Key nutritional factors
Contents

1 Key nutritional factors
1.1 In healthy pets ............................................. 4
1.2 In sick pets ............................................... 4
1.3 Risk factor management ................................. 5

2 Some key nutritional factors in clinical nutrition
2.1 Protein ...................................................... 10
  2.1.1 Too much protein ..................................... 10
  2.1.2 Too little protein ..................................... 10
2.2 Fat .......................................................... 11
  2.2.1 Too much fat .......................................... 11
  2.2.2 Too little fat .......................................... 11
2.3 Calcium .................................................... 12
  2.3.1 Too much calcium .................................... 12
  2.3.2 Too little calcium .................................... 12
2.4 Phosphorus ............................................... 12
2.5 Sodium ..................................................... 13
2.6 Magnesium ............................................... 13
2.7 Copper ..................................................... 13

• Summary of key points
• Self-assessment questions
• Building your portfolio
By the end of this module, you should be able to:

- summarise and explain the key nutritional factors in small animal nutrition.
Key nutritional factors

1.1 In healthy pets

Over time, the public has become more aware of the importance of nutrition to health. There is a growing recognition that food can help prevent disease processes such as:

- coronary heart disease
- hypertension
- obesity
- diabetes mellitus
- cancer.

This increased recognition of the intimate relationship between maintaining health and nutrition has led to the development of the full range of high quality Hill’s products for healthy animals (See Chapter 7).

1.2 In sick pets

Apart from the role that nutrition plays in helping healthy cats and dogs lead longer, happier lives, nutrition also plays a very important role in the management of sick animals.

Every disease needs specific nutritional management. This can include a number of factors:

- higher content of specific nutrients e.g. zinc or fibre
- reduction of acute or chronic acidosis
- maintenance of a specific urinary pH range
- structured kibble texture
- increased digestibility
- avoidance of certain protein sources.

The tailored nutrition for specific diseases is called Clinical Nutrition.

Interesting fact

In the 1988 ‘Surgeon General’s Report on Nutrition and Health’, it was noted that: ‘For the two out of three adult Americans who do not smoke and do not drink excessively one personal choice seems to influence long-term health prospects more than any other: what we eat’.

Let your client know

When food is formulated correctly, it not only helps prevent disease, but it can also help:

- improve life quality by alleviating signs and symptoms
- lengthen life expectancy by slowing down disease processes.
1.3 Risk factor management

Nutritional risk factors have recently been identified for people.

Examples:
1. excessive intake of saturated fat is linked to cardiovascular disease
2. excessive intake of sodium chloride increases the risk of hypertension.

Examples of nutritional risk factors in pets are:
1. excess phosphorus intake increases the progression of renal disease (including subclinical disease!)
2. excessive intake of energy and calcium increases the risk of developmental orthopaedic disease in large- and giant-breed puppies.

In order to maintain the best possible health in the pet, it is important to detect and manage any health risk factors. In human medicine, a physician will want to take into account the patients age, sex, weight, lifestyle and family history in order to provide good healthcare. Examples of what a doctor might consider health risk factors would be if the patient:
- spends more than 8 hours a day in front of the TV
- is 5% overweight
- eats a high percentage of fast food
- has a family history of heart disease.

Vets look at pet health in a similar way and would look at factors such as the age, breed, diet and lifestyle of the pet. For example, a client may bring in a pet that:
- is four months old
- is a golden retriever
- is 10% overweight
- lives in a high-rise apartment without a lift.

It would be crucial for this dog to have the right nutritional advice – otherwise, this could be a recipe for illness.

See table below for more examples of potential risk factors for dogs and cats:

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>DISEASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive fat and energy intake</td>
<td>Developmental orthopedic disease</td>
</tr>
<tr>
<td></td>
<td>Obesity</td>
</tr>
<tr>
<td>Excessive calcium intake</td>
<td>Developmental orthopedic disease</td>
</tr>
<tr>
<td>Excessive phosphorus intake</td>
<td>Progression of renal disease</td>
</tr>
<tr>
<td>Excessive sodium chloride intake</td>
<td>Progression of renal disease</td>
</tr>
<tr>
<td></td>
<td>Hypertension</td>
</tr>
<tr>
<td>Excessive protein intake</td>
<td>More serious symptoms of renal disease</td>
</tr>
<tr>
<td>Excessive magnesium intake</td>
<td>Feline struvite urolithiasis</td>
</tr>
</tbody>
</table>

The risk of disease increases with age, but even young animals may develop illnesses that must be addressed. The table on the following page shows the disease prevalence for dogs and cats examined in North American Veterinary practices.
Each and every one of these diseases will do better with the proper clinical nutrition. Correct clinical nutrition takes into account all the different factors in a disease and is designed especially to combat these.
Some key nutritional factors in clinical nutrition

In order to minimise the risk of disease, Hill’s has developed a set of key nutritional factors (KNF) that should be taken into account in the day-to-day feeding of both healthy and sick animals. These KNFs address the most common risk factors for developing ailments in dogs and cats, which may vary by age.

Definition
Malnutrition is defined as any disorder that results from either inadequate or unbalanced nutrition. The most common form of malnutrition in dogs and cats is consumption of excessive levels of fat and energy, leading to obesity.
The concept of focusing on a few key nutrients is very appropriate for cats and dogs that are fed commercial pet foods.

