

# **Boxer**

**Tailor-made  
nutrition for Boxers**



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**Royal Canin scientific research:  
innovation in Health Nutrition**

# INTRODUCTION

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*It's a great pleasure for me to write the introduction to this brochure today. A pleasure, quite simply, because everyone knows the dog affectionately called the 'gentle giant'. It's not the biggest or the heaviest, but it's certainly the most popular. And you'll often hear a Boxer owner say: 'A Boxer is for life, I'd never swap it for another breed.'*

*But what particular attributes does it have that appeals to us so much?*

*Above all, the Boxer is an exceptionally dynamic dog, with a frank, even impetuous character, whose image has also been widely used to exemplify resistance and speed. The muscle-bound Boxer has a strong build and requires a high-energy diet that fulfills its extensive requirements without exceeding its digestive capacity.*

*Royal Canin has conducted a string of studies since 2002 – to complement the professional knowledge of our network of breeders – aimed at developing a targeted response to the particular sensitivities of this exceptional dog. We worked hard to adapt the texture and shape of the kibble to facilitate prehension. Once we achieved our objective we directed our efforts to controlling the speed of ingestion, by encouraging the dog to chew. The more the dog wolfs its food down, the higher the risk it will be poorly digested. The Boxer's digestive sensitivity is fairly marked, so we've done all we can to minimize the quantity of indigestible ingredients in our food: the quality of proteins has received particular attention, in order to slow fermentation reactions in the colon.*

*As a sociable dog that's very loyal to its human companions, the Boxer deserves the best care and nutrition there is to keep it in tip-top shape for as long as possible. Despite its outward show of strength, its health must be monitored, because unfortunately its life expectancy is shorter*

*than that of other large-breed dogs, like the German Shepherd, the Labrador and the Golden Retriever.*

*The vivacious, noble and powerful Boxer has a generous heart that must be protected. We do so by supplementing its food with all the nutrients that can have a positive impact: taurine, L-carnitine to optimize the intake of energy, more antioxidants to help the heart cells combat free radicals, and EPA/DHA to limit the risk of arrhythmia.*

*Royal Canin has repeatedly risen to the challenge of fulfilling the nutritional needs of dogs as diverse as the Yorkshire Terrier, the German Shepherd, the Labrador, the Poodle, the Dachshund and now the Boxer. Each one of these breeds requires a highly precise nutritional response, which we formulate purely to assure the dog's well-being and longevity. In that sense, 'Knowledge and Respect' means that Royal Canin – nourishing and health-promoting foods.*

*We are confident that this contribution will bring longevity, happiness and well-being to all Boxers, a breed for which we share your passion.*



© Y. Lanceau



Alain Guillemin  
Chief Executive Officer  
Royal Canin Group

# **THE BOXER...**

*never out of fashion*

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**1 THE BOXER: A POWERFUL,  
ATHLETIC DOG**



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**2 A HEART THAT NEEDS TO BE MONITORED**



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**3 A HEAD WITHOUT COMPARISON**



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**4 AN IRRITABLE DIGESTIVE SYSTEM**



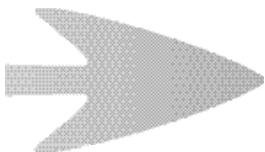
## **BOXER 26:** *Specific nutritional responses*

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### **1 Maintaining muscle tone and protecting joint health** (p. 8)

- concentrated, easy-to-assimilate energy, an L-carnitine supplement and very high quality proteins for the muscles
  - cartilage protectors to maintain joint health
- 



### **2 Optimizing functioning of the heart muscle** (p. 13)

- taurine and L-carnitine supplements to optimize cardiac contractility
  - incorporation of an antioxidant complex that helps heart cells combat free radicals
  - supply of EPA/DHA to limit the risk of arrhythmia
- 



### **3 Adapting the kibble to the brachycephalic conformation of the Boxer** (p. 17)

- carefully designed shape and texture facilitates prehension and encourages the dog to chew
  - fulfills the folic acid requirement of a pregnant bitch to combat the risk of cleft palate in its offspring
- 



### **4 Regulating digestive transit** (p. 20)

- limits undesirable bacterial fermentation reactions through a very low indigestible protein content
- supply of vegetable fibers for good digestive hygiene

# 1 The Boxer: a powerful, athletic dog



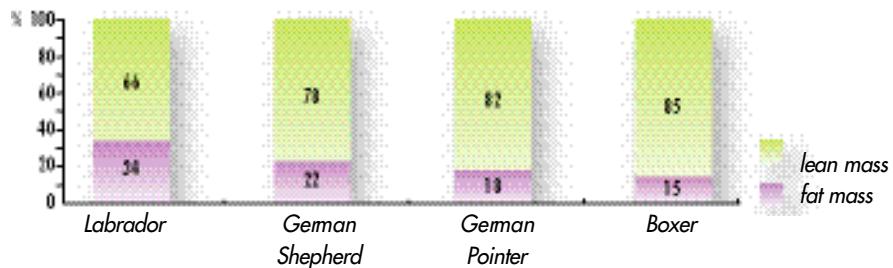
© Y. Laroche

While its height to the withers is average (20-23 in for the bitch and 22-24 in for the male), its weight puts it in the large-breed category. This size to weight ratio is what gives the breed its compact appearance. It has a very solid bone structure.

Temperamentally speaking, the Boxer is an energetic dog that's always on the move. Its direct, exuberant character is endearing, but its unbounded energy does need to be channeled by its owner. It is very comfortable in disciplines that require strength and endurance: Ring, RCI certificates, Tracking, etc. It's also a good guard dog that doesn't allow itself to be easily intimidated.

**Comparison of the distribution of lean mass/fat mass in various large breeds**

(Royal Canin, 2003-2004)



The lean mass is more important in Boxers than it is in any other large breed. That's why it has such well developed muscles. This body composition influences certain biological parameters: the physiological content of creatinine produced continuously by the muscles is twice as high in the Boxer as it is in the Beagle (Lefebvre & Watson 2002).

