URINARY CARE

A SCIENTIFIC SUPPORT PAPER

When fed Urinary Care diet, 90% of cats achieved optimal urine pH, to support urinary tract health

Kennel 'De Morgenstond', Dussen, Netherlands - 2025 Study

CONTENTS

WHY IS URINARY HEALTH IMPORTANT FOR CATS?

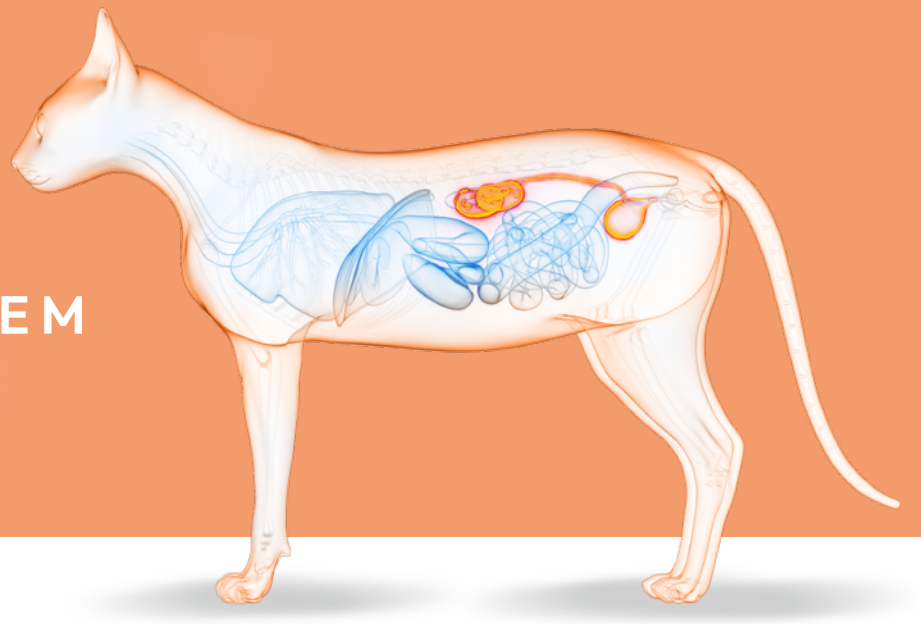
Keeping a cat's urinary tract healthy is important as urinary issues are common in cats and can affect their overall health and wellbeing.

Mild urinary issues can lead to urinary tract disorders which are among the most prevalent medical conditions in feline veterinary practice. Examples include feline lower urinary tract disease (FLUTD) encompasses a range of conditions that can affect the bladder and urethra. Mild signs of urinary problems include more frequent urination or occasional accidents outside the litter tray, whereas cats can display more noticeable symptoms such as straining to urinate or blood in the urine (Kruger et al., 2022). Urinary concerns are a frequent reason for veterinary consultation, particularly in adult and male cats, who are predisposed to urethral obstruction due to anatomical differences (Gunn-Moore et al., 2016).

Urinary health is influenced by several factors, including the cat's environment, stress levels, and diet. Stress, for example, can make the bladder more sensitive and increase the likelihood of episodes in cats with feline idiopathic cystitis (FIC) (Buffington, 2004; Gunn-Moore, 2012).

Diet also plays a role e.g. low water intake, high levels of certain minerals, or changes in urine pH can contribute to the formation of urinary crystals and stones (Lekcharoensuk et al., 2001; Gunn-Moore et al., 2016). By supporting urinary health through appropriate and preventive nutritional strategies, stress management and hydration, owners can help maintain their cat's urinary wellbeing and overall long-term health.

IMPORTANT ROLES OF THE URINARY SYSTEM



The urinary tract in cats plays a crucial role in maintaining homeostasis by regulating the body's fluid, electrolyte, and acid-base balance. It consists of the kidneys, ureters, urinary bladder, and urethra, each contributing to the filtration, storage, and excretion of waste products (Gunn-Moore, 2012).

KIDNEYS

The kidneys filter blood to remove metabolic waste products such as urea, creatinine, and excess electrolytes, while also conserving essential substances like glucose and proteins. They regulate water balance, sodium, potassium, calcium, and phosphate levels, and produce hormones, including erythropoietin for red blood cell production and renin for blood pressure regulation (Buffington, 2004).

