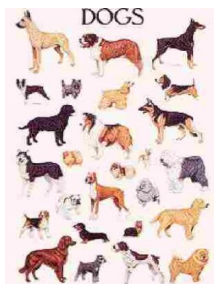


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By: Stefan Anitei, Science Editor



[Just One Gene Makes the Difference Between Pygmy Dogs and Huge Ones](#)

The gene sets the amount of growing hormone

Geneticists at the National Human Genome Research Institute in Bethesda, Maryland, found that a single gene may explain the huge size difference between tiny dog breeds like Chihuahua and massive dogs, like the mastiff. They chose for the study one breed: the Portuguese water dog. Based on skeleton measurements, the dogs were classified as either big or small for their own breed. After that, they searched for DNA differences between the large and small water dogs. A previous study has already sequenced the dog genome, and the team already knew places of large variation on the chromosomes. The loci are fewer in purebred dogs than in humans, because usually human populations are biologically very mixed. One of the few differences between big and small dogs occurred in a gene called 'insulin-like growth factor 1' (Igf-1). Lab experiments made on mice had already shown that eliminating Igf-1 led to mini-mice. Then, the team analyzed the Igf-1 genes in 350 other dogs of giant and pygmy breeds - from pomeranians and Yorkshire terriers up to great Danes and St Bernards. There were also examined genes in wild dogs, such wolves, which are the wild ancestors of the domestic dogs, to foxes, which are distantly related to domestic dogs. Almost all of the 18 small breeds had the same gene variant as small Portuguese water dogs while almost none of the 15 giant breeds presented this gene variant. "That suggested that the gene plays a major role in controlling dog body size," Sutter said. Igf-1 sets the amount of the growth hormone. Less hormone means smaller size. "The 'small' version of Igf-1 seems to have formed long ago," Sutter says. Humans started long ago fixing this gene variant in small breeds by selecting tiny dogs. "The study proves how useful genetic studies in dogs can be," Sutter says. Because the dogs breeds are pure (they have lost a lot of their genetic variation) it is easier to track the genetic causes of traits than it is in people. Some geneticists are already looking for genes that cause diseases, such as cancer. "The power in dog populations is that they can deliver a simple genetic story about a precise genetic trait," Sutter says.