

Cats and Dogs, Carnivores or Omnivores?

Nathaniel Fastinger, Ph.D., Senior Nutritionist and Sally Perea, DVM, MS, DACVN, Senior Nutritionist

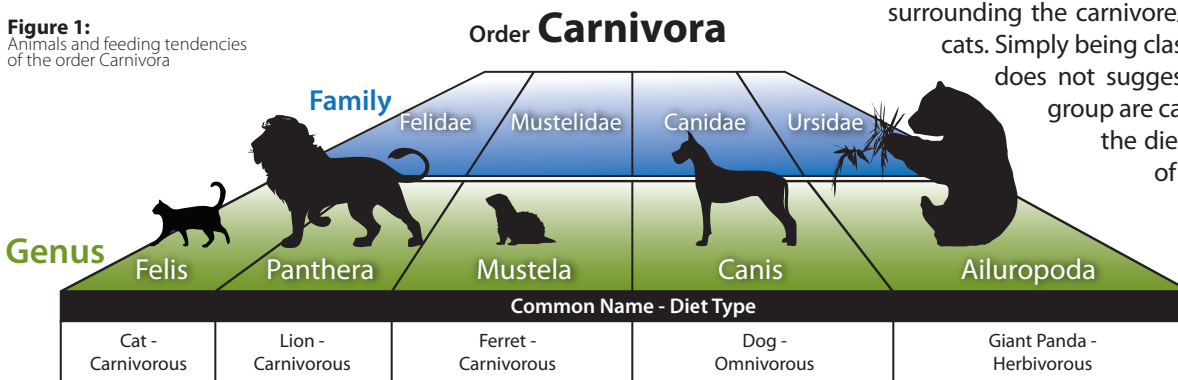
Today's dogs and cats share common ancestry and belong to the order Carnivora (also referred to as carnivorans). The animal members of this order are very diverse, and we find that just because an animal may belong to this order does not mean their dietary habits follow suit to what we typically expect for a carnivore. There are two methods of classifying the diets of animals found within the order Carnivora. The traditional method separates them into carnivores, omnivores and herbivores. The definition of a carnivore is an animal that consumes a diet consisting of almost exclusively animal meat. Omnivores consume both plant material and animal meat as their primary food source, while herbivores consume solely plant material. There is no clearly defined ratio of plant to animal material that would distinguish a carnivore from an omnivore, or an omnivore from a herbivore, for that matter. An alternate method of classification uses a tripartite division into hyper-, meso- and hypo-carnivores. Hypercarnivores are any animal that consumes at least 70% animal flesh. Mesocarnivores and hypocarnivores consume between 50 and 70% animal flesh and less than 30% animal flesh, respectively¹ (examples of non-animal flesh foods include insects, fungi, fruits and other plant materials). Using the classical definition, animals found in the order Carnivora include carnivores such as the domestic cat, ferret and lion, omnivores such as the domestic dog, raccoon and bear and even an herbivore such as the giant panda (Figure 1). The alternate method groups the domestic cat and domestic dog together in the hypercarnivore group because both animals' natural diet consists of > 70% meat¹.

What separates cats from dogs has been ingrained into their genetics and biochemistry throughout their evolution. The domesticated cat (*Felis catus*) belongs to the Felidae family that also includes lions, tigers and panthers. The ancestral heritage of the cat is derived from a specialized predator², the African wildcat (*F. silvestris lybica*). The carnivorous nature of the cats' diet has led to very specific metabolic differences that show up in their nutrient requirements. These differences make the domestic cat and other felids "obligate" or "strict" carnivores, meaning that they rely on nutrients in animal tissues to meet their specific and unique nutritional requirements and that some level of animal meat is required in their diet for survival. Specific nutritional idiosyncrasies of the cat includes increased protein requirement, requirement for dietary taurine (an amino acid) and arachidonic acid (a fatty acid), inability to convert beta-carotene to Vitamin A or tryptophan to niacin, and sensitivity to arginine deficiency (protein, taurine, arachidonic acid, vitamin A, niacin and arginine are all found in animal meat and are either absent or at much lower levels in plant material). Consequently, these differences lead to additional nutrient requirements that must be accounted for in the diet of cats that are not required by dogs. The strict carnivore heritage of the cat has resulted in a more specialized metabolism that can effectively process high levels of dietary protein and fat after a meal. Because of this, cats are able to rapidly convert dietary protein and fat to glucose in the liver after a meal so that it can be utilized by the body for energy.

Unlike this strict carnivore heritage of the cat, the domestic dog (*Canis lupus familiaris*) is now recognized as a subspecies of the omnivorous wolf (*Canis lupus*)³. The diet of the wolf is predominantly meat; however, they will eat non-meat food like fruit and other plant materials when prey is difficult to find⁴. The divergence of the domestic dog from the wolf took place somewhere between 14,000 and 100,000 years ago⁵. This divergence is thought to have occurred with the shift by humans from hunter-gatherer lifestyles to the early stages of agriculture⁵. Thus, we see that the domestication of the dog was closely correlated with the shift towards a larger reliance on farmed grains. Although both domestic dogs and cats have adapted to the influence of grains in the modern diet, grains are not consistent with their ancestral diet. It is believed that the dogs' ability to more readily adapt to grain containing diets (demonstrated by their ability to more quickly clear blood glucose than cats) has been a direct result of their domestication alongside humans.

To conclude, it is apparent why there may be confusion surrounding the carnivore/omnivore status of dogs and cats. Simply being classified into the order Carnivora does not suggest that all animals within this group are carnivores. Further evaluation of the dietary and biochemical nuances of each species helps elucidate the obligate carnivore status of the cat and the omnivorous status of the dog.

Figure 1: Animals and feeding tendencies of the order Carnivora



References

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