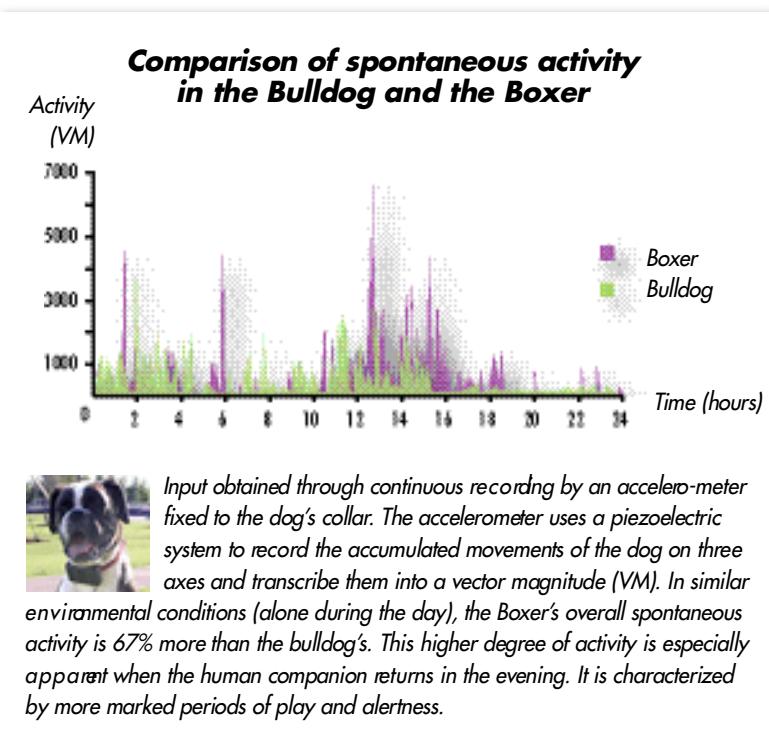
First and foremost, the Boxer is a dynamic dog. It's earned its reputation as an athlete fairly, because it's well adapted both anatomically and psychologically to physical exercise.

It is an athletic dog: its muscles are lean and well developed compared with other large breeds. This gives the dog a powerful appearance. Its build is also shown off to advantage by its short hair. The Boxer's solid form does not tolerate excess fat. That said, it isn't prone to being overweight.

This highly active, impulsive dog is continuously running and jumping, which means its joints are always under a great amount of stress.

They are subjected to major mechanical strain, which sometimes leads them to develop injuries, especially when the dog is overfed at an early age. A study of over 300,000 young dogs visiting ten American veterinarian colleges between 1986 and 1995 (Lafond & al, 2002) listed the most frequently diagnosed complaints in this breed:

- **Panosteitis:** a spontaneous general inflammation of long bones, leading to lameness in one or more limbs. The disease typically resolves when the dog reaches the age of 18-20 months.
- **Osteochondritis Dissecans (OCD) in the shoulder or the elbow:** a complaint in which cracks appear in the developing cartilage of puppies. The symptoms generally appear between four and ten months. The Boxer is one of the most predisposed breeds (Asimus, 2002).
- **Separation of the coronoid process of the ulna:** a specific type of elbow dysplasia (Meyer-Lindenberg & al, 2002).



# **MAINTAINING MUSCLE TONE AND PROTECTING JOINT HEALTH**

The Boxer is a robust dog whose diet has to take its highly active character into account.

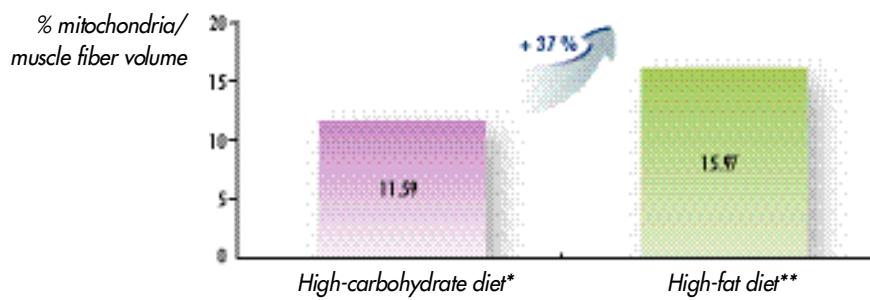
## **Objective #1: providing sufficient calories to compensate for spent energy**

Fats or lipids provide 2.25 times as much energy as the same quantity of carbohydrates or proteins.

A high-fat diet (20% in **BOXER 26**) helps save muscle glycogen\* reserves. If these reserves are exhausted the dog will show signs of fatigue, so a high-fat diet provides the dog with more energy to make an intense effort at the end of a long period of exercise.

### **Impact of fat content of the food on the muscle cell's ability to produce energy from fatty acids**

(study conducted on dogs trained for three months and fed  
with each diet before the measurement) (Reynolds & Taylor, 1996)



\* Carbohydrates account  
for 65% of metabolizable  
energy

\*\* Lipids account for 65%  
of metabolizable energy

*The volume of mitochondria expresses the ability of the cell to oxidize fatty acids to produce energy.  
A high-fat diet improves the body's ability to burn fats. The return to a carbohydrate-rich diet is marked  
by a return to the initial values.*

\* see glossary on p. 30

Dogs can tolerate high fat levels much better than humans. A lipid-rich diet also improves sporting endurance (*Grandjean, 1983; Reynolds, 1998*) and speed (*Hill & Coll, 2000*). A diet that is high in fat raises the threshold of endurance: the quantity of oxygen that can be used by the body. When fats represent 65% of the food's metabolizable energy, maximum oxygen consumption ( $\text{VO}_2 \text{ max}$ ) – one of the parameters used to measure resistance to effort – increases by 40% (*Reynolds & Taylor, 1996*).

The nature of fatty acids in the food also has an influence on athletic performance.

- Omega 6 unsaturated fatty acids from vegetable oil improve the permeability of cell membranes and ease the passage of nutritional elements through the blood to the cells.
- Omega 3 unsaturated fatty acids from fish oils improve microcirculation (*Enikeeva & Coll, 1998*), encouraging the oxygenation of tissues.

