Evaluation of genetic variants proposed as myopathy risk factors in relation to sport performance in riding horses

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Equine myopathies vary widely in frequency, age at onset, types and contexts of clinical manifestation. Genetics play an important role among the causal factors, but diagnostic challenges and involvement of several, possibly interacting mutations complicate scientific evaluations. This study aimed to increase knowledge about six genetic variants proposed as risk factors for muscle integrity myopathy (MIM). Genotype data (MIM test results) were available for 557Warmblood riding horses (including 219Oldenburg broodmares) with estimated breeding values (EBV) for sport performance in dressage (D) and show jumping (J) from the national genetic evaluation for riding horses in Germany. At least one mutated allele in >10% of tested horses was seen for 4 of the 6 variants (P2, P4, P8, Px). Further statistical analyses considered sport performance through 14 individual EBV and indices (8 for D, 6 for J). General linear models included year of birth, discipline focus in breeding (studbook) and binary variant status (absence vs. presence of at least one mutated allele) as fixed effects. Analyses of variance were performed variant by variant and revealed significant discipline differences (P2, P4, P8, Px; all EBV / indices) as well as some indications of favorable performance potential regarding young horse classes in carriers (P2, P4, P8; up to 6 EBV / indices). The most frequent Px mutation appeared unrelated with genetic performance potential. Further research is needed to verify these findings which may explain observed distributions of mutations referred to as MIM variants.