



WINN FELINE FOUNDATION

For the Health and Well-being of All Cats

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SUSCEPTIBILITY TO DERMATOPHYTES AND CARRIER STATE IN PERSIAN CATS

PROJECT STUDY: Susceptibility to dermatophytes and asymptomatic carrier state in Persian cats.

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Final report summary, MT16-015

In the final progress summary for this study, the investigators report on the exciting discovery of a genetic locus that is associated with severe, chronic ringworm in Persian cats. In addition, they report their findings on the fungal microbiome of Persians with ringworm compared with healthy Persians and domestic longhair cats.

The first aim of the study was to search for a genetic mutation contributing to ringworm susceptibility in Persians. DNA from 34 Persian cats was analyzed, and the results indicate that a particular region of DNA appears different in Persian cats with severe dermatophytosis. This region of DNA contains a cluster of genes called S100 genes. S100 genes allow for the creation of S100 proteins that have been shown to exhibit antifungal properties in other species and are present in feline skin; therefore, this gene cluster represent an exciting target for additional investigation. Manuscript preparation is underway, and additional studies are being planned to test the affected S100 genes (*S100A9* in particular) on the ringworm fungus outside of the feline host (i.e., in culture plates).

The second aim of this study was to examine the fungal microbiome on the skin of affected and unaffected Persian cats. The fungal microbiome (also referred to as the mycobiome) encompasses all the fungus present on the skin, including beneficial/protective fungi that normally inhabit the skin without causing disease. Using a technique known as next-generation sequencing (specifically, sequencing of a region of fungal DNA), they successfully identified the ringworm fungus on nearly all cats who had been diagnosed with ringworm. They were also somewhat surprised to find that this method did not detect any Persians who were carrying the typical ringworm fungus without symptoms (asymptomatic carriers), as some have hypothesized that Persians are asymptomatic carriers more often than other breeds of cat. They also detected no difference in the mycobiomes between healthy Persian cats and healthy domestic longhair cats. Further, they did not detect any differences in other fungi on the skin to suggest that other fungi play a role in the development of dermatophytosis (i.e., it does not appear that other fungi are beneficial against dermatophytosis from this study). They are continuing to assess the bacterial microbiome of these cats, as beneficial bacteria living on the skin may play a more significant role in defending against fungal infection.

In summary, the results from this study support that severe ringworm has a genetic basis in Persians, and that mutations affecting the S100A antimicrobial peptides, particularly S100A9, may be the culprit. Additional work will be needed to validate these findings. If altered S100A9 function is borne out in additional studies, the investigators could begin to develop strategies, including genetic testing, to combat the disease in catteries, shelters, and homes worldwide.

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