

*There is a growing body of evidence that low stores of vitamin D are associated with a wide range of diseases in dogs and cats:*

- **Cancer (2,5,7,10,11,12)**
- **Heart disease (9)**
- **Inflammatory bowel disease (4,11)**
- **Renal disease (1,2)**
- **Hyperparathyroidism (2)**
- **Infection (8)**
- **Feline tooth resorption (3)**
- **30 day mortality in hospitalized cats (13)**

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## 1. Serum concentrations of 1,25-dihydroxycholecalciferol and 25-hydroxycholecalciferol in clinically normal dogs and dogs with acute and chronic renal failure

**Gerber B, et al, Am J Vet Res, 2003**

- Mean 25VitD was significantly lower in dogs with ARF and CRF (34 and 52 ng/mL respectively) than control dogs (107 ng/mL). 1,25VitD was not significantly different.

## 2. Serum levels of 25-hydroxycholecalciferol and 1,25-dihydroxycholecalciferol in dogs with hypercalcaemia

**Gerber B, et al, Vet Res Commun, 2004**

- Median 25VitD was significantly lower in dogs with lymphoma, primary hyperparathyroidism and CRF (41, 36, and 27 ng/mL respectively) than control dogs (123 ng/mL). 1,25 VitD was not significantly different.

## 3. Tooth resorption and vitamin D3 status in cats fed premium dry diets

**Girard N, et al, Journal Veterinary Dentistry 2010**

- Mean 25VitD was significantly lower in cats with significant tooth resorption (52.5 ng/mL) than healthy cats (75.1 ng/mL).

## 4. Hypovitaminosis D in dogs with inflammatory bowel disease and hypoalbuminaemia

**Gow AG, et al, J Small Anim Pract, 2011**

- Median 25VitD was significantly lower in dogs with IBD and hypoalbuminaemia than control dogs (median values not provided). 1,25 VitD was not significantly different.

## 5. Cross-sectional study to investigate the association between vitamin D status and cutaneous mast cell tumours in Labrador retrievers

Wakshlag JJ, et al, *Br J Nutr*, 2011

- Mean 25VitD was significantly lower in dogs with MCT (42 ng/mL) than control dogs (48 ng/mL).

## 6. Diet and circulating 25-hydroxyvitamin D levels in dogs

Selting K, VCS poster, 2012



- 320 apparently healthy dogs on 41 different manufacturers of commercial dog food were evaluated for 25VitD levels. Overall serum 25VitD levels ranged from 9.5 – 249 ng/ml, with median, Q1, Q3 at 69.7, 54.5, 88.1 ng/ml, respectively.
- Neuter status correlated with 25VitD concentration. Median 25VitD was 9% lower in spayed compared to intact females, but 27% lower in neutered compared to intact males. Intact status, particularly males, appears to have an impact on serum 25VitD.

## 7. Hypovitaminosis D in dogs with spirocercosis

Rosa CT, et al, *J Vet Intern Med*, 2013

- Median 25VitD was significantly lower in dogs with neoplastic spirocercosis (12 ng/mL) and dogs with non-neoplastic spirocercosis (21 ng/mL) than control dogs (30 ng/mL).

## 8. Domesticated cats with active mycobacteria infections have low serum vitamin D (25(OH)D) concentrations

Lalor SM, et al, *Transboundary and Emerging Diseases* 2012

- Median 25VitD was significantly lower in cats with mycobacteriosis (22.2 ng/mL) than healthy cats (49.0 ng/mL).

## 9. Relation of vitamin D status to congestive heart failure and cardiovascular events in dogs

Kraus MS, et al, *J Vet Intern Med*, 2013

- Mean 25VitD was significantly lower in CHF dogs (40 ng/mL) than in the control group (50 ng/mL)
- There was a significant association of low 25VitD and poor outcome; those with low values had a 2.6 times greater hazard of having a cardiovascular event

## 10. Low stores of 25-hydroxyvitamin D levels and its association with cancer in dogs.

Husbands B, VCS presentation, 2013



- Median 25VitD was significantly lower in the disease cohort (n=335, 313 malignant and 22 benign; 62.6 ng/mL) than the control group (67.4 ng/mL). Cancers that demonstrated significantly lower 25VitD levels were carcinoma (n=64), histiocytic sarcoma (n=8), hemangiosarcoma (n=10), lymphoma (n=80), and sarcoma (n=48).

## 11. Cats with inflammatory bowel disease and intestinal small cell lymphoma have low serum concentrations of 25-hydroxyvitamin D

Lalor S, et al, *J Vet Intern Med*, 2014

- Median 25VitD was significantly lower in cats with IBD/ISCL (12.7 ng/mL) than in healthy cats (45.1 ng/mL) and in hospitalized cats with non-GI disease (33.8 ng/mL).

## 12. Circulating 25-hydroxyvitamin D levels in dogs – correlation with health and cancer risk



Selting K, et al, *Vet Comp Onco*, 2014

- Median 25VitD was significantly lower in dogs with cancer of various types (49 ng/mL) than control dogs (69 ng/mL). Relative risk of cancer increased as 25VitD concentrations decreased ( $P < 0.0001$ ).

25(OH)D	Relative Risk
<40 ng/mL	3.9
<60 ng/mL	2.0
<80 ng/mL	1.4
<100 ng/mL	1.1
>100 ng/mL	0.2 (benefit)

- Sufficient 25VitD to provide cellular health is 100-120 ng/mL.

## 13. Vitamin D status predicts 30 day mortality in hospitalized cats

Titmarsh H, et al, *PLOS*, 2015

- 25VitD was significantly lower in hospitalized cats that died within 30 days than those that were alive after 30 days. Cats with 25VitD levels of 29 ng/mL or lower had an 8.3 times higher rate of dying than those with higher 25VitD levels ( $P = 0.0008$ ).

Further studies are in progress to examine the role of 25(OH)D in dogs and cats and to better understand absorption and potential toxicity levels.

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### Testing Information:

VDI Laboratory offers routine testing of serum 25(OH)D in dogs, cats, & horses. For more information please call 805.577.6742 or visit [www.vdilab.com](http://www.vdilab.com)