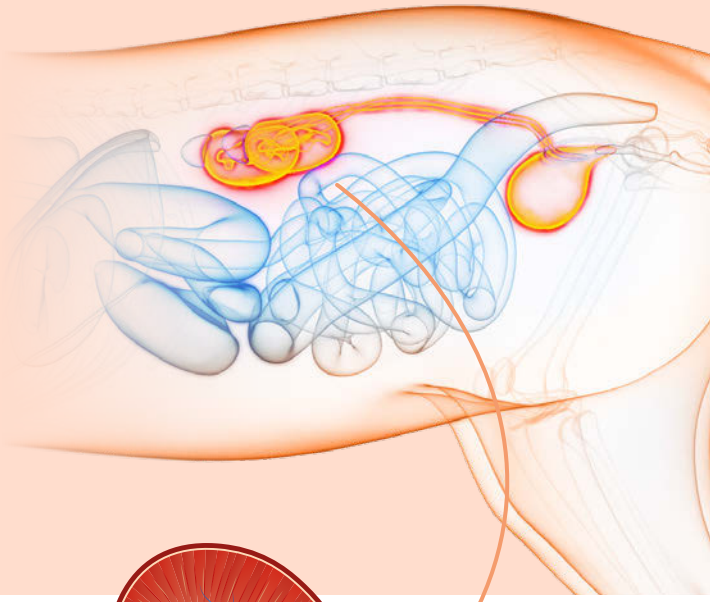
URINARY BLADDER

The urinary bladder serves as a temporary storage reservoir, allowing controlled micturition, while the urethra provides a conduit for the elimination of urine from the body. Proper functioning of the urinary tract is essential for preventing toxicity, dehydration, and electrolyte imbalances. Dysfunction in any part of this system can lead to disorders such as FLUTD, urinary obstruction, or chronic kidney disease, all of which can significantly affect feline health and welfare (Kruger et al., 2022).

SPECIALISED ADAPTATIONS

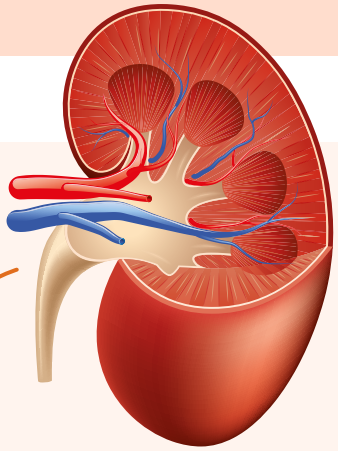
In cats, the urinary tract also has specialised adaptations, such as a relatively concentrated urine to conserve water, reflecting their evolutionary adaptation to arid environments.

However, this concentration increases susceptibility to crystal and stone formation, making urinary tract health particularly important in feline species (Lekcharoensuk et al., 2001).



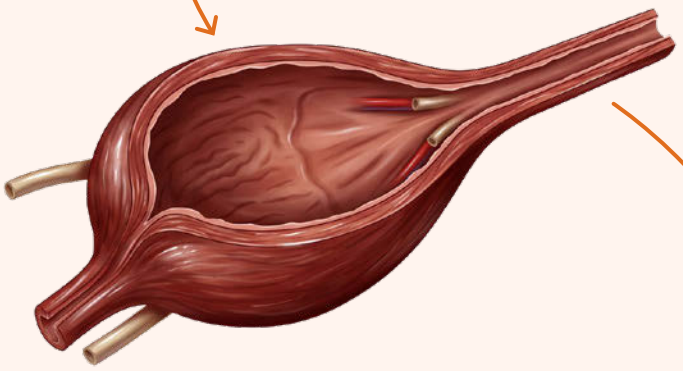
ANATOMY OF FELINE URINARY ADAPTATIONS

This diagram highlights the key structures of the feline urinary tract and illustrates how their specialised adaptations influence urinary health.

