

# SPECIFIC DIETS FOR THE NUTRITIONAL MANAGEMENT OF PANCREATITIS



## FAT AND PROTEIN LEVELS

Nutritional support of pancreatitis requires the management of both fat AND protein levels

High levels of fat and protein in the diet give rise to:

- Hyper stimulation of the pancreas by excessive release of cholecystokinin (CCK)
- Acinar cells of dogs fed high-fat diets are more vulnerable to damage caused by bile and trypsin (Haig et al. 1970)



## ROLE OF OMEGA-3 FATTY ACIDS

Omega-3 fatty acids can support management of pancreatitis:

- Hyperlipidemia is a risk factor for pancreatitis. Omega-3 fatty acids help maintain normal serum triglyceride and low-density lipoprotein levels (Backes et al. 2016, Karalis 2017, Stroes et al. 2018)
- Inflammatory cytokines play an important role in the pathogenesis of pancreatitis and can even result in systemic inflammation. Omega-3 fatty acids can support the natural anti-inflammatory process
- Increased levels of CCK induce the release of  $Ca^{2+}$  and a rise in intracellular  $Ca^{2+}$ . Prolonged elevation of cellular  $Ca^{2+}$  can eventually result in zymogen activation and premature activation of digestive enzymes, autodigestion, inflammatory injury and acinar cell death. Omega-3 fatty acid DHA reduced regulators of the release of  $Ca^{2+}$  (Kim et al. 2019)

## RECOMMENDED DIETARY FAT AND PROTEIN LEVELS



(Davenport et al. 2000)

## MANAGEMENT OF CONCURRENT CONDITIONS

The presence of concurrent clinical conditions requires diets that meet both the guidelines for nutritional support of pancreatitis and additional needs arising from the concurrent condition.

Concurrent condition	Additional nutritional requirements
Hyperlipidemia	Even lower dietary fat level at under 10% DM and/or high level of omega-3 fatty acids
Obesity	Low fat level and a low energy density
Diabetes mellitus	Low carbohydrate or high-fibre diet with complex carbohydrates
Exocrine pancreas insufficiency	Highly digestible diets
Inflammatory bowel disease	Highly digestible, hypoallergenic diets, preferably with increased levels of omega-3 fatty acids

# SPECIFIC DIETS FOR THE MANAGEMENT OF PANCREATITIS AND CONCURRENT CONDITIONS



General recommendation for SPECIFIC diets for the management of pancreatitis			
	DOGS	CATS	Characteristics <sup>1</sup>
Adult	CID-LF CIW-LF CDD-HY CΩW-HY	FDD-HY FΩD-HY FXD	Fat levels 10-15% DM and below 10% dry matter for CID-LF and CIW-LF
Juvenile - still growing	CPD-XL CDD-HY CΩW-HY	FDD-HY FΩD-HY FND	Protein levels 15-30% DM (dogs) 30-45% DM (cats)

SPECIFIC Diets for the management of both pancreatitis and concurrent conditions			
	DOGS	CATS	Additional characteristics
Hyperlipidemia	CID-LF*,** CIW-LF*,** CRD-2* CGD* CΩW-HY**	FRD* FΩD-HY**	*fat level <10% DM **High omega-3 fatty acid levels maintaining normal plasma triglyceride levels
Obesity	CID-LF* CIW-LF* CRD-2*	FRD* FRW	*fat level <10% DM
Diabetes Mellitus	CED-DM* CRD-2**	FED-DM* FRD** FRW	*protein level > 30% for CED-DM and > 45% for FED-DM, but due to low fat and carbohydrate level recommended for dogs and cats with pancreatitis and concurrent diabetes mellitus **fat level <10% DM
Exocrine pancreas insufficiency	CID-LF* CIW-LF* CDD CDD-HY CΩW-HY	FDD-HY FΩD-HY	High digestibility *fat level <10% DM

<sup>1</sup> The following SPECIFIC diets meet the recommended dietary protein and fat levels for support of pancreatitis: CID-LF, CIW-LF, CPD-XL, CXD, CGD, CDD, CDD-HY, CID, CIW, CJD, CΩW-HY, CRD-2; FND, FXD, FQD-F, FCD-L, FDD-HY, FΩD-HY, FRD, FRW. The diets in the above table are the most common recommendation.

## References:

- Bakes J et al. (2016) The clinical relevance of omega-3 fatty acids in the management of hypertriglyceridemia. *Lipids Health Dis* 15: 118.
- Davenport DJ et al. (2000) Gastrointestinal and exocrine pancreatic disease. In: Hand et al. *Small Animal Clinical Nutrition*, 4th edition, p 790.
- Haig THB (1970) Nutritional alteration of pancreatic acinar cell stability. *Ann Surg* 172: 852-860.
- Karalis DG (2017) A review of clinical practice guidelines for the management of hypertriglyceridemia: a focus on high dose omega-3 fatty acids. *Adv Ther* 34: 300-323.
- Kim SH et al. (2019) Effect of docosahexaenoic acid on Ca<sup>2+</sup> signaling pathways in cerulein-treated pancreatic acinar cells, determined by RNA-sequencing analysis. *Nutrients* 11: 1445.
- Stroes ESG et al. (2018) Omega-3 carboxylic acids in patients with severe hypotriglyceridemia: EVOLVE II, a randomized, placebo-controlled trial. *J Clin Lipidol* 12: 321-330.