HAIR DISORDERS

WATER AVOIDANCE STRESS TEST ON CCHCR1 KNOCKOUT MICE INDUCES ALOPECIA AREATA PHENOTYPE.

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Background: Alopecia areata (AA) is a highly heritable multi-factorial and complex disease. We have recently identified a variant in the coiled-coil alpha-helical rod protein 1 (CCHCR1) gene as the only non synonymous variant in the AA risk haplotype. Using CRISPR/Cas9 for allele-specific genome editing, we reproduced AA symptomatic patched hair loss in mice engineered to carry the Cchcr1 risk allele.

Objective: The purpose of this study is to develop a spontaneous AA mice model to investigate the effect of CCHCR1 gene deficiency on the AA pathogenesis.

Materials and Methods: Using the c57BL/6N Cchcr1 gene knockouts which were subjected to water avoidance stress (WAS) test.

Results: Eight weeks after WAS test, in contrast to wild-type mice, all knockout mice exhibited non-inflammatory foci of alopecia on the dorsal aspect of the heads and bodies. Furthermore, the hair-pull test showed an increase in the dystrophic anagen hair. Characteristic phenotypes of AA, short stubs of hair and exclamation-mark hair, were observed in the hair loss area by dermoscopy. Classic peribulbar “swarm of bees” inflammation in AA mice by lymphocytic cells which were composed of both CD4+ and CD8+ cells.

Conclusions: The effect of stress on the pathogenesis is a classical key mediator and therefore we tested the effects of WAS as a stressful trigger. Our results consequently suggest that Cchcr1 knockout c57BL/6N mice are good morel mice of AA and strongly support that CCHCR1 is a susceptibility gene for AA.