It is important to keep a good balance between omega 6 and omega 3 unsaturated fatty acids by mixing the sources of fat (poultry fat, fish oil, soy oil).

All of these properties are beneficial in the diet of an athletic dog to optimize its physical performance.

\* see glossary on p. 30

## **Objective #2: facilitating fat utilization through L-carnitine**

L-carnitine is the only means of shuttling long-chain fatty acids to the cell sites, the mitochondria, where they are oxidized to provide energy. In dogs 95% of the L-carnitine is concentrated in the heart and the muscles, which use it to produce energy.

In humans and dogs the L-carnitine level in the blood clearly falls in the 30 minutes following major physical effort (Harichaux & al, 1994). L-carnitine is synthesized in the liver, but the more active the dog the more limited this supply line may become. A supplement is accordingly recommended to help restore the reserves. When the level is increased in the food, the plasma concentration of L-carnitine is replenished to its normal level more quickly.

By promoting the utilization of fatty acids, L-carnitine helps limit the accumulation of fatty tissue, while preserving muscle mass better, which is very important for the Boxer. L-carnitine is traditionally used in slimming diets to speed up weight loss, while preserving the body's lean mass (Allen, 1998).

## **Objective #3: guaranteeing muscle cell regeneration**

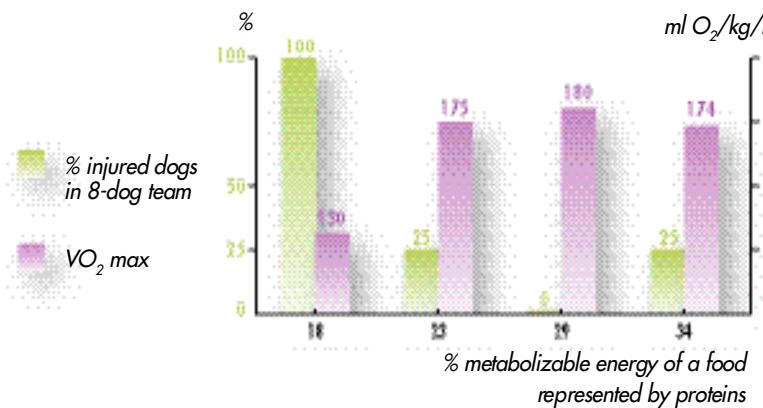
Proteins play a major part in tissue regeneration. The more physical and psychological stress the dog is subjected to, the faster the cell turnover. Proteins provide 5-15% of all energy expended, although the dog does not possess any protein reserves outside of the muscles. An increased intake of proteins is therefore essential if the body isn't to draw on its muscle protein reserve.

An inadequate protein intake has dramatic consequences for the health of the dog: anemia, poor hair quality, less potent immune defense and muscle deterioration. Conversely, the improvement in the quality and quantity of proteins taken in by the dog helps improve performance, while reducing the risk of muscle or tendon injury (Reynolds & al, 1999).

\* see glossary on p. 30

### **Effect of the protein level on the performance of 32 dogs after 12 weeks of endurance training**

(Reynolds & coll, 1999)

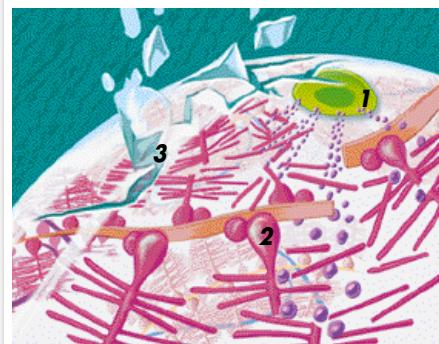


The maximum oxygen consumption ( $VO_2$  max) is an endurance marker. It improves significantly when the protein content exceeds 18-23% of total calories (BOXER 26 : 25% of calories provided by proteins). Too low a protein level (18% of calories) is correlated to a major risk of muscle or tendon injury during training.

### **Objective #4: maintaining cartilage and joint health**

Around 40% of large dogs over 7 years old suffer from osteoarthritis (Deeb & Wolf, 1994). At particular risk are those dogs suffering from dysplasia or osteochondritis and those engaged in physical activity too intensely or at too early an age, which puts repetitive strain on the articular cartilage. A regular nutritional intake of the natural cartilage constituents glucosamine and chondroitin sulfate from an early age can help maintain cartilage and joint health. Oral intake enhances glucosamine and chondroitin concentrations in the articular cartilages and the synovial liquid in which the joints are immersed (Mc Namara & al, 1997). Glucosamine and chondroitin have long been used in human and veterinary sports medicine to help maintain cartilage and joint health. The earlier they are used, the greater the opportunity to maintain good joint health (Todhunter & Lust, 1994).

#### **Articular cartilage lesion**



Damage to cartilage leads to an excessive secretion of enzymes<sup>1</sup>. These enzymes disorganize the proteoglycans<sup>2</sup>, the large molecules that ensure cartilage<sup>3</sup> elasticity.

## **2 A heart that needs to be monitored**

The Boxer is known for its predispositions to certain heart complaints and breeders are working hard to pinpoint them so as to modify selection (Doxey & Boswood, 2004).

Cardiology is the main reason for a visit to the veterinarian among adult Boxers, representing 11-20% of cases in this age group (*Veterinary Medical Data Base: more than 11,000 cases between 1981 and 2001*).

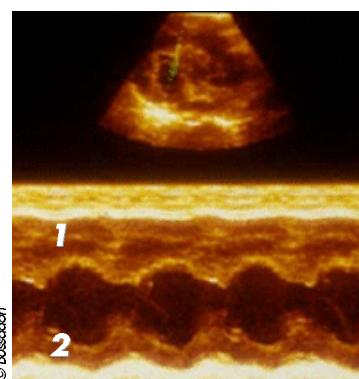
**Subaortic stenosis (SS)** represents 22-35% of all congenital heart complaints (Corlouer, 2002). The Boxer is the most frequently affected breed. SS is characterized by lesions in the aortic valves that disrupt the rate at which the arterial blood is pumped, generating a noise audible with a stethoscope, called a heart murmur.

