# CANINE HP HEPATIC™

Complete dietetic dry pet food for puppies* and adult dogs for support of liver function in cases of chronic liver insufficiency and for reduction of copper in the liver in cases of accumulation.

## RECOMMENDED FOR & NOT RECOMMENDED FOR

- ✓ Liver failure/disease
- ✓ Hepatitis
- ✓ Portosystemic shunt
- ✓ Copper metabolism disorders
- ✓ Piroplasmosis/Babesiosis
- ✓ Leptospirosis
- ✓ Leishmaniasis
- ✓ Hepatic encephalopathy

- ✗ Not suitable during pregnancy, lactation and growth in puppies before 14 weeks of age
- ✗ Pancreatitis
- ✗ Hyperlipidaemia


3 kg and 12 kg

## KEY BENEFITS


**Selected protein sources**
to help reduce accumulation of toxins and maintain liver function


**Restricted copper**
to reduce hepatic copper accumulation


**High energy content**
to help maintain positive energy balance

## ADDITIONAL BENEFITS & CHARACTERISTICS

**Helps maximise the natural anti-inflammatory processes**
Long-chain omega-3 fatty acids from fish oil

**Helps reduce ammonia production and reabsorption in the large intestine**
Added prebiotic (chicory root)

**Reduces the risk of onset of hepatic encephalopathy**
Thanks to a moderate protein level from selected sources (62% plant, 33% egg)

**Helps protect hepatic tissue and help slow progression of hepatic disease**
Increased levels of antioxidants (Vitamins E and C)

**Helps maintain a steady glucose supply**
Added prebiotics and moderate carbohydrate level

**An easy to digest fat source**
Added medium chain fatty acids from coconut oil

**Helps counteract nutrient deficiencies that may occur in liver disease**
Added zinc

* For puppies over 14 weeks.

## COMPOSITION

Corn###, dried egg#, soya meal#, dried beet pulp#, pork fat, digest#, minerals, fish oil, coconut oil, dried chicory root, cellulose.

\# Protein sources.
\## Highly digestible carbohydrate sources.

| KEY NUTRIENT VALUES* | |
|---|---|
| Moisture | 7.5% |
| Protein | 19.0% |
| Fat<br>- Omega-6 fatty acids<br>- Omega-3 fatty acids<br>- Medium chain fatty acids | 18.0%<br>2.4%<br>0.5%<br>0.9% |
| Carbohydrate | 45.4% |
| Crude fibre | 3.5% |
| Crude ash | 6.0% |
| Sodium | 0.21% |
| Linoleic acid | 2.2% |
| Arachidonic acid | 0.18% |
| Alpha linolenic | 0.16% |
| DHA | 0.12% |
| Vitamin E | 471 IU/kg |
| Total copper | 0.5 mg/100g |
| Zinc | 20.8 mg/100g |
| Metabolisable energy (ME)[1] | 390 kcal/100g |

* Typical analysis in the final product as fed.
[1] Calculated following NRC 2006 equations.

## FEEDING GUIDELINES

Suitable for puppies from 14 weeks old. The recommended period of use is initially up to 6 months for copper reduction in the liver and 4 months for chronic liver insufficiency, but this product is suitable for long-term feeding.

| PUPPY GROWTH – AGE IN MONTHS | | | | |
|---|---|---|---|---|
| Adult weight (kg) | 4 | 6 | 9 | 12 |
| | Daily feeding quantity (g/day) | | | |
| 2.5 | 95 | 85 | 80 | 70 |
| 5 | 135 | 140 | 125 | 115 |
| 10 | 200 | 215 | 185 | 180 |
| 15 | 275 | 300 | 270 | 235 |
| 25 | 335 | 425 | 385 | 335 |
| 35 | 395 | 455 | 525 | 425 |
| 45 | 415 | 465 | 545 | 465 |
| 70 | 455 | 660 | 790 | 745 |

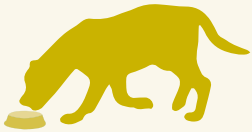
| ADULT MAINTENANCE | |
|---|---|
| Body weight (kg) | Daily feeding quantity (g/day) |
| 2.5 | 65 |
| 5 | 105 |
| 10 | 165 |
| 15 | 215 |
| 25 | 305 |
| 35 | 385 |
| 45 | 455 |
| 70 | 610 |

For adult dogs over 70 kg: for each additional 5 kg of body weight, feed an additional 20 g of dry HP food.

Because the liver is central to the digestion, absorption, metabolism and storage of many nutrients, nutritional support is fundamental in the management of dogs with hepatic disease. The main characteristics that a diet should have for helping in the management of hepatic disease are:

## HIGHLY PALATABLE, HIGH ENERGY DIET

Chronic liver disease causes malnutrition due to impaired nutrient intake associated with anorexia and nausea, and due to maldigestion and malassimilation of food often associated with hepatic fibrosis and portal hypertension[1]. Malnutrition has been proven to have a significant negative impact on the outcome of hepatic patients[2] and preventing malnutrition and maintaining optimal body weight should be major nutritional goals of a hepatic diet. This is achieved by provision of a **highly palatable, high energy diet.** Adding **medium-chain fatty acids,** a form of fat which does not require bile salts or a fully functioning liver for its digestion and absorption, is a good way of providing energy to dogs with hepatic disease.



