HAIRLESS BREEDS SHARE THE SAME GENETIC MUTATION AND HAVE A COMMON HISTORY

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The Dog Genome Project that was completed in 2005 in the USA started a new chapter – or maybe a whole new novel in the history of dog genetics. Not only the mutations that cause diseases but also those creating breed specific characteristics have been opened up by researchers recently one after another. **One of the most peculiar phenomenon among the breeds of dogs is the so called hairless phenotype.** The most well-known naked breeds actually also share the same gene mutation. The mutation speaks also for the common past and history of these breeds. **Indeed, this might be the fact that in the future helps to keep these breeds alive since they are variations of the same "theme" and maybe should be treated as variations of the same breed.**

The gene mutation behind the hairless phenotype in Chinese Crested, Mexican Hairless and Peruvian Hairless has occurred at some point in the history of dogdom in DNA coding for a so called transcription factor. This factor, called Foxi3, belongs to the FOX-protein family. It may sound a funny name game if it would refer to the closely related species, fox, but actually the name comes from complicated and ambiguous English name "FOrk head-winged heliX". The FOX genes have a very similar DNA sequence and the proteins encoded by these genes have a very characteristic three-dimensional structure with butterfly-like wings as a center surrounded by a so called alfa-helical sheet. "Fork head" comes from the first gene mutation caused by a FOX family member actually found in fruit flies. The fruit fly embryos with the mutation had head and brain-like structures in their gut.

This phenomenon is known as homeotic transformation and speaks for a gene that has a profound effect on normal embryonic development. There are dozens of FOX-gene family members and proteins. This "hairless" factor is thus only one among many similar transcription factors, but almost nothing was know about it before the hairless mutation in dogs was characterised.

The gene mutation found in dogs is so called deletion and as a consequence one part of this gene located in dog chromosome 17 is lacking. The deletion is a so called inactivating mutation and the protein is totally missing.

All the consequences of the mutation are not known yet, but what we know is that lack of this factor that regulates the transcription (="reading") of numerous other genes, has a dramatic effect during dog embryogenesis.


Crested


Peruvian


Xolo