In an Italian epidemiological study, 35% of Boxers examined had a slight heart murmur but did not exhibit any clinical signs or lesions visible on an echocardiograph (Bussadori & al, 2001). A similar prevalence has been observed in Norway, Sweden and the United Kingdom (Heiene & al, 2000).

Representing only 5-10% of canine cardiology complaints, **dilated cardiomyopathy (DCM)** is another heart complaint that affects the Boxer. DCM is a large dilatation of the heart cavities, linked to the thinning of the muscle wall. The myocardium\* can no longer contract sufficiently to fulfill its task of pumping the blood around the body.

### **Echocardiographic examination of a case of subaortic stenosis**

Two-dimensional echocardiographic imaging shows hypertrophy of the interventricular septum and left ventricular free wall<sup>2</sup>.



© Bussadori

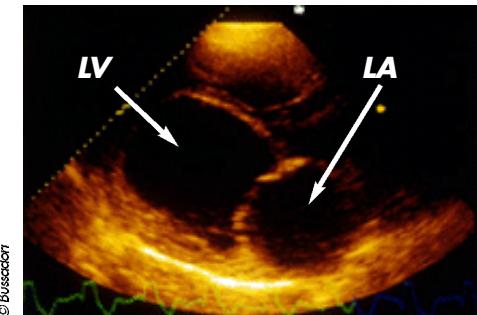
The genetic etiology of DCM in the Boxer is no longer doubted, although the disease is often associated with too low a taurine or L-carnitine plasma level (Costa & Labuc, 1994). The male is affected more than the bitch. Studies are ongoing into the disease's genetic origins (Meurs & al, 1999).

\* see glossary on p. 30

# **OPTIMIZING FUNCTIONING OF THE HEART MUSCLE**

The administration of a taurine and L-carnitine supplement to dogs suffering from dilated cardiomyopathy has helped wean them from their medical treatment, while allowing them to maintain a normal life (*Kittleson & al, 1997*).

## **Echocardiographic examination of a case of dilated cardiomyopathy in a large-breed dog**



*Left parasternal long axis showing the dilatation of the left atrium (LA), as well as the spherical form the left ventricle (LV) tends to take. It is difficult to see the dilatation of the ventricle on the radiograph due to the specific configuration of the Boxer's chest.*

## **Objective #1: encouraging good cardiac contractility through taurine**

Taurine is an amino acid that is normally synthesized by the dog from methionine and cystine, but stocks can run low when synthesis is inadequate, as it is in certain breeds or certain lines. A simple blood test can show whether the dog has a taurine deficiency.

Taurine is essential to contractility of the heart muscle: It has a positive or negative inotropic effect\* depending on whether there is an abundance of calcium in the cells; taurine protects the muscle fibers from a excess of calcium and it has an anti-arrhythmic role\* (*Satoh & Sperelakis, 1998*).

\* see glossary on p. 30

### **Variation of the shape of the Boxer's heart**

*Chest radiographs on Boxers are difficult to interpret, as the heart shape varies from very long (left) to very short (right).*



*The heart is narrow, fine and elongated, longer than it is wide and almost vertical viewed from the side.*



*The heart protrudes and to a large extent comes into contact with the breastbone.*

© Bussadori

Cases of DCM in dogs have been linked to extremely low plasma taurine levels (Lake, 1993; Alroy & Coll, 2000), particularly in the Newfoundland (Dukes-McEwan & al, 2001). Positive reactions to taurine supplementation have been noted in Boxers suffering from DCM (Backus & al, 2003). So it is advisable to add sufficient quantities of taurine to the food.

### **Objective #2: facilitating the supply of energy to the muscle fibers through L-carnitine**

A study of dogs suffering from heart failure has shown that the L-carnitine concentration in the muscle fibers is often diminished, even when the plasma value is normal (Pierpont & coll, 1993).

- In the Boxer, an oral supplement helps increase the carnitine content in the heart and the tissues (Costa & Labuc, 1994) ;
- Complete DCM remission and lesion reversibility has been achieved in four Boxers of the same family, after 24 weeks of L-carnitine supplements (Keene & al, 1991). The disease recurred after the treatment was stopped.

The higher the dose and the earlier the age of the dog it is administered to, the more effective the action of the L-carnitine. At more than 600 mg/kg, **BOXER 26** is very rich in L-carnitine.

\* see glossary on p. 30

## **Objective #3: helping the heart cells combat free radicals through the incorporation of an antioxidant complex**

Oxidative stress has been implicated in the development of a certain number of heart diseases.

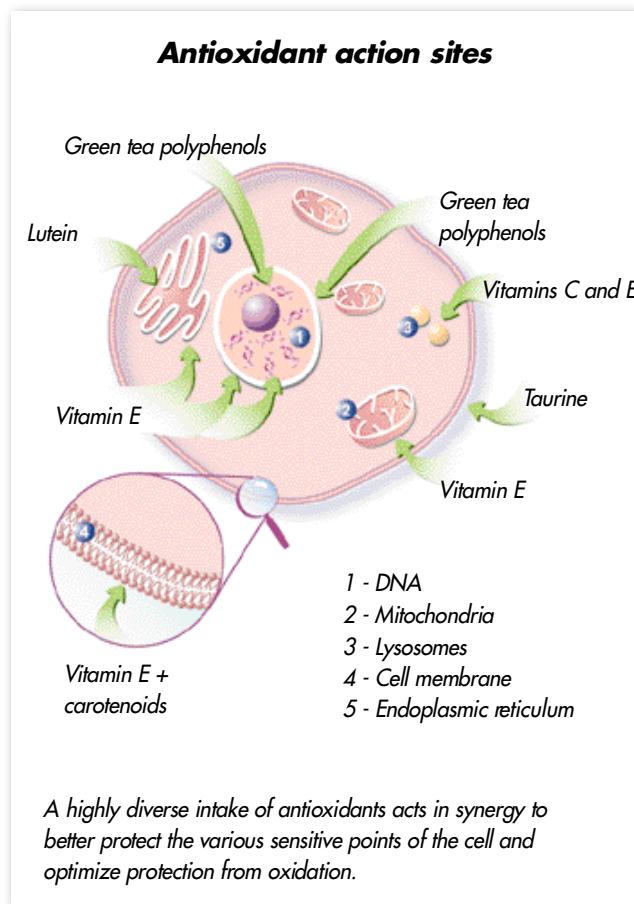
Antioxidants help neutralize free radicals, the production of which increase with heart disease.