## REDUCE COPPER ACCUMULATION

The second goal in nutritionally managing canine liver disease should be to **reduce copper accumulation** in relevant cases. Diets low in copper are recommended for dogs diagnosed with hepatic copper accumulation, particularly breeds such as Bedlington terriers which are predisposed to abnormal hepatic copper storage.

## PROVIDE ADEQUATE PROTEIN TO PRESERVE MUSCLE MASS

Reduced liver function can also lead to a decline in stored hepatic glycogen and lipids, necessitating the catabolism of muscle protein in order to meet ongoing energy needs. Given that approximately 50% of body ammonia is temporarily stored in muscle and muscle is the primary site of ammonia detoxification outside the liver, muscle wasting can potentiate hyperammonaemia and hepatic encephalopathy[3]. Therefore another important goal of nutritional management of liver disease should be to **provide adequate protein to preserve muscle mass** while not exceeding the liver's capacity to prevent the accumulation of toxic metabolites and consequent hepatic encephalopathy. The protein source is also important. Dogs with portosystemic shunts (PSSs) may have longer survival and fewer clinical signs if fed vegetable or dairy-based proteins[4]. Feeding dogs with PSSs a soya-based diet has been shown to reduce fasting ammonia concentrations[5].

## FACILITATE HEPATIC CELLULAR REGENERATION

A fourth goal when nutritionally managing canine hepatic disease should be to **facilitate hepatic cellular regeneration** by providing nutrients which are hepatoprotective (e.g. zinc[2]), ameliorate inflammation (e.g. long-chain omega-3 fatty acids[6]) and help neutralise free radicals[2] (e.g. antioxidants such as vitamins C and E).


1. Center SA. (1998) Nutritional support for dogs and cats with hepatobiliary disease. *J Nutr.* **128**:2733S-2746S.
2. Meyer HPT, *et al.* (2010) Hepatobiliary Disease In: Hand MS *et al* (eds). Small Animal Clinical Nutrition, 5th edition. *Mark Morris Institute, Topeka, KS*: 1155-1180.
3. Rothuizen J *et al.* (2001) Inherited liver diseases: New findings in portosystemic shunts, hyperammonaemia syndromes, and copper toxicosis in Bedlington terriers. In: Proceedings 19th Annu Vet Forum. *Am Coll Vet Int Med.* Denver: 637- 639.
4. Condon RE. (1971) Effect of dietary protein on symptoms and survival in dogs with an Eck fistula. *Am J Surg.* **121**:107-114.
5. Proot S, *et al.* (2009) Soy protein isolate versus meat-based low-protein diet for dogs with congenital portosystemic shunts. *J Vet Intern Med.* **23**:794-800.
6. Scorletti E, *et al.* (2013) Omega-3 fatty acids, hepatic lipid metabolism, and nonalcoholic fatty liver disease. *Annu Rev Nutr.* **33**:231-4.

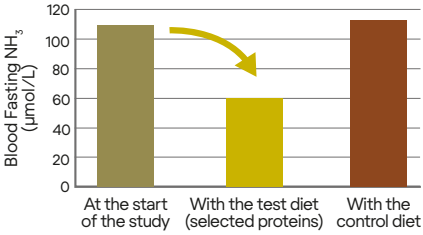
## CLINICAL ADVANTAGES WITH THE USE OF CANINE HP HEPATIC™

PURINA® PRO PLAN® Canine HP Hepatic™ is specifically designed to meet the precise needs of dogs with liver disease:

**Selected sources of protein and adapted levels** to help reduce accumulation of toxins and maintain liver function.

- Moderate protein level (19%) to provide all the dog's amino acid needs and minimise muscle catabolism, which can increase the risk of hepatic encephalopathy (HE)
- Sources of protein are soya meal, maize, egg and beet pulp (62% plant and 33% egg) to provide for dogs' needs whilst reducing risk of HE

EFFECT OF SELECTED DIETARY PROTEIN ON FASTING NH IN DOGS WITH A PORTO SYSTEMIC SHUNT




↓Cu **Low copper** to reduce hepatic copper accumulation.

**High energy density diet** adapted to hypercatabolic state to help maintain body weight and prevent excessive tissue catabolism.

Ω3 **Medium chain fatty acids** to aid fat digestion.

**Long chain omega-3 fatty acids** to maximise natural anti-inflammatory processes.

**Added dietary fibre and prebiotics** (chicory root) to help reduce ammonia reabsorption and production in the large intestine.

**Fortified with zinc** to help reduce the risk of deficiency which may occur in liver disease. Zn

**Highly palatable** to encourage consumption, promote good patient compliance and prevent malnutrition.

**High levels of antioxidants** (Vitamin C and E) to protect hepatic tissue and to slow progression of hepatic conditions. Vit C Vit E