

Scientists cross-breed to improve head shape in toy dogs predisposed to a painful disorder

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In a new study published today in the journal *PLOS ONE*, scientists from the University of Surrey, working with an experienced breeder in the Netherlands, examined how the skull and brain of toy dogs change when a Brussels Griffon with Chiari-like malformation is crossed with an Australian Terrier. The succeeding hybrid puppy is then back crossed to a Brussels Griffon to give some of the features of the Brussels Griffon, but keeping the longer skull of the Australian Terrier.

The results from the study showed it is possible to breed a dog which had the external features of a short-nosed Brussels Griffon and reduce the risk of Chiari malformation, a debilitating condition found in [toy dogs](#) and affecting 1 in 1,280 humans. The disease is characterised by premature fusion of [skull bones](#) forcing parts of the brain to push through the opening in the back of the skull causing fluid filled cavities to develop in the spinal cord. Chiari malformation causes headaches, problems with walking or even paralysis and has become prevalent in some toy breed dogs as a result of selective breeding.

The breeder, Henny van der Berg proposed the project idea after an accidental mating between two of her dogs. The four-year study analysed five traits on magnetic resonance images (MRI) scans and how they changed generation by generation in the family of 29 dogs. Using a careful selection of head shape and MRI scans over two generations, the findings revealed it was possible to breed a dog which had the external features of a Brussels Griffon, but is less susceptible to Chiari malformation.

"This is a true collaboration with breeders and researchers working together and using their expertise to improve the health of dogs," said Dr Clare Rusbridge from the University of Surrey.

"Our study investigated how the characteristics of this disease is inherited in the family. Such knowledge could help in tackling this debilitating disease in toy dog breeds. We hope our research will help develop more sophisticated ways of screening and improve breeding guidelines by creating robust breeding values."

The team at the University of Surrey is now collaborating with geneticists at the University of Montreal, and correlating the [skull](#) and brain traits visualised on [magnetic resonance images](#) with the dog genome. This information will then be translated to humans.

Provided by University of Surrey

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