The main antioxidants in **BOXER 26** are:

- **Vitamin E:** dogs suffering from heart failure produce more oxidants and have lower levels of vitamin E (*Freeman & al 1999*),
- **Vitamin C:** its presence, optional in dogs, maximizes the potential of the effect of vitamin E,
- **Lutein** protects the lipid membranes from potential damage caused by oxidative stress,
- **Green tea polyphenols:** there is an inverse relationship between the intake of dietary flavonoids\* and cardiovascular diseases (*Urquiaga & Leighton, 1999*),
- **Taurine:** as well as its effect on cardiac contractility, it has antioxidant properties.

## **Objective #4: helping limit the risk of heart arrhythmia\* through omega 3 fatty acids (EPA/DHA)**

The consumption of fish oil promotes the incorporation of a large quantity of long chain omega 3 fatty acids (EPA/DHA) into the membrane phospholipids of heart muscle fibers. When the DHA concentration in the muscle fiber is high, it is less vulnerable to arrhythmia *in vivo* and *in vitro* (*Pepe & McLennan, 2002*).



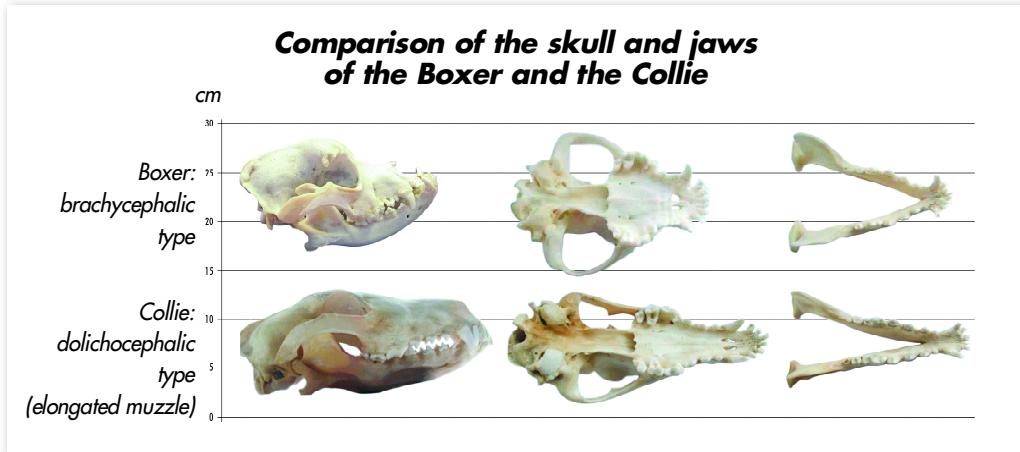
\* see glossary on p. 30

# 3

## A head without compare



The Boxer is a highly representative brachycephalic\* specimen: it has a compact face with a wide and powerful muzzle.



The specific conformation of the Boxer's head is characterized by a compact face and an upper jaw that is less prominent than the lower jaw, a phenomenon known as undershot jaw. The Boxer has the same number of teeth (42) as every other breed, so the lack of space in the jaw tends to push it outwards.

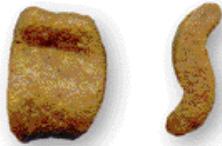
The associated irregular position of the teeth creates difficulties for the Boxer when it seizes its food. As a result it tends to suck up its food hastily, which is a factor increasing the risk of stomach dilatation-torsion, a serious condition that deep-chested dogs are prone to develop (Glickman & al, 1997).

Brachycephalic breeds like the Boxer are more likely to display another anomaly at birth: cleft lip or cleft palate due to the non-fusion of the nasal and maxillary arches during embryonal development. This very serious fault often results in euthanasia due to the risk to respiration pneumonia caused by the passage of food into the nasal cavities. A deficiency of folic acid plays a major role in the appearance of cleft lips and cleft palates in humans and dogs.

\* see glossary on p. 30

# **ADAPTING THE KIBBLE TO THE BRACHYCEPHALIC CONFORMATION OF THE BOXER**

Kibble **BOXER 26**



The shape and the texture of the kibble must be studied on the basis of the particular dentition and jaws of the Boxer.

## **Objective #1: facilitating prehension**

Seven different models were tested. The selected kibble has a very specific wave shape that required many industrial trials before the agreement of the participating breeders was secured. Trials were carried out using 65 dogs from 16 breeders over a 12-month period to choose the solution best adapted to the objective.

*The selected kibble is the best shape that assists prehension and slows down ingestion. Its particular wave shape gives it a large surface area, which encourages even the most gluttonous dog to chew.*

## **Objective #2: encouraging the dog to chew**

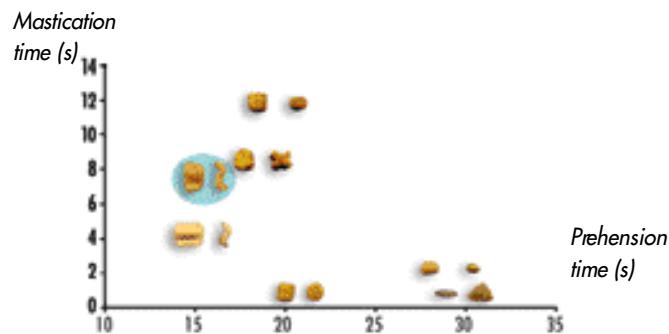
The kibble's large size is justified by the necessity to slow down the speed of ingestion. The risk of dilatation-torsion is reduced when the kibbles are larger than 30 mm (*Theyse et al, 1998*).

## **Objective #3: fulfilling the folic acid requirement to combat the risk of cleft palate**

A study on the Boston Terrier shows that a supplement of folic acid (5 mg/day/dog) reduces the risk of a cleft palate by 76% (*Elwood & Colghoun, 1997*). To take into account the general sensitivity of brachycephalic breeds, **BOXER 26** contains 15 mg of folic acid per kg, which is ten times the amount found in a traditional food.

