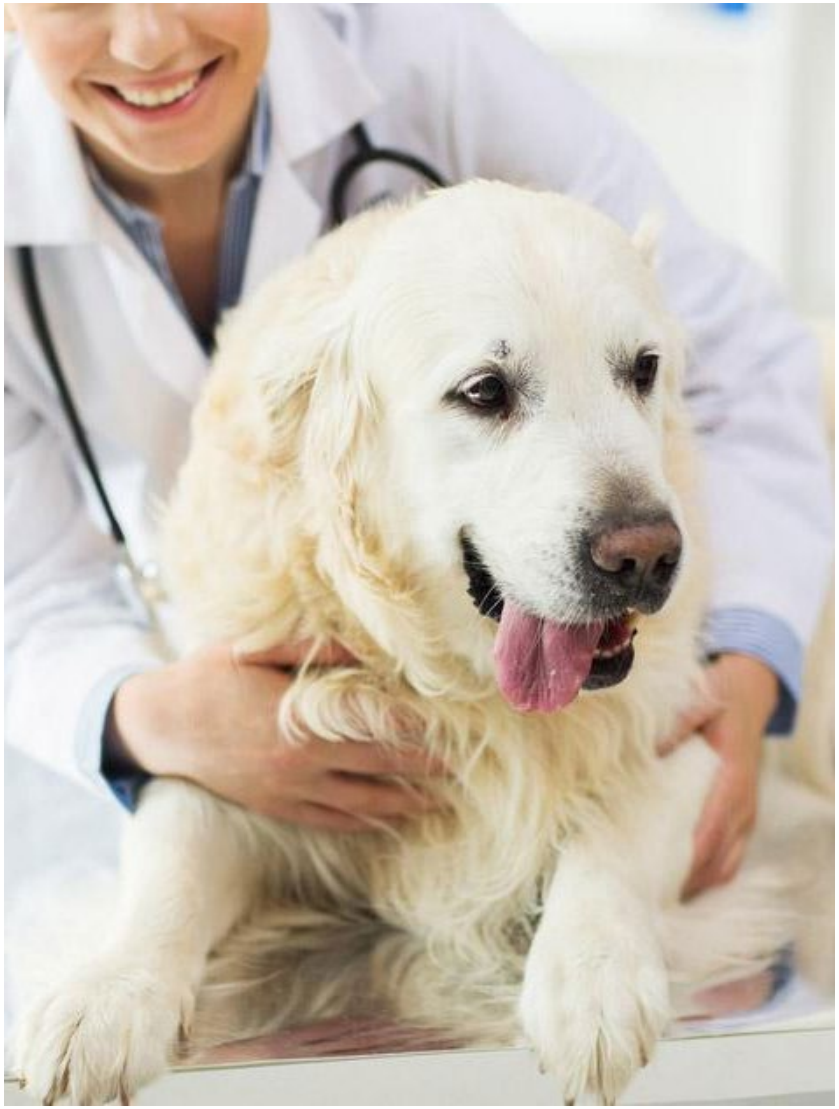

Assessment

Assessment

- Patient
- Diet
- Feeding management

Important factors to consider

- Screen and address physiologic changes caused by ***normal aging***
- Screen for and address ***age related disease***
  - Cognitive function
  - Renal function
  - Neoplasia
  - Cardiac function



Assessment – PE and Nutrition

Body condition (over/underweight?)

