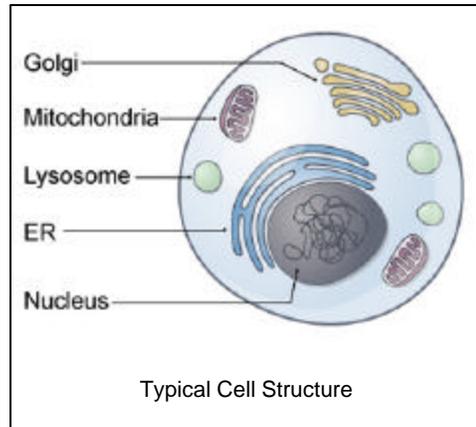


# Carnitine

## What is it?

Carnitine (L-carnitine) is an amino acid (protein) that the body uses to turn fat into energy. Specifically, carnitine is required for transporting long chain fatty acids and their derivatives into the mitochondria of cells. The mitochondria are the tiny little powerhouses present in each cell that convert fatty acids into the ultimate chemical energy source of the body, known as ATP. Mitochondria are abundant in the cells of all organs that have a large energy requirement, including semen and the heart, epididymis, kidney, skeletal muscle and liver. Carnitine is not normally considered an essential nutrient, because the body can manufacture all it needs in the liver from lysine, methionine, and vitamins C, B1, and B6. However, it may be useful as a supplement to debilitated heart muscle that needs all the help it can get.

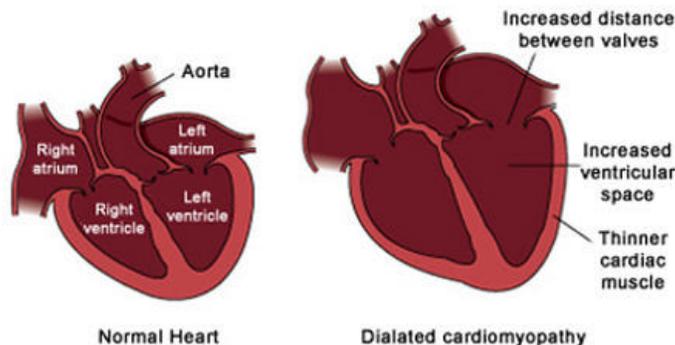


## Why recommend administration of carnitine to my pet?

The main indication for carnitine supplementation is for the pet with heart disease, specifically dilated cardiomyopathy in dogs. There is no reason to suspect that it may not prove useful in the management of other small animal cardiac disorders, given its wide use in humans.

Another cell that has high energy requirements is sperm. Mitochondria are the engines that make sperm swim, and carnitine supplementation has been shown to improve sperm motility and numbers in infertile men.

Because carnitine facilitates metabolism of fatty acids and their derivatives, it has shown promise in the treatment of ketoacidosis (a serious metabolic consequence of uncontrolled diabetes) and hyperlipidemia (too much fat in the bloodstream). It also appears beneficial in the management of both obesity and fatty liver syndrome in cats. Simultaneous choline administration is required for the uptake of carnitine into liver cells.



One other chemical in the human body derived from carnitine is L-acetylcarnitine, a neurotransmitter (a chemical that helps nerve impulse transmission) in the brain.

Significant improvement has been noted in humans with memory loss and with Down's syndrome when carnitine was supplied as a supplement. It may likewise prove beneficial in the treatment of cognitive dysfunction in small animals.

### ***How much experience is there with the use of carnitine in pets?***

Carnitine has been used successfully to help some dogs with dilated cardiomyopathy. Since true carnitine deficiency may exist in a small number of dogs such as boxers with dilated cardiomyopathy, supplementation with L-carnitine may be especially useful in these pets. Studies in the 1990's showed a benefit in the treatment of cardiomyopathy in both American Cocker Spaniels and Boxers.

### ***What species of animals are being treated regularly with carnitine?***

Carnitine should be considered for obesity, cardiomyopathy, hyperlipidemia and diabetic ketoacidosis, which are conditions found in both dogs and cats. It appears to be effective in fatty liver syndrome in cats when administered with choline.

### ***How much research has been conducted on this supplement?***

Carnitine is one of our better-researched supplements and appears to be of benefit in dogs with dilated cardiomyopathy and cats with obesity, ketosis, and fatty liver syndrome.

### ***How successful is carnitine?***

For some dogs with true carnitine deficiency, supplementation can be life-saving. For most pets with heart disease, hyperlipidemia, fatty liver syndrome, and ketoacidosis, carnitine supplementation will need to be integrated with other nutraceuticals and conventional treatments to achieve optimum results.

### ***How safe is carnitine?***

L-carnitine is very safe, simply because it is already a crucial constituent of almost every cell in our bodies. It is consumed whenever meat and dairy products are eaten. People are advised not to use other forms of carnitine, particularly D,L-carnitine, which reduces L-carnitine levels of skeletal and heart muscle, leading to muscle pain and decreased exercise tolerance. The maximum safe dosages for young children, pregnant or nursing women, or those with severe liver or kidney disease have not been established. High doses may cause diarrhea and heartburn in humans. Pets that are taking anticonvulsants, particularly phenytoin (Dilantin) or phenobarbital, may need extra carnitine, especially those with heart disease.



### ***Where do I obtain carnitine and do I need a prescription?***

Your veterinarian may have preferred supplements that he or she will recommend. Carnitine is available over-the-counter, often combined with other supplements that also improve energy production in the mitochondria, such as coenzyme Q10 and taurine. When used to treat fatty liver syndrome, it should be administered with choline. Consumers are advised that quality of supplements may vary significantly among manufacturers.

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