These pet foods usually meet the minimum requirements for all nutrients but may suffer from nutrient excess.
2.1 Protein

2.1.1 Too much protein

Too much dietary protein can be a problem for dogs and cats with specific disease conditions. These include:
- impaired renal function
- uroliths
- adverse food reactions
- fear-related territorial aggression in dogs.

Not all dogs and cats that appear healthy are free of disease. Dogs and cats with chronic renal disease are usually subclinical until the disease has progressed to the point that two-thirds or more of functional renal tissue is lost. Renal disease is also the second most common cause of non-accidental death in dogs and cats. This means that a significant number of apparently healthy dogs and cats will have sub clinical renal disease! Feeding a diet with an excess of protein, and therefore usually with an excess of phosphorus, may contribute to the progression of renal disease and its symptoms. As a result, the pet develops clinical symptoms earlier than it would have done if it were fed a diet with a more appropriate protein level.

Therefore, Hill’s recommends a balanced protein level, especially for ‘at risk’ animals and senior dogs and cats.

Definition
Sub clinical: a disease is present in a dog or cat but the pet displays no obvious symptoms.

2.1.2 Too little protein

There are conditions where pets need additional protein, such as:
- growth
- severe infection
- burns
- liver disease.
2.2 Fat

2.2.1 Too much fat

When a pet has an increased intake of fat, they will also have an increased intake of energy. This may predispose growing large and giant-breed puppies to developmental orthopaedic disease and adult pets to obesity. Optimal skeletal development is more likely to occur if growth is slowed by reducing the fat and energy intake of these puppies. Obesity is the most significant clinical problem associated with malnutrition in adult dogs and cats. 25–50% of dogs and cats in the UK are above their ideal weight for their breed, age and sex.

Risk factors for obesity include:
- middle age
- female gender
- neutering
- certain breeds
- lack of exercise
- feeding foods high in fat and energy.

Obesity prevention is an important goal in feeding adult dogs and cats, and should be aggressively pursued in dogs and cats with multiple risk factors.

2.2.2 Too little fat

Deficiencies of fatty acids:
- impair wound healing
- cause a dry lustreless coat and scaly skin
- may predispose the pet to pyoderma (skin infection)
- may result in alopecia (loss of hair)
- may cause oedema
- may cause moist dermatitis (superficial skin infection).

Deficiencies of fatty acids are most commonly seen with homemade foods.
2.3 Calcium

Deficiencies and excesses of calcium as well as calcium-phosphorus imbalances, should be avoided in dogs and cats.

2.3.1 Too much calcium

Calcium excess is especially detrimental in rapidly growing pets, especially in large and giant-breed puppies. Specific factors that are thought to increase the risk of developmental orthopaedic disorders include:

- belonging to a large or giant-breed
- free-choice feeding
- feeding high-energy foods
- excessive calcium intake from food, treats and supplements.

2.3.2 Too little calcium

Calcium deficiency occurs most commonly when feeding foods that are high in phosphorus (high in meat and offal).

2.4 Phosphorus

In general, meat tissue (poultry, lamb, fish, beef) is high in phosphorus and so are eggs and milk products. Therefore, a high phosphorus content in the food will often be present when the food has a high protein content.

An excess of phosphorus in the diet has been shown to increase the progression of renal disease. Research in dogs and cats with advanced renal disease has shown that decreasing the level of dietary phosphorus slows the progression and reduces the severity of renal disease. This has the beneficial effect of lengthening the pet’s life.

Limiting excess phosphorus throughout dogs’ and cats’ adult lives may reduce progression of renal disease in its earlier stages when diagnosis is difficult.
2.5 Sodium

Research has demonstrated that feeding cats a diet high in sodium is dangerous. In cats with early, undiagnosed, renal disease that were fed a diet high in sodium, a progressive deterioration in renal function was shown.

2.6 Magnesium

Excess dietary magnesium should be avoided to prevent the precipitation of struvite crystals in the urine of cats and dogs.

2.7 Copper

Copper deficiency may occur with high levels of zinc and iron. Copper toxicity occurs mainly in specific breeds that are predisposed to copper storage defects. Bedlington Terriers and West Highland White Terriers are prone to hepatic copper storage defects. These defects cause accumulation of copper in the liver, which results in severe liver disease.
Summary

Summary of key points
1. Nutrition is important for good health: avoiding disease, improving life quality and increasing life expectancy.
2. Risk factor management ensures that health risks are detected and addressed appropriately.
3. Some nutrients are considered key nutritional factors.
4. Nutritional risk factors in pets include excessive intake of phosphorus and energy and calcium for particular breeds.

Self-assessment questions
1. What is the aim of clinical nutrition?
2. What is malnutrition?
3. Which nutrients are considered key nutritional factors?
Building your portfolio

Photocopy and use the form below to keep a record of your answers to the questions below. Keep this information for your portfolio.

Exercise

a. Explain to Mrs Read, in simple terms why too much meat in the diet can cause problems for her cat.

b. How would you explain, in simple terms, why the right nutrition can help prevent disease and help keep her cat healthy?