Muscle condition score (normal/mild/moderate/severe loss)

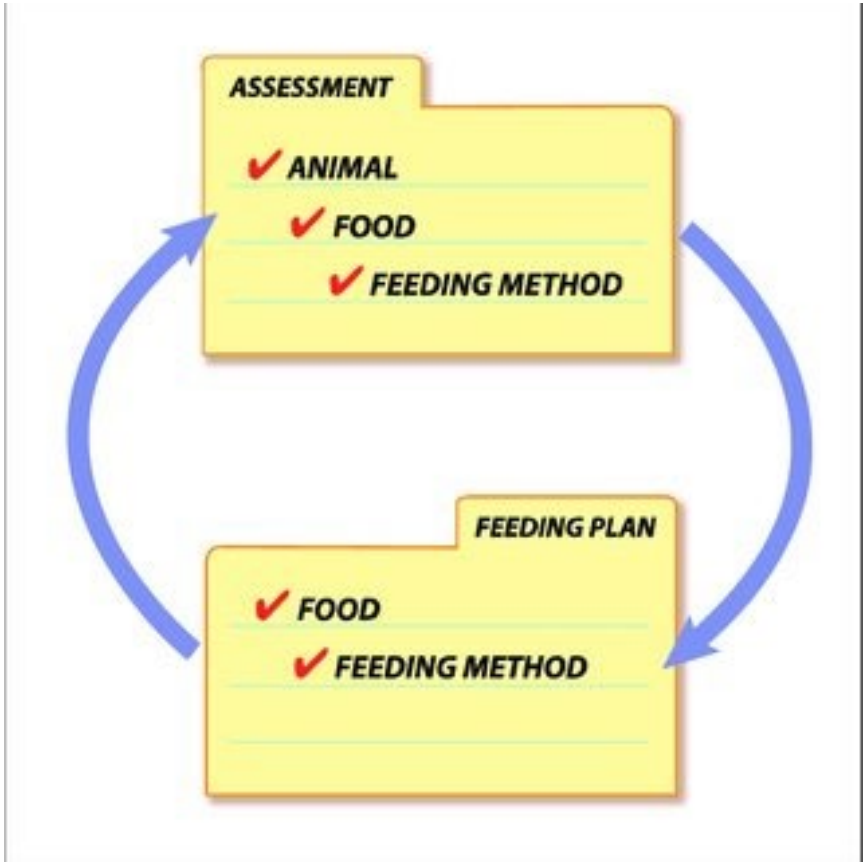
Balanced diet?

Is the caloric intake appropriate?

Can the dog prehend, masticate and swallow food appropriately?

Is the diet palatable to the dog?

Can the dog ambulate to the food and water in the house?



Create a Diet Plan

Consider the current diet

Consider age related needs

Consider disease related needs

Review diet options and provide specific feeding recommendations

Reassess on a regular basis

Izzy- 14 year old, spayed female, Welsh Corgi

Age related changes

- Osteoarthritis
- Cognitive dysfunction
- Decreased ability to prehend food
- Hearing loss
- Decreased lean body mass

Disease related changes

- Proteinuria (UPC- 2.3)
- Renal azotemia (BUN- 63, Creat- 2.3; USG- 1.022)
- Intermittent gastrointestinal signs, supspect chronic pancreatitis

Izzy- Current diet

A rotation of several diets to keep her interested in eating:

- Hill's i/d (regular and low fat, dry and canned)

- Purina EN Low Fat (canned and dry)

- Hill's k/d

- Purina NF

- Home prepared diet- beef, rice, bread

- Unable to determine current caloric intake

Izzy physical exam and assessment

10 kg

BCS 3/9

Moderate to severe generalized muscle loss

Nutrition assessment:

