

Dog DNA study reveals new role for protein

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CHICAGO (Reuters) - A family of proteins known to fight off microbes surprisingly also helps determine whether a poodle's coat will be black, white or somewhere in between, U.S. researchers said on Thursday in a finding that may also help explain why people come in different colors and weights.

Researchers at Stanford University in California studied the DNA of hundreds of dogs, looking for a gene mutation that controls coat color.

"When we did genetic mapping and identified the gene responsible, it was a surprise," said Dr. Gregory Barsh of Stanford, whose study appears in the journal Science.

It turns out the gene that controls coat color in dogs also controls a family of proteins called defensins that are thought to defend the body from invading microbes.

"It connects a whole family of genes, the defensin family, to what was previously thought to be a different pathway, the melanocortin pathway," Barsh said in a telephone interview.

Barsh's laboratory has spent the past 15 years studying the melanocortin pathway -- the hormones and proteins that control the amounts of melanin and cortisol produced in the body.

This pathway plays an important role in weight control and skin pigmentation, which is what drew Barsh to study of coat color in dogs.

But the link between two distinct pathways raises many questions about the role of defensin proteins.

BIGGER ROLE?

"They're called defensins because people think their function is to defend against microbes," Barsh said. "No one has really been able to prove the defensins are defensive."

Instead of strictly playing a role in immunity, Barsh thinks they may play a bigger role.

"One of the striking things about the defensin genes is they vary tremendously in their number," he said. "They show a lot of differences between different kinds of animals. Most genes aren't like that."

Barsh suggests the changeability or plasticity of defensin genes may afford dogs -- and humans -- the ability to respond to changes in the environment.

"They are evolution's way of responding to things that change rapidly on an evolutionary timescale," he said, something that also makes them appealing in terms of immunity.

"One of the things that changes very rapidly during evolution are pathogens," Barsh said. "We wonder if maybe defensins might be involved more broadly in dealing with environmental challenges that are faced by organisms."

That could explain coat color, which could work as camouflage to better adapt to one's environment.

"What our results suggest is that the net should be cast a bit wider," Barsh said. "When we see differences in defensins in different people, we should be looking for differences in body weight, cortisol production and differences in hair, eye or skin color."

In 2003, a team at the National Cancer Institute found that a gene that makes cats' fur black, and people's hair red, can affect the ability of bacteria and viruses to infect cells.