

# Critical appraisal of sports genetics

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## **VALORISATION ADDENDUM**

The aim of this thesis was to evaluate the existing evidence of sports genetic research and its practical applications. This impact paragraph describes the scientific and societal impact of the main findings of this thesis.

### **Scientific impact**

The results from this thesis may be useful for researchers in several ways. Firstly, it advances our understanding of the genetic architecture underpinning athletic performance. This thesis not only confirms the hypothesis that genetic makeup plays a crucial role in endurance performance but also provides a solid foundation for further research. Secondly, the thesis underscores the importance of methodological rigor to improve study validity and comparability across studies. This could potentially lead to more accurate genetic profiling. As (direct-to-consumer) genetic testing becomes increasingly commonplace, the imperative for rigorous scientific research to back its applications has never been more critical. Thirdly, this thesis offers a unique methodology that combines the precision of meta-analysis with the practical insights gained from fieldwork with athletes and coaches. Such an approach not only underlines the research's scientific merit but also increases its practical relevance to athletes, coaches, and sports associations. Further, this research stands out for an innovative approach, particularly through the development of a genetic test that incorporates weighted genotype scores, one of the first in the field. Finally, the thesis calls on the scientific community to engage in larger multidisciplinary collaborations and adopt advanced technologies such as -omics and artificial intelligence to improve our understanding of sport genetics.

### **Stakeholders and dissemination activities**

This research holds value for various stakeholders including sports associations, athletes, coaches, and genetic testing companies. Each of these groups can use the findings to guide training regimens and inform decision-making processes. To reach these audiences, the findings have been disseminated through various channels (e.g., publications, presentations, phone calls, and social media). Notably, the results of the meta-analysis were presented at the European Congress Sport Science in Sevilla in 2022, highlighting the thesis's contribution to the field. Furthermore, engagement with different stakeholders has been an ongoing process during the PhD trajectory, with considerable interest expressed by entities across various sports disciplines such as football and handball from different countries.

### **Practical implications**

The ability to customize training and nutrition plans based on genetic predispositions represents a significant advancement in training methodologies. By understanding the genetic factors that influence for instance endurance, strength, recovery times, or nutritional needs, coaches (and athletes) can develop efficient training programs. Beyond performance optimization, the findings of this thesis also highlight the role of genetics in predisposing athletes to certain injuries. Sports medicine professionals can address these risks through targeted prevention strategies and personalized rehabilitation programs. This proactive approach to injury management may enhance athlete's welfare and contribute to longer, more productive athletic careers.

### **Market potential**

Additionally, the insights derived from this thesis can be incorporated into genetic testing services tailored for endurance athletes. This application represents a direct translation of scientific

findings into a service with market potential, bridging the gap between research and real-world application.

### **Education and public health**

Educating the public about the potential and limitations of genetic testing in general is essential. Through organizing workshops, seminars, and engaging with the public in the future, the complexities related to genetic testing can be clarified, creating a space where the public is empowered to make informed choices regarding its application. Finally, insights from future research may be translated to inform public health initiatives aimed at encouraging physical activity among the general population. Understanding genetic variations in exercise response may help tailor public health programs to diverse needs, fostering a more active and healthy society.