

# Diet affects skin gene expression in both healthy and atopic dogs

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Researchers from the University of Helsinki, Finland examined 48 Staffordshire Bull Terriers, of which eight dogs—four healthy and four atopic—were selected for RNA sequencing where their skin gene

expression was compared between both atopic and healthy dogs as well as between dogs that ate dry food or raw food. The diet appears to make a great difference in skin gene expression.

"Before the dietary intervention comparing atopic and healthy dogs, only a total of eight genes functioning in a range of ways in the skin were found, but the intervention increased this figure manifold. In other words, dietary intervention is extremely important for actual differences in gene expression to emerge," says researcher Johanna Anturaniemi from the Faculty of Veterinary Medicine, University of Helsinki.

The effect of the diet on skin gene expression was mostly associated with the immune system, antioxidants and inflammatory processes. Raw food appeared to activate the skin's immune defense system as well as the expression of genes that increase antioxidant production or that have anti-inflammatory effects.

"A previously conducted study also demonstrated that diets based on raw meat engender an anti-inflammatory effect on blood gene expression," Anturaniemi says.

In terms of puppyhood, the researchers consider a particularly important finding the fact that the immune defense of dogs whose diet is based on raw food is activated. What is known is that in people suffering from atopic dermatitis, the development of immunity has been disturbed and that diverse exposure to microbes in childhood reduces the risk of becoming atopic.

The differences in skin gene expression between atopic and healthy dogs highlighted the possibility of deficiencies in the lipid metabolism and keratinocyte proliferation of atopic individuals. Both hold a key role in the normal functioning of the skin barrier. Additionally, the expression of genes that boost the formation of new blood vessels, a phenomenon

known to be associated with the inflammatory response of the skin, was seen to have increased in atopic dogs. The findings support those made in prior studies.

"We identified several genes whose link with canine atopic dermatitis had not been reported earlier. Some of them are associated with previously known disturbed metabolic pathways, while the role of others in atopic dermatitis requires further investigation. Since the number of [dogs](#) involved in the study was small, the results can be considered preliminary. Indeed, the aim is to confirm them at a later date by utilizing the rest of the skin samples collected," Anturaniemi says.

**More information:** Johanna Anturaniemi et al. The Effect of Atopic Dermatitis and Diet on the Skin Transcriptome in Staffordshire Bull Terriers, *Frontiers in Veterinary Science* (2020). [DOI: 10.3389/fvets.2020.552251](#)

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