

First validated canine behavioral genetics findings of nine fear and aggression traits in dogs

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Anxiety disorders are the most common type of mental illness in the United States. And while much is understood about the biochemistry of anxiety, little is known about the genetic variation associated with it.

Recently published in *BMC Genetics*, a study led by researchers at Nationwide Children's Hospital reports that genetic predisposition to aggression toward an owner or a familiar dog is distinct from that for fear and aggression directed at unfamiliar humans and dogs. The researchers identified approximately 12 genes associated with these traits.

"Our strongest focus is on specific genes related to aggression toward unfamiliar humans and dogs, which are associated with highly relevant genes at two genome regions," said Carlos Alvarez, PhD, principal investigator in the Center for Molecular and Human Genetics in The Research Institute at Nationwide Children's Hospital. "Those genes are consistent with the core fear and aggression neural pathway known as the amygdala to hypothalamic-pituitary-adrenal axis."

The findings not only relate to the most important dog behavioral problems but are also likely to be highly relevant to human [anxiety disorders](#), according to Dr. Alvarez.

While the most immediate implications are for veterinary behavioral

medicine—genetic testing for risk of specific types of fear and aggression, the long term implications for adults and children with anxiety disorders are encouraging.

Because these risk variants are common across [dog breeds](#), the canine veterinary setting provides an ideal testbed for new therapies targeting those biochemical pathways. Once it is determined which neuronal circuits are affected by the risk variation, this will likely reveal drug targets that could be inhibited or activated to increase or decrease the emotional behavioral effects. Those findings can immediately be tested in pet dog patients under owner consent. And, if those therapies are effective in [dogs](#), they can then be applied to humans with similar conditions. Knowledge of the affected pathways will also provide biomarkers that can be used to identify the patients who are most likely to respond to such treatments.

"This project has only just begun," said Dr. Alvarez. "We are continuing to identify and validate other genes associated with these traits, including the expansion of dog breeds studied and biological validation of the findings. We are excited about what this work will continue to uncover."

Provided by Nationwide Children's Hospital

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