### **Influence of the shape and the size of the kibble on the feeding behavior of the Boxer**

(study on a 50 g sample among 15 Boxers)



# 4

## An irritable digestive system

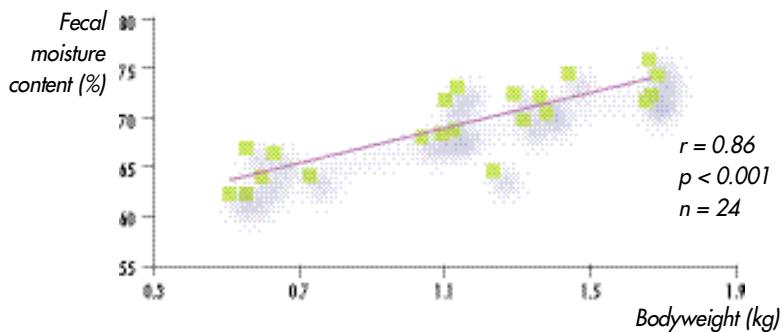
Like all large dogs, the Boxer's digestive sensitivity is more marked than that of a smaller dog. Those who keep a Boxer know that digestive disorders are not rare when the dog is worried or devotes itself to highly intensive physical activity.

These digestive problems are generally explained by disturbances in the speed of intestinal transit, particularly in the large intestine: transit through the colon accounts for 80-90% of the total duration of digestive transit (Weber & al, 2003).

When the duration of transit is increased, the contact time between the undigested residues and the microbe flora of the colon is also increased, which intensifies fermentation activity and the production of foul-smelling substances: ammonia, aromatic amines, indoles and phenols, and combisulphurated compounds, etc.

### Correlation between the weight of dogs and the moisture content in their stools

From Weber et al., 2002-2003.



The heavier the dog, the more water the stools contain, which increases the risk of diarrhea. The stool's high water content is due to strong fermentation activity and the increased permeability of the small intestine, facilitating the transfer of water to the intestinal lumen.

The emission of gas (flatulence) is prone to occur at any time. Even though malodorous molecules generally account for only 1% of the total quantity of gas emitted (the rest is made up of non-odorous gases like hydrogen, methane, carbon dioxide), the phenomenon is particularly disagreeable when the dog is indoors or in the car.

\* see glossary on p. 30



Conversely, when the duration of transit is shortened too much due to stress, the absorption time of fluids and electrolytes is reduced, which leads to lower quality stools that contain more water. This may explain the occurrence of diarrhea after a period of exercise.

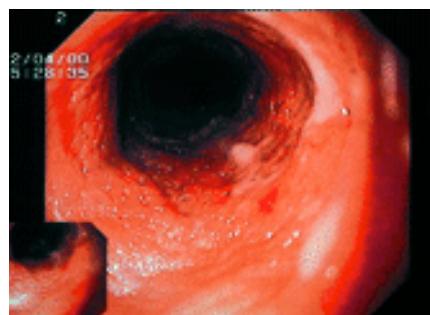
Besides the physiological variations in digestive transit time, the Boxer is predisposed to certain digestive complaints, which must be recognized if they are to be prevented or treated.

**Chronic intestinal inflammation** is another traditional complaint among Boxers. It takes the form of lymphoplasmacytic enteritis or histiocytic colitis, depending on the type of cells that infiltrate the intestinal submucosa

(Dossin & Henroteaux, 2004). The symptoms – chronic diarrhea with mucus and blood in the stools – generally appear before two years of age. Histological examination of a biopsy confirms the diagnosis. Dietary management consists of avoiding the presence of potential antigens by providing a highly digestible and hypoallergenic food.

Generally, positive results are seen in two to six weeks (Dossin & Henroteaux, 2004).

#### ***Endoscopic image of the duodenal mucosa in a dog suffering from chronic vomiting***



The mucosa is granular and crumbly; this dog is suffering from chronic intestinal inflammation (lymphocytic plasmacytic enteritis)