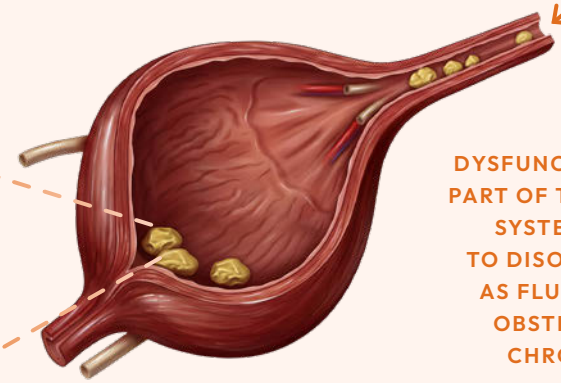


CROSS SECTION OF A KIDNEY

CROSS SECTION OF A HEALTHY BLADDER



CATS PRODUCE VERY CONCENTRATED URINE, WHICH HELPS CONSERVE WATER BUT ALSO RAISES THE RISK OF URINARY CRYSTALS AND KIDNEY STONES.



DYSFUNCTION IN ANY PART OF THE URINARY SYSTEM CAN LEAD TO DISORDERS SUCH AS FLUTD, URINARY OBSTRUCTION, OR CHRONIC KIDNEY DISEASE.

THE IMPORTANCE OF BIOAVAILABLE & BIOACTIVE PEPTIDES FOR URINARY HEALTH

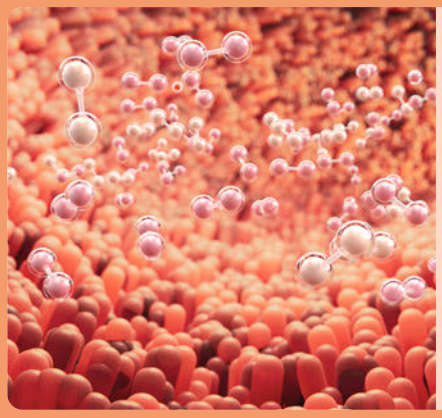
Proteins are large molecules made up of individual 'building blocks' called amino acids. After eating food containing protein, the process of protein digestion begins as enzymes released in different parts of the gastrointestinal tract break it down into protein hydrolysates: short chains of amino acids called peptides and free amino acids.

This enables these building blocks to be absorbed into the body where they can be recombined to build new proteins. The urinary tract relies on a wide variety of proteins that play crucial roles in maintaining urinary health, including regulating urine composition, protecting urinary tissues, and supporting immune function. Some of the key proteins and amino acids involved in urinary health include albumin, uromodulin, Tamm-Horsfall protein, taurine, methionine, cysteine, and arginine. These proteins contribute to the maintenance of urinary health by helping to prevent crystal and stone formation, supporting the structural integrity of the urinary tract, and enhancing defence against urinary tract infections. Adequate intake of high-quality, highly digestible proteins ensures that these building blocks are available in sufficient amounts to sustain renal function, maintain optimal urine pH, and support overall urinary tract resilience (Backlund et al., 2017; Funaba et al., 2003; Paßlack et al., 2014; Scherk, 2025).

Historically it was believed that only free amino acids were absorbed from the gastrointestinal tract by specific amino acid transporters whereas it is now recognised that the majority of amino acids are absorbed from the intestine as di- and tri-peptides by the broad-specificity peptide transporter PepT1 (Fei et al., 1994). Di-peptides and tri-peptides are most abundant in the molecular weight range of 0.2–0.25 kDa and 0.3–0.4 kDa, respectively.

Research has shown that intake of proteins that have already been hydrolysed (peptides) are more readily absorbed from the digestive tract than intact protein and even individual amino acids (Maebuchi et al., 2007; Zhao et al., 1997).

High-quality, highly digestible proteins (peptides) are particularly beneficial for urinary health due to their efficient amino acid absorption and minimal strain on the kidneys. Peptides are rapidly broken down and absorbed, ensuring the body receives essential nutrients without overwhelming renal function. This is crucial because excessive protein intake can lead to increased production of nitrogenous waste products like urea, which the kidneys must filter. In individuals with compromised kidney function, an overload of these waste products can exacerbate renal stress and potentially lead to protein toxicity, characterised by symptoms such as vomiting, loss of appetite, and in severe cases, seizures or encephalopathy (Backlund et al., 2017). Moreover, high-quality proteins contribute to maintaining an acidic urine pH, which is less conducive to the formation of urinary crystals and stones. This is particularly important for carnivorous species, such as cats and dogs, whose natural diets result in acidic urine, thereby reducing the risk of struvite crystal formation (Funaba et al., 2003). Additionally, these proteins support the immune system by providing the necessary building blocks for immune cells and antibodies, enhancing the body's ability to combat urinary tract infections. However, it is essential to balance protein intake, as excessive amounts can lead to kidney strain and increased risk of urinary issues. Therefore, incorporating high-quality, highly digestible proteins into the diet, while monitoring total intake, can promote optimal urinary health and prevent potential complications associated with both deficiency and excess.



