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ABSTRACT BOOK

Epigenetic response of mountain hare (Lepus timidus) in different climate zones

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POSTER SESSION 3 - **P03.002**, EXPO AREA, August 21, 2025, 5:00 PM - 7:00 PM

The mountain hare (Lepus timidus) is a boreal mammal with a wide distribution across northern Europe, ranging across dramatically different climate zones, from mild winters in Ireland and strong winter conditions like in the Alps and Norway. Here, we investigated DNA methylation patterns in liver samples from individuals legally hunted in these three areas to investigate whether epigenetic responses varied among individuals. Pairwise population comparisons showed that differentially methylated regions were located in genes involved in pathways determining thermoregulation, pigmentation and developmental processes linked to body size. In addition, epigenetic distances between populations mirrored previously published genetic distances for the same populations, and several differentially methylated genes were those reported to have fixed alleles. In both pairwise comparisons including Ireland (which do not universally moult to a white pelage in winter) pigmentation genes were hypomethylated. Comparing Alpine (smaller body size) and Norwegian (larger) hares, the latter had mostly hypomethylated genes in the pathway developmental process assumed to underlie the observed differences in body mass index. This indicated that in addition to genetic changes, epigenetic modifications may also contribute to the molecular basis of Bergmann's rule. Overall, our results suggest that epigenetic mechanisms may increase adaptability to rapid environmental changes.