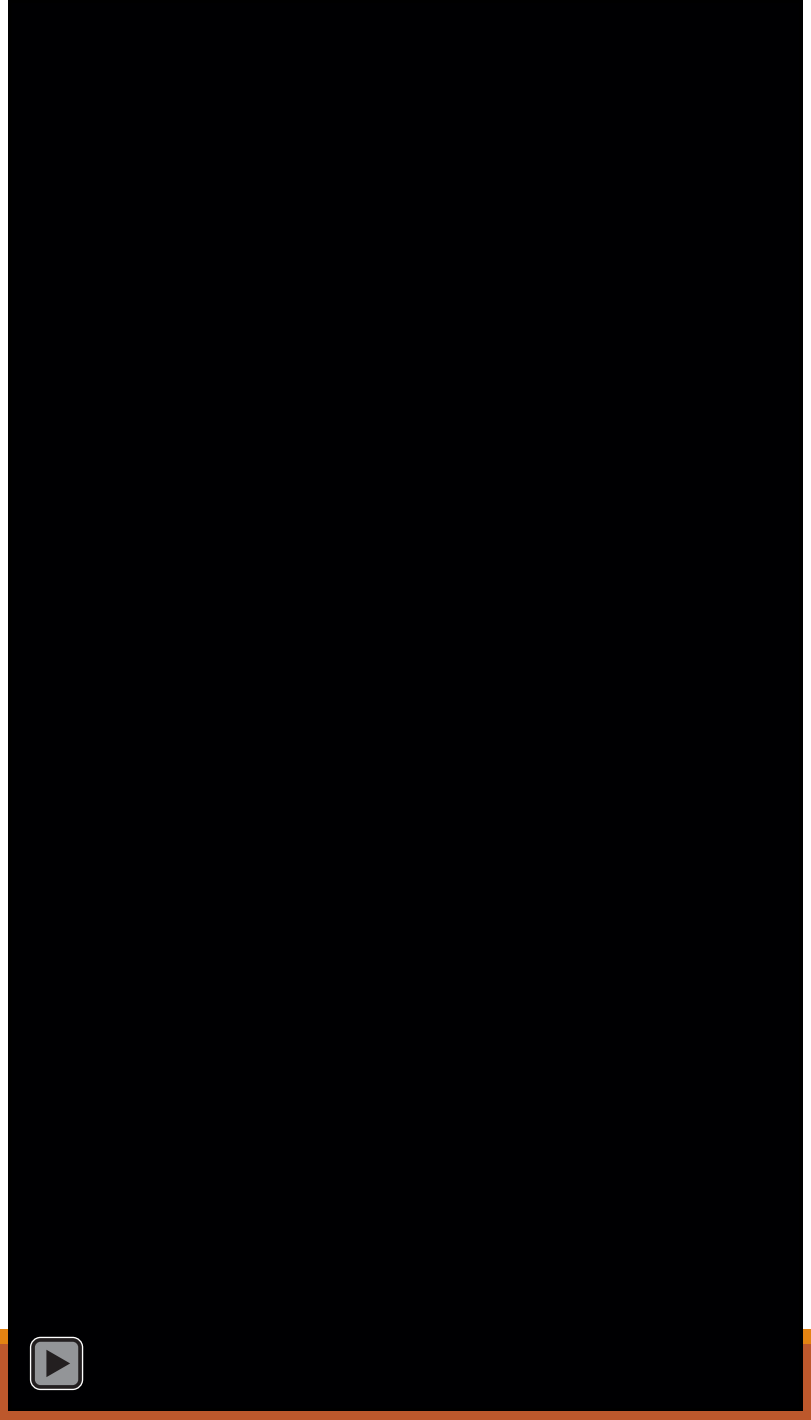
Balanced diet?

Is the caloric intake appropriate?

Can the dog prehend, masticate and swallow food appropriately?

Is the diet palatable to the dog?

Can the dog ambulate to the food and water in the house?



Let's watch Izzy…

Nutrition assessment

Nutrition assessment:

Balanced diet?

- **No (eating >90% of calories from unbalanced food source)**

Is the caloric intake appropriate?

- **No (not meeting RER, losing weight, losing muscle)**

Can the dog prehend, masticate and swallow food appropriately?

- **Maybe**

Is the diet palatable to the dog?

- **Yes and no (does not eat the same diet consistently)**

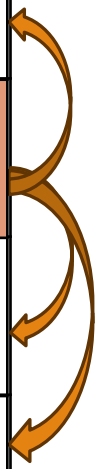
Can the dog ambulate to the food and water in the house?