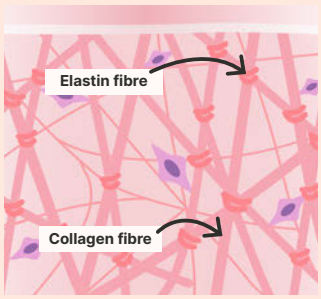
BENEFITS OF HIGH-QUALITY, EASILY DIGESTIBLE PROTEINS FOR URINARY HEALTH

High-quality, highly digestible proteins help support urinary health by providing efficiently absorbed amino acids without overloading the kidneys, reducing nitrogenous waste and the risk of renal stress. They also help maintain an acidic urine pH that discourages urinary crystal and stone formation, particularly important for carnivorous species like cats and dogs, while supporting immune function to help prevent urinary tract infections. Balancing overall protein intake is essential, as both deficiency and excess can contribute to urinary issues.

COLLAGEN PEPTIDES AND URINARY TRACT HEALTH

COLLAGEN'S STRUCTURAL ROLE IN THE FELINE URINARY TRACT: IMPLICATIONS FOR HEALTH AND DISEASE

Collagen is a primary structural protein in connective tissues, forming a significant component of the extracellular matrix (ECM) in the urinary tract. In cats, as in other monogastric species, collagen provides essential strength and elasticity to the bladder, urethra, and kidneys, facilitating their proper function. Maintaining healthy collagen levels is therefore critical for normal urinary physiology. Alterations in collagen structure or quantity can compromise tissue integrity, potentially contributing to urinary tract disorders such as FIC and other forms of FLUTD (Kullmann et al., 2018; McCullagh et al., 1983).



CROSS SECTION OF HIGH DENSITY OF COLLAGEN AND ELASTIN FIBRES

COLLAGEN IN URINARY TRACT FUNCTION

The urinary tract comprises tissues that rely heavily on collagen for structural integrity. In the bladder, collagen fibres contribute to organ compliance, enabling expansion and contraction during urine storage and voiding. A balanced proportion of collagen and elastin is essential for maintaining this function; disruptions can lead to impaired bladder compliance and dysfunction (Hatala et al., 2023). In the urethra, particularly in female cats, reduced collagen content or altered cross-linking has been linked to stress urinary incontinence (SUI). Such changes weaken the supportive connective tissue, decrease urethral elasticity, and increase susceptibility to incontinence (Cendron et al., 1995).

COLLAGEN'S ROLE IN FELINE URINARY HEALTH

Beyond providing structural support, collagen also participates in tissue remodelling and repair. In FIC, alterations in the ECM, including collagen, have been observed, suggesting that collagen dysregulation may contribute to disease pathogenesis (Kullmann et al., 2018; Labelle et al., 2023). Collagen-based interventions have also been investigated for urinary tract disorders in cats. For example, bladder reconstruction using in-body tissue engineering, which incorporates collagen scaffolds, has demonstrated potential for structural and functional regeneration of feline urinary tissues (Fujita et al., 2024).

CONSEQUENCES OF COLLAGEN DEFICIENCY

Deficiency or imbalance in urinary tract collagen can result in multiple complications. Weakening of bladder connective tissue may lead to bladder prolapse, causing urinary retention and incontinence. Insufficient collagen support around the urethra can trigger stress urinary incontinence, characterised by involuntary urine leakage during physical activity. Altered collagen composition in the urethra may also increase the risk of obstruction, particularly in male cats due to their narrow urethral anatomy (Ichii et al., 2022).

RESEARCH EVIDENCE IN CATS

Several studies underscore the importance of collagen for feline urinary health. Renal shear wave elastography has been used to evaluate kidney stiffness and collagen-related tissue elasticity in cats, providing insights into renal function and structural integrity (Thanaboonnipat et al., 2019). Additionally, collagen-based scaffolds in bladder reconstruction demonstrate the feasibility of using collagen for tissue regeneration, highlighting its critical role in maintaining urinary tract function (Fujita et al., 2024; Cendron et al., 1995).

