

Gene Responsible for Dog Coat Color Found

Stanford researchers have discovered a gene variation that determines whether a dog's coat is black, yellow, or a variation of the two.

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All dogs' coat color is a variation on a gene that supplies either black or yellow fur, according to genetic researchers from Stanford's School of Medicine.

After swabbing the inner cheeks of hundreds of dogs, a team of genetic researchers from Stanford's School of Medicine, believe they have found the gene that determines a dog's coat color.

Researchers visited five San Francisco Bay area dog shows over six months to gather hundreds of samples. They also recruited friends, family, and dog breeders to mail in results.

"It's painless for the dogs, so they didn't mind," said Sophie Candille, Ph.D., a former graduate student in lead author Greg Barsh, Ph.D., of Stanford University's lab. "The dogs we met at dog shows were very well-behaved and happy to cooperate."

The gene makes a protein that's part of a family called defensins. Humans have between 40 and 50 different defensin genes while dogs have up to 46. This protein also engages a range of bodily functions that control skin and hair color as well as stress-coping and weight regulation.

The study, which was funded by the National Institutes of Health, was published in the Nov. 2, 2007, issue of Science.

The project began several years ago when Candille studied the genetic differences between Boxers and large Munsterlanders, later moving on to Miniature Schnauzers and 36 other dog breeds.

Despite the wide range of colors in dog coats, researchers say the defensin protein only comes in two versions: one that produces yellow dogs and a mutant version that produces black. Everything in between is a modification of these two colors.

"A Dalmatian looks white with black spots but based on its genetics it's black," said Barsh. "Dogs that are chocolate – like one of my dogs, a chocolate Poodle – are also a modification of black." His other dog, an apricot Poodle, is genetically yellow, as are Irish Setters, he said.

In addition to the findings on coat color, researchers are looking at whether or not the defensin family does in fact fight infection as previously believed.

The researchers plan to continue their study on the role defensins play in our bodies and whether or not future drugs could be personalized to match an individual's unique needs based on these gene sequences.