

Dog Ancestry and Domestication

Ancestry

Molecular systematics indicate that the domestic dog is descended from a wolf-like ancestor, and dogs and wolves can still interbreed. The domestication of the dog probably occurred at least 14,000 years ago, and perhaps long before that. There is archaeological evidence of dog remains, showing the characteristic morphological differences from wolves, from at least 14,000 years ago, while wolf remains have been found in association with hominid remains that are at least 400,000 years old. The molecular genetic data suggest that the domestic lineage separated from modern wolves around 150,000 years ago (Vilà et al, 1997). In the early 2000s, some research indicated that domestication in fact had already begun to occur as early as 100,000 years ago. Dogs were, and are, valued for their aid in hunting. Dog burials at the Mesolithic cemetery of Svaerdborg in Denmark indicate that, in ancient Europe, dogs were valued companions.

Wolf ancestors

Some evidence suggests that several varieties of ancient wolves contributed to the domestic dog, with deliberate or unintentional interbreeding taking traits from one or more of the ancestral wolf lines. Although all wolves belong to the species *Canis lupus*, there are (or were) many subspecies that had evolved somewhat distinctive appearance, social structure, and other traits. For example, the Japanese wolf, which became extinct in the early 20th century, was much smaller than most wolves, generally had a gray coat with reddish underbelly, and possibly had a more solitary hunting habit; the North American wolf, which still exists in limited ranges, is much larger than many wolf subspecies, displays many coat colors from nearly white through solid black, and exhibits a complex social structure involving highly formulaic dominance and submission rituals.

The Indian or Asian wolf probably led to the development of more breeds of dogs than other subspecies. Many of today's wild dogs, such as the dingo, the dhole and pariah dogs, are descended from this wolf, along with sighthounds such as the Greyhound. Recent genetic evidence shows that most modern dog breeds are related to Asian canines, contradicting earlier hypotheses that the dog, like humans, had evolved originally in Africa. The Asian wolf also likely interbred with descendants of the European wolf to create the Mastiffs—the Tibetan Mastiff being an example of a very ancient breed—leading eventually to the development of such diverse breeds as the Pug, the Saint Bernard, and the Bloodhound.

The European wolf, in turn, may have contributed many of its attributes to the Spitz dog types, most terriers, and many of today's sheepdogs. The Chinese wolf is a probably ancestor to the Pekingese and toy spaniels, although it is also probable that descendants of the Chinese and European wolves encountered each other over the millennia, contributing to many of the oriental toy breeds. The North American wolf is a direct ancestor to most, if not all, of the North American northern sled dog types; this mixing and crossing still goes on today with dogs living in the Arctic where the attributes of the wolf that enable it to survive in a hostile environment are still valued. Additionally, accidental crossbreeding occurs simply because dogs and wolves live in the same environment. The general reproductive isolation which is required to define dogs and wolves as separate species is purely a result of lack of opportunity, stemming from a general mutual unfamiliarity, suspicion, mistrust, and fear.

The single phenotypic characteristic that seems to separate dogs from wolves is the sickle tail—dogs who have tails all have an upward curve in the tail, whereas wolves' tails hang straight—the "brush tail"—similar to that of a fox.

Domestication

Current research indicates that domestication, or the attributes of a domesticated animal, can occur much more

quickly than previously believed, even within a human generation or two with determined selective breeding. It is also now generally believed that initial domestication was not attained deliberately by human intervention but through natural selection: wild canines who scavenged around human habitation received more food than their more skittish counterparts; those who attacked people or their children were probably killed or driven away, while those more tolerant animals survived, and so on.

Neoteny

This rapid evolution of dogs from wolves is an example of neoteny or paedomorphism. As with many species, the young of wolves are more social and less dominant than adults; therefore, the selection for these characteristics, whether deliberate or inadvertent, is more likely to result in a simple retention of juvenile characteristics into adulthood than to generate a complex of independent new changes in behavior. This is true of many domesticated animals, including human beings themselves, who have many characteristics similar to young bonobo. This paedomorphic selection naturally results in a retention of juvenile physical characteristics as well. Compared to wolves, many adult dog breeds retain such juvenile characteristics as soft fuzzy fur, round torsos, large heads and eyes, ears that hang down rather than stand erect, etc.; characteristics which are shared by most juvenile mammals, and therefore generally elicit some degree of protective and nurturing behavior cross species from most adult mammals, including humans, who term such characteristics "cute" or "appealing".

The example of canine neoteny goes even further, in that the various breeds are differently neotenized according to the type of behavior that was selected.

Breeds that guard flocks, such as the various sheepdogbreeds, retain the most juvenile characteristics: they stay close to home with their foster "litter" (which might include a flock of sheep) rather than going out hunting, they

have almost no predatory behavior (which would be disastrous in the vicinity of such a natural prey stimulus as sheep), they respond to perceived threats with a lot of vocalization and attempts to alert and engage the dominant individuals in their "pack" whenever possible, engaging in actual combat only as a last resort. In addition, they retain very juvenile physical characteristics such as round bodies and heads, soft coats, ears that hang down, and so on, which do not elicit fear responses from the sheep in the way that an appearance similar to that of an adult wolf would. (Compare to the physical appearance of the border collie, a sheep herding dog, whose physical configuration is closer to that of an adult wild canine and who therefore has a greater capacity to frighten sheep into a desired pattern of movement, along with the more adult aggressive temperament to do so). Breeds that are hunting dogs that is, pointers, setters, spaniels, retrievers, etc. have an intermediate degree of paedomorphism; they are at the point where they share in the pack's hunting behavior, but are still in a junior role, not participating in the actual attack. They identify potential prey and freeze into immobility, for instance, but refrain from then stalking the prey as an adult predator would do next; this results in the "pointing" behavior for which such dogs are bred. Similarly, they seize dead or wounded prey and bring it back to the "pack", even though they did not attack it themselves, that is, "retrieving" behavior. Their physical characteristics are closer to that of the mature wild canine than the sheepdog breeds, but they typically do not have erect ears, etc.

Scenthounds maintain an intermediate body type and behavior pattern that causes them to actually pursue prey by tracking their scent, but tend to refrain from actual individual attacks in favor of vocally summoning the pack leaders (in this case, humans) to do the job. This contrasts with sighthounds, who pursue and attack perceived prey on sight, and who maintain the mature canine body type with erect ears, lean bodies, and adult coats. Terriers similarly have adult aggressive behavior, famously coupled with a lack of juvenile submission, and display correspondingly adult physical features such as erect ears, although many breeds have also been selected for size and sometimes dwarfed legs to enable them to pursue prey in their burrows.

The least paedomorphic behavior pattern may be that of the basenji, bred in Africa to hunt alongside humans almost on a peer basis; this breed is often described as highly independent, neither needing nor appreciating a great deal of human attention or nurturing, often described as "catlike" in its behavior. It too has the body plan of an adult canine predator. Of course, dogs in general possess a significant ability to modify their behavior according to experience, including adapting to the behavior of their "pack leaders" again, humans. This allows them to be trained to behave in a way that is not specifically the most natural to their breed; nevertheless, the accumulated experience of thousands of years shows that some combinations of nature and nurture are quite daunting, for instance, training whippets to guard flocks of sheep.