- **Yes, but has limitations (generalized OA)**

Disease	Protein	Omega-3 Fatty Acids	Phosphorus	Digestibility	Fat	Energy Density	Palatability
Proteinuria	Low	Yes	Controlled?				
Renal Dysfunction	Low	Yes	Low	High	High	High	High
Gastrointestinal Disease/ Pancreatitis	Type of protein			High	Low	High	High
Underweight	Moderate to high	Yes		High	High	High	High
Muscle Loss (Cachexia)	High	Yes		High	High	High	High

Nutrients to consider

Disease	Protein	Phosphorus	Fat
Proteinuria	Low	**Controlled?**	
Renal Dysfunction	Low	**Low**	**High**
Gastrointestinal Disease/ Pancreatitis	**Type of protein**		Low
Underweight	**Moderate to high**		**High**
Muscle Loss (Cachexia)	**High**		**High**



Nutrients to consider

How to manage comorbidities

- Tailor recommendations to the individual patient.
- Assess the current diet and adjust based on existing intake.
- Prioritize conditions based on their clinical significance.
- Evaluate diet options by reviewing nutrients on a calorie basis (e.g., grams per 100 or 1,000 kcal) or caloric distribution (% of metabolizable energy- ME).

Diet	Protein (g/1000 kcal)	Fat (g/1000 kcal)
Purina EN Low Fat canned	120	24.5
Purina EN Low Fat dry	81	19.5
Hill's i/d Low Fat dry with chicken	72	21
Hill's i/d dry chicken flavor	68	37
Hill's i/d Stew Chicken and Vegetable	65	38
Hill's i/d Stew	64	24
Purina NF canned	42	59
Purina NF dry	41.5	42
Hill's k/d stew	37	53
Hill's k/d dry with chicken	36	49

Current diet- sorted by protein (low protein <42 g/1000 kcal)

Diet	Protein (g/1000 kcal)	Fat (g/1000 kcal)
Purina EN Low Fat dry	81	19.5
Hill's i/d Low Fat dry with chicken	72	21
Hill's i/d Stew	64	24
Purina EN Low Fat canned	120	24.5
Hill's i/d dry chicken flavor	68	37
Hill's i/d Stew Chicken and Vegetable	65	38
Purina NF dry	41.5	42
Hill's k/d dry with chicken	36	49
Hill's k/d stew	37	53
Purina NF canned	42	59

Current diet- sorted by fat (low fat <25 g/1000 kcal)

Diet	Protein (g/1000 kcal)	Fat (g/1000 kcal)
Purina EN Low Fat canned	120	24.5
Purina EN Low Fat dry	81	19.5
Hill's i/d Low Fat dry with chicken	72	21
Hill's i/d dry chicken flavor	68	37
Hill's i/d Stew Chicken and Vegetable	65	38
Hill's i/d Stew	64	24
Purina NF canned	42	59
Purina NF dry	41.5	42
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Hill's i/d Stew Chicken and Vegetable	65	38
Purina NF dry	41.5	42
Hill's k/d dry with chicken	36	49
Hill's k/d stew	37	53
Purina NF canned	42	59

Compare diets:
protein- 42 g/1000 kcal
fat- <25 g/1000 kcal

Diet	Protein (g/1000 kcal)	Fat (g/1000 kcal)
Hill's g/d dry	48	29
Hill's g/d canned	49	28
Hill's z/d dry	49	37
Royal Canin Renal Support + Advanced Mobility Support dry	35	41
Just Food For Dogs Hepatic Low Fat Fresh Frozen	52	17.5
Just Food For Dogs Hepatic Low Fat Pantry Fresh	41	22

Look for diets in other categories
protein- 42 g/1000 kcal
fat- <25 g/1000 kcal

Summary

Nutrition Matters: Aging impacts energy, protein, and fat needs.

Individualized Care: Tailor diets to individual needs and comorbidities.

Nutrient Guidelines: Specific guidelines for senior diets do not exist, base recommendations on your patients needs

Practical Steps: Evaluate diets by nutrients per calorie; reassess regularly.

Thank you

CAMILLE TORRES, DVM
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