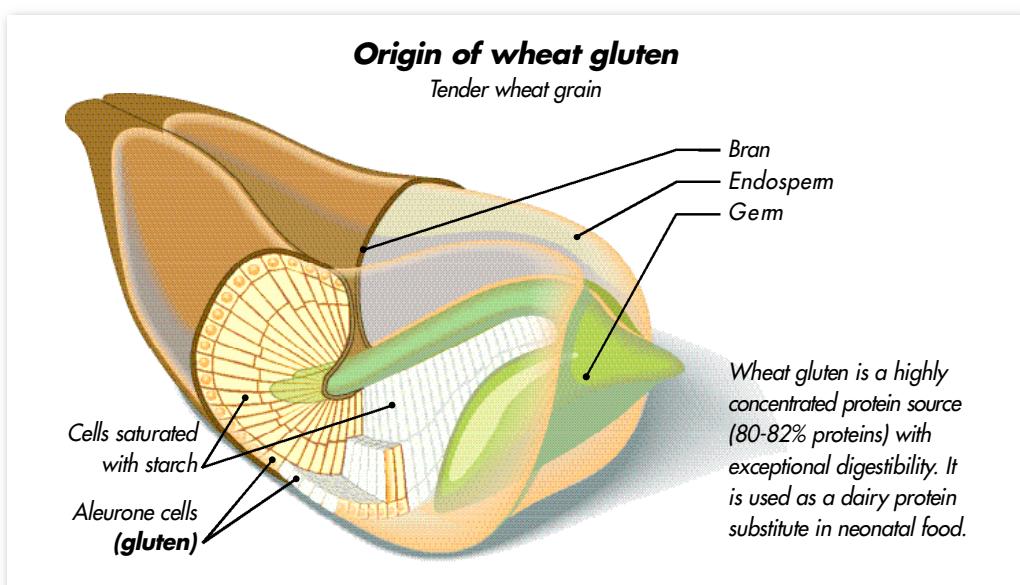
\* see glossary on p. 30

# **REGULATING DIGESTIVE TRANSIT**

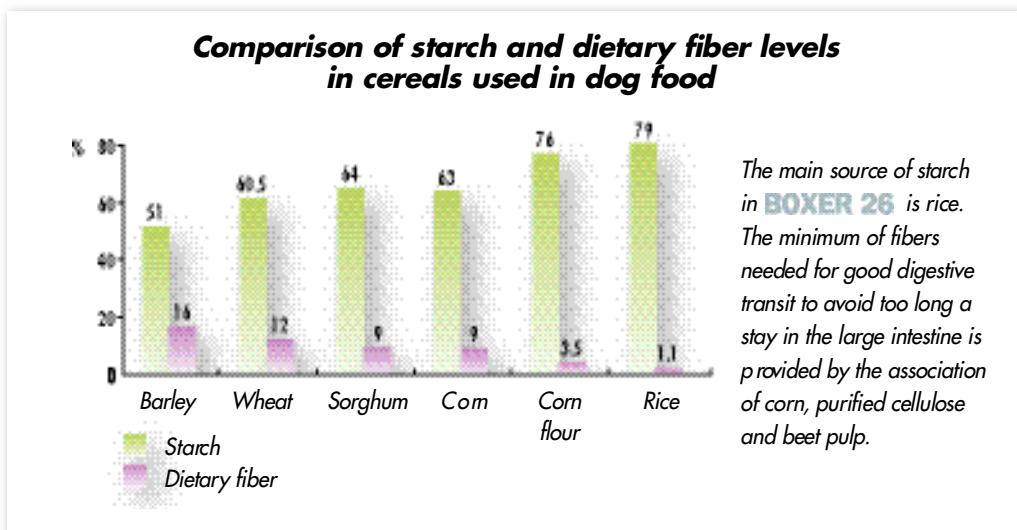
## **Objective #1: minimizing the indigestible residues in the colon**

The use of highly digestible proteins limits the quantity of substrate available to the bacterial populations in the colon, minimizing undesirable putrefaction reactions. Nowadays the use of concentrated vegetable protein sources like wheat gluten enables new progress to be made: with only 2% of indigestible proteins, **BOXER 26** offers a 30% improvement in protein digestibility compared with a traditional food, which has immediately perceptible consequences for stool quality.

The vegetable proteins are extracted from highly standardized raw ingredients, guaranteeing the extreme regularity of their composition.



Dogs are carnivores that have gradually adapted to the omnivore diet of humans. That does not change the fact that their ability to digest complex carbohydrates like cereal starch remains limited. For a sensitive dog like the Boxer, the total quantity of carbohydrates should be limited, to avoid exceeding enzyme capacities, and low sources of dietary fiber should be selected, like rice, to increase digestibility.



## Objective #2: optimal quantity of fermentable fibers

Fermentable fibers are indispensable to a properly balanced colon ecosystem. They generate a large quantity of short chain fatty acids, a major source of energy for the cells of the intestinal mucosa.

However, too large a quantity of fermentable fibers can lead to a softening of the stools among dogs that tend to have strong fermentation activity like the Boxer. This observation favors beet pulp, which comprises only 50% fermentable fibers.

Mannan-oligo-saccharides (MOS) belong to the category of non-fermentable fibers. They limit the development of potentially pathogenic bacteria through competitive inhibition of the attachment sites on the intestinal mucosa.

# A NUTRITIONAL PROGRAM FOR

0-15  
months

## GROWTH PHASE



### PHASE 1

For the whole weaning period\*  
and the first part of growth to month 5:  
maximum energy requirement  
\*product may be administered rehydrated

5 month



End of growth  
(month 15)

### PHASE 2

The food program for large-breed puppies addresses the two growth stages. The transition between Maxi Baby Dog and Maxi Puppy generally comes in month 5. It may be delayed until month 6 for puppies with a high digestive sensitivity like the Boxer.



Priority is given to the energy concentration. The puppy is protected against an excess of calcium.



Small kibble adapted to the first dentition of large-breed dogs.



Quantity and quality of fibers adapted to the digestive sensitivity of large-breed puppies.



Moderate energy concentration. Calcium content adapted to the growth of large-breed puppies.



Quantity and quality of fibers adapted to the digestive sensitivity of large-breed puppies.



Presence of glucosamine and chondroitin to help protect the joints.

Birth

## EVERY STAGE OF THE BOXER'S LIFE

from  
15  
months

### ADULT AND MATURE PHASES

## BOXER 26

**Tailor-made nutritional food  
exclusively formulated  
for the Boxer**



Limits intestinal fermentation reactions through a very low indigestible content and a supply of vegetable fibers that promote good digestive hygiene.



Helps promote muscle tone through easily assimilated energy, very high quality proteins and an L-carnitine supplement. Protects joint health through glucosamine and chondroitin.



Taurine and L-carnitine supplements optimize the contraction capacity of the heart muscle and incorporate an antioxidant complex that helps heart cells combat free radicals.



Carefully designed shape and texture facilitates prehension by a brachycephalic, prognathous dog and encourages the dog to chew.

## ***The history of the Boxer...***

Contrary to some popular misconceptions, the Boxer doesn't have a long history. All the experts agree that the Boxer was first selected in Germany in the middle of the nineteenth century, based on crosses between various imported and local breeds, especially the small Bullenbeisser – a breed no longer found, whose name translates literally as 'biter of bulls', that was famed as an intelligent fast learner – and the English Bulldog.

The German Boxer Klub was founded in Munich in 1895, and the first Boxer show was held in the city that very year. The standard was set early in the twentieth century with the publication of the *Zuchtbuch*. Mühlbauer's Flocki became the first Boxer to be registered in this studbook in 1904. Interestingly, it was a dam imported from France, Alt's Flora, that helped set the characteristics of the breed.

One of the enthusiastic breeders that were to leave their mark on the breed was Frau Friederun Stockman, who bred some wonderful dogs in the first half of the twentieth century under the Von Dom affix. In her reference work *My Life with Boxers* she stresses that 'The Boxer...is a gentleman amongst dogs with short coats. He not only wants the best food, he wants to be handled in a civilized manner too'.