Collagen is integral to the structural integrity and function of the feline urinary tract. Maintaining healthy collagen levels supports the bladder and urethra's ability to store and void urine effectively. Disruptions in collagen balance can lead to various urinary issues, emphasizing the importance of collagen for urinary tract health and providing a potential target for therapeutic interventions.

WHAT MAKES THE URINARY CARE DIET SO UNIQUE?

The development and formulation of the Urinary Care recipe has centred around the 'Power of Peptides' using the latest Freshtrusion HDP technology.

Freshtrusion HDP (Highly Digestible Protein) is the unique process of cooking fresh meat and fish ingredients in the presence of a natural enzyme, which digests (hydrolyses) the protein into a mixture of peptides and free amino acids.

This increases the digestibility and bioavailability of the protein and improves palatability, through what we like to refer it as Goldilocks Principle:

HDP freshtrusion® HIGHLY DIGESTIBLE PROTEIN

THE GOLDILOCKS PRINCIPLE

Instinctively, it would be assumed that intact protein would be best for a dog to digest as it contains all the nutritional elements together as one. Similarly, individual amino acids, broken down as small as possible, might be considered to be much easier to absorb. However, it has been proven in research studies that the ideal digestibility and absorption rates occur in small-chain peptides (≤ 3kDa). We like to refer to this as the 'Goldilocks principle'.

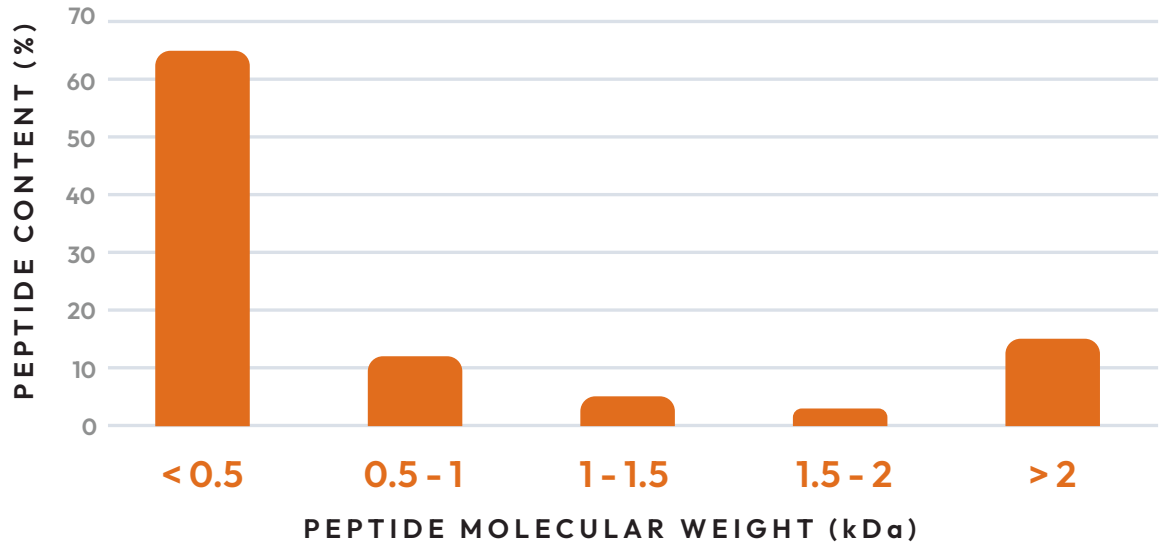
INTACT PROTEIN

DI AND TRI-PEPTIDES

SINGULAR AMINO ACIDS

TOO BIG JUST RIGHT TOO LITTLE

URINARY CARE RECIPE: PEPTIDE CONTENT (%)



A minimum of 65% of the peptides in this recipe are < 0.5 kDa with just 15% of the peptides > 2 kDa

These results show the majority of peptides in the finished kibble fall into the < 0.5 kDa category, which includes the highly digestible and nutritionally beneficial dipeptides and tripeptides - achieving the Goldilocks Principle.