The etymology of the name Boxer is still contentious. It may be a reference to its fighting prowess, or perhaps, as others say, it refers to the breed's habit of using its front paws, 'boxing' with them when it fights and even dribbling the ball with them when it plays football!



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# **The Boxer from the tips of its toes...**

**The Boxer has evolved greatly through the years. Breeders are obliged to comply when the country of origin imposes new selection criteria. So when Germany proscribed the breeding of Black Boxers, the kennels had to accept this. Likewise, the proscription of ear cropping and tail docking has led to amendments to the standard and a new way of appraising the dog at shows: in Nordic countries, Germany, Switzerland and the Netherlands, 'complete' dogs (with drooping ears and long tails) have become the rule. Other countries follow this development, including France (where ear cropping was banned in May 2004). The Boxer we know today can still differ somewhat, due to the work of breeders that unceasingly sculpt and hone the breed.**

## **General Aspect**

The Boxer is a compact, medium-sized dog with a square build, strong bones and close-cropped hair. Its lean muscles are well developed. Its chest must extend down to the height of the elbows.

to dark deer red. The mask is black. Brindles exhibit dark or black stripes parallel to the ribs, on a ground colour that may be any shade of fawn. White spots are tolerated, Americans even appreciate them.

## **Head**

The head gives the Boxer its characteristic appearance. It must be in proportion to the rest of the body, without appearing too light or too heavy. The muzzle must be as wide and powerful as possible and in proportion to the skull (not too small) from whatever angle it is viewed.

The White Boxer, which accounts for almost 10% of births, has not been recognized in selection since 1925, although it was ubiquitous at the turn of the twentieth century. Nowadays, two-thirds of the dog's body must be brindle or fawn.

## **Coat**

The Boxer's hair is short, wiry, shiny and dense. There are two recognized colors: fawn and brindle. The shades of fawn go from clear yellow

So why has this White Boxer been rejected when it isn't an albino? Boxers were used by the army in the two world wars. White Boxers that were too conspicuous in the dark were sidelined. At the same time, those occupied with the development of the breed proscribed litters of more than six

## ***... to the tip of its nose***

puppies. When choosing which puppies to keep the white ones were removed from the kennel, because they were unsuited to the use for which they had been bred. The White Boxer is more likely to suffer from congenital deafness.

### ***Size and weight***

**Males:** 22-24 in and 66-70 lbs

**Bitches:** 20-23 in and 55-60 lbs

Besides its indisputable physical qualities, the Boxer is above all a good natured companion, which underscores the responsibilities of its selection: "The Boxer's character is of the highest importance and demands great care..." The standard states: "The Boxer must have solid nerves, be self-assured, calm and well balanced."

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# **Scientific Glossary**

**Arrhythmia:** an abnormal heartbeat rhythm.

**Brachycephalic:** Greek for 'short-headed'. Brachycephalic dogs (including Boxers, Bulldogs, Shih Tzus and Pekingese) have a squashed face with a very flat muzzle viewed in profile. This conformation is accompanied by a shortening of the upper airways resulting in often noisy breathing.

**Colon:** middle section of the large intestine between the cecum and the rectum. The section of the intestine with the highest concentration of bacteria, containing  $10^{10}$ - $10^{11}$  bacteria /g compared with 'only'  $10^5$ - $10^9$  /g in the small intestine.

**Flavonoids:** principle family of polyphenols found in abundant quantities in plants. Catechin and epicatechin are especially active flavonoid molecules found in green tea.

**Glycogen:** form of glucose stored in the liver and muscles. Reserves are rapidly exhausted during very intense exercise. The intake and distribution of highly digestible carbohydrates just after physical effort helps accelerate the replenishment of reserves.

**Inotropic:** effect of a substance that influences the contractility of heart cells. A positive inotropic effect improves contractility, a negative inotropic effect worsens it.

**Myocardium:** heart muscle

**Pylorus:** sphincter at the end of the stomach that controls the speed of gastric emptying.

**VO<sub>2</sub> max:** maximum rate of oxygen consumption during exercise, expressed in ml/min/kg. A high VO<sub>2</sub> max enables the body to oxygenate better and improves resistance.

**Wheat gluten:** protein part of wheat grain. It owes its name to the fact that wheat proteins are made up of almost 40% glutamine, which is an amino acid that plays an important role in maintaining digestive integrity. Wheat gluten contains very few dietary fibers and is highly digestible.

# ***Key innovations in the history of Royal Canin***

**A history of commitment to developing our knowledge of and respect for the needs of small, medium and large breed dogs.**

## **1980**

Launch of AGR, the first food specially formulated for large-breed puppies and the first "cynotechnic" range especially for breeders.

## **1990**

Launch of the first RCCI nutritional program for dogs, sold through specialist outlets, including PR 27 – specially for small breeds.

## **1997**

Launch of RCCI SIZE, the world's first nutritional program for dogs to take into account age, activity and especially the size of the various breeds.

## **1999**

Launch of the first weaning food, STARTER, for exclusive use by breeders.

## **2000**

Launch of SIZE NUTRITION, 3 nutritional programs adapted to the needs and physiological characteristics of small, medium and large breeds.

## **2001**

Launch of GIANT, the first nutritional program specially developed for large breeds (>100 lbs.).

## **2002**

Launch of the first immunity program for medium breeds (MEDIUM IMMUNITY PROGRAM), which helps strengthen the dog's natural defenses during every stage of its life.

Royal Canin innovates again by formulating a best balance food for the Yorkshire Terrier: MINI YORKSHIRE 28.

## **2003**

Nutritional precision for the German Shepherd, the brand's emblem since the very beginning (GERMAN SHEPHERD 24), and the Labrador (LABRADOR RETRIEVER 30).

## **2004**

Launch of the Size Health Nutrition range to optimize the growth of large- and giant breed puppies, with the foods Maxi Baby Dog and Giant Baby Dog.

Launch of two best balance foods especially for the Poodle and the Dachshund: POODLE 30 and DACHSHUND 28.

**Launch of two best balance foods especially for the Boxer and the Bulldog:**

**BOXER 26 and BULLDOG 24.**

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