THE POWER OF THE PEPTIDES FOR URINARY CARE

- ✔ **Increases the digestibility and bioavailability of the protein**
- ✔ **Improves the palatability of the recipe**
- ✔ **Reduces allergenic potential of the animal protein source**
- ✔ **Ensures an ideal supply of amino acid building blocks required for the renewal, maintenance and repair of urinary tract and supporting tissues**

WHAT OTHER INGREDIENTS ARE BENEFICIAL IN SUPPORTING URINARY HEALTH?

In addition to the inclusion of hydrolysed protein, Urinary Care is formulated with **UriTract™** - a multi-functional urinary-support blend combining five carefully selected ingredients: **Cranberry, Camomile, Rosehips, L-Tryptophan and L-Carnitine**.

Together, this blend supports the maintenance of a healthy urinary environment, and helps reduce risk factors associated with urinary discomfort in cats.

Cranberry

Cranberry *(Vaccinium macrocarpon)* is included in feline urinary-support formulations primarily for its content of A-type proanthocyanidins (PACs), which exhibit a well-documented anti-adhesion effect against uropathogenic Escherichia coli (UPEC) (Howell et al., 2010). **Multiple lines of evidence support cranberry's role in feline urinary health**, with the strongest data coming from a recent blind randomized cross-over feeding trial in cats (Carvajal-Campos et al., 2024). In this study, six neutered adult cats were fed three diets - control, 0.1% cranberry powder, and 0.3% cranberry powder - each for two-week periods, followed by ex-vivo testing of their urine on CRFK feline uroepithelial cells. The authors reported a significant reduction in E. coli adhesion in 60% of cats at 0.1% and in all cats at 0.3%, establishing 0.1–0.3% as an evidence-based dietary inclusion range for anti-adhesive urinary support.

These findings are reinforced by a small clinical RCT in cats with idiopathic cystitis, where Colombino et al. (2022) demonstrated that a cranberry-containing oral supplement improved lower urinary tract signs, bladder ultrasound findings, and owner-reported comfort compared with controls. Cross-species data further validate the mechanism: Chou et al. (2016) showed that cranberry extract given to dogs reduced E. coli adhesion to MDCK cells and lowered UTI incidence, while in-vitro mechanistic studies (Ermel et al., 2012; González-de-Llano et al., 2019) confirmed that cranberry PACs and their metabolites directly inhibit uropathogenic E. coli adhesion at microgram-per-millilitre concentrations.

In addition to anti-adhesive activity, **cranberry provides polyphenolic antioxidants that may help maintain bladder tissue integrity and reduce oxidative stress associated with lower urinary tract inflammation**. Together, these convergent data sets demonstrate that cranberry - particularly when inclusion levels, extract standardisation, and PAC exposure are controlled - offers a reproducible, biologically validated anti-adhesive effect for cats prone to urinary sensitivity or UTI-associated discomfort.

Camomile

Camomile *(Matricaria chamomilla)* may contribute indirect urinary health benefits through its anxiolytic, anti-spasmodic, and anti-inflammatory properties. Stress is a significant trigger of FIC, and camomile's active flavonoids - apigenin and bisabolol - have demonstrated central nervous system calming activity and reduced stress-related biomarkers in animal models (Singh et al., 2011; Miraj & Kiani, 2016).

These anxiolytic effects are relevant because stress reduction is strongly associated with decreased FIC flare-ups and improved urinary frequency and comfort in affected cats. Camomile also exhibits anti-inflammatory and antioxidant activity in vivo (Hussein et al., 2024), suggesting potential supportive roles in maintaining normal bladder mucosal integrity. While camomile is not considered a direct influence, its **stress-modulating and anti-inflammatory properties** justify its inclusion in multi-functional urinary-support diets.

Rosehips

Rosehips *(Rosa canina)* provide **a concentrated natural source of polyphenols, vitamin C, and carotenoid antioxidants**. Although cats synthesise vitamin C endogenously, supplemental antioxidant intake may help protect urinary tract tissues from oxidative stress, which is associated with lower urinary tract inflammation and epithelial irritation (Chrubasik et al., 2008). Studies in monogastric species demonstrate rosehip extracts exert significant anti-inflammatory and antioxidant effects (Babujanarthanam et al., 2011), supporting their relevance in mitigating inflammation-associated oxidative pathways. These mechanisms may help maintain normal bladder wall structure, support mucosal defences, and contribute to overall urinary tract resilience in cats experiencing recurrent urinary sensitivity. While not a direct functional ingredient, **rosehips functions as a complementary botanical supporting antioxidant balance and normal urinary tissue health**.

L-Carnitine

L-carnitine (LC) is an essential nutrient that facilitates fatty acid transport into the mitochondria for β-oxidation, thereby supporting fat metabolism and energy production. **In overweight or obese cats, supplementation with L-carnitine has been shown to enhance fat oxidation and preserve lean body mass.** For example, in a study of overweight neutered cats, dietary L-carnitine significantly increased resting energy expenditure relative to lean body mass and promoted fatty acid utilization compared to control cats (Laflamme et al., 2012). Another study in obese pet cats undergoing weight loss found that oral L-carnitine supplementation accelerated weight reduction while maintaining lean tissue (Biourge et al., 2001). A further controlled feeding trial reported that cats consuming diets with higher L-carnitine concentrations gained less adipose tissue than those fed lower concentrations, even in positive-energy-balance conditions (Jewell et al., 2016). Because obesity is a known risk factor for urinary problems in cats - likely due to both metabolic inflammation and mechanical pressure on the bladder (Walker et al., 2019) - **L-carnitine helps support urinary health indirectly by promoting healthy body weight and optimal body composition**.

L-Tryptophan

L-tryptophan is an essential amino acid and a precursor for serotonin, a neurotransmitter involved in regulating mood and stress responses (Xu et al., 2023). Increased dietary tryptophan raises central serotonin synthesis, producing calming and anxiolytic effects in cats (Landsberg et al., 2016). In one study, cats fed a diet supplemented with L-tryptophan and α-casozepine, a milk-derived peptide that modulates GABA_A receptors, exhibited decreased inactivity and anxiety-related behaviours in open-field tests after 2 – 4 weeks compared to controls (Landsberg et al., 2016). Another study demonstrated that cats fed this combination for eight weeks showed reduced urinary cortisol levels, indicating lower physiological stress (Plumlee et al., 2015). Stress is strongly implicated in FIC, as increased sympathetic activity and neurogenic bladder inflammation can trigger flare-ups (Buffington et al., 2006). Dietary strategies that reduce stress - such as L-tryptophan supplementation - have been associated with fewer recurrent urinary episodes; for instance, cats on a stress-reducing therapeutic diet experienced significantly fewer FIC recurrences over five weeks than those on a control diet (Vogelsang et al., 2019). **By mitigating stress, L-tryptophan contributes to stabilising bladder function and reducing the risk of urinary flare-ups**.

WHAT ARE THE RESULTS?

As part of the development of the Urinary Care recipe, an independent study was conducted to assess the efficacy of the diet in maintaining optimal urine pH and supporting urinary tract health in cats.

The study was conducted at Kennel 'De Morgenstond' (Dussen, The Netherlands), a dedicated animal care and research facility equipped for controlled dietary trials. The centre adheres to strict protocols for animal care, housing, and environmental control, providing a stable and standardised setting for the collection of physiological data such as urine pH.

The study involved a panel of 10 healthy adult cats and lasted one week, including a transition onto the Urinary Care diet, focusing on regulating urinary pH within the physiological range of 6.0 to 6.6, which is recognised as ideal for reducing the risk of urinary stone (urolith) formation.

Cats are particularly susceptible to developing uroliths, which are crystalline deposits that form when urinary mineral concentrations become excessive. The most common types of feline uroliths are struvite and calcium oxalate. Urine pH plays a key role in determining which type of crystal may form: struvite stones tend to develop in more alkaline urine (higher pH), while calcium oxalate stones are favoured by more acidic conditions (lower pH).

Maintaining urine pH between 6.0 and 6.6 therefore helps minimise the risk of both types—keeping pH at or below 6.6 reduces struvite formation, while maintaining pH at or above 6.0 helps prevent calcium oxalate development.

During the study, urine samples were collected on feeding days 4 through 7 and analysed using a calibrated pH meter to ensure accuracy and repeatability. All cats were exclusively fed Urinary Care during this period to eliminate dietary variability.

The results demonstrated that when fed Urinary Care, 90% of the cats achieved a urine pH within the optimal range of 6.0–6.6. These findings indicate that the Urinary Care formula provides effective dietary modulation of urinary pH, contributing to the nutritional management and long-term maintenance of urinary tract health in cats.

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