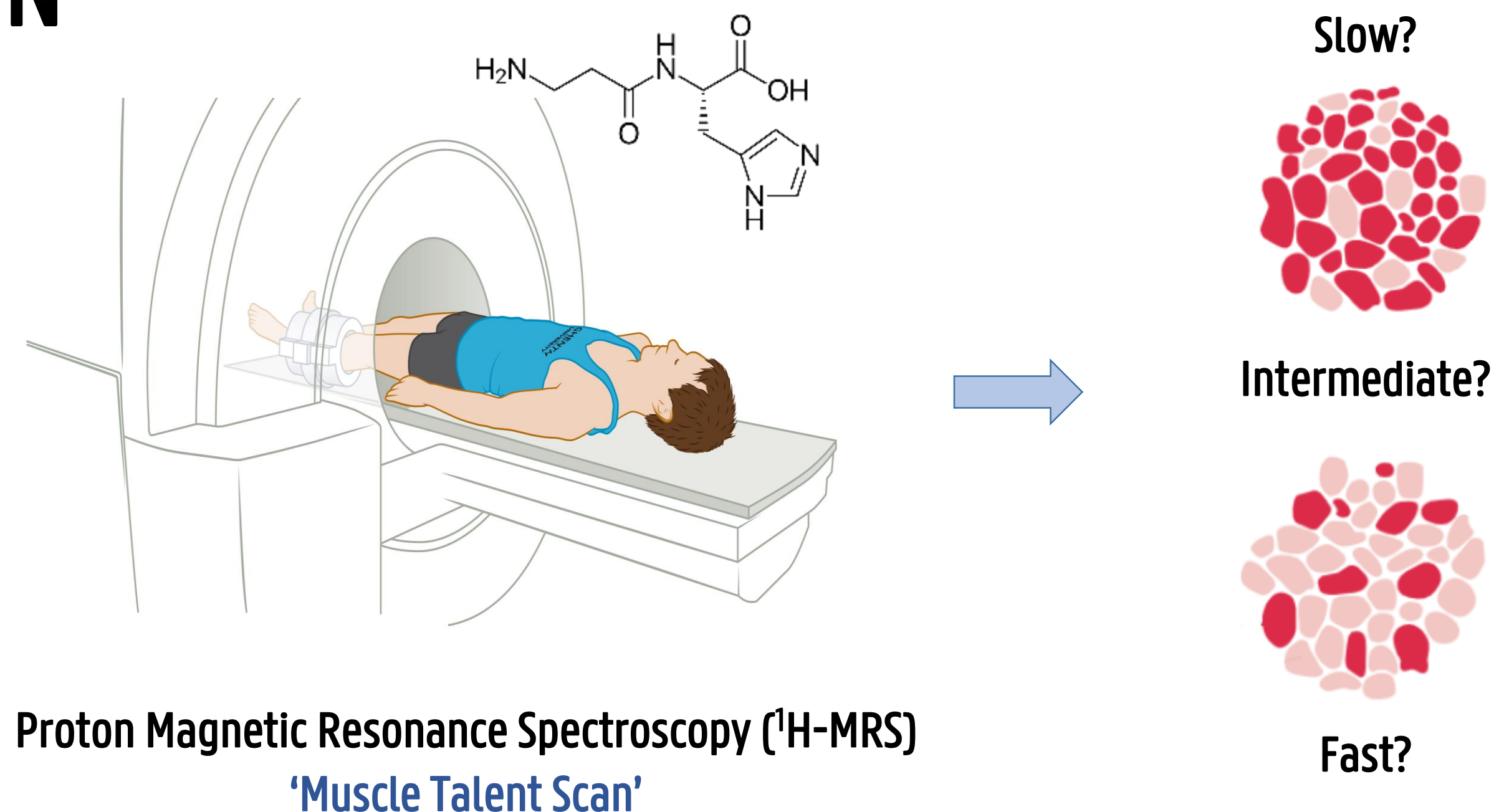


INTRODUCTION

Classical muscle biopsy studies¹ demonstrated that elite **endurance** athletes exhibit a more pronounced **slow** muscle typology, while elite athletes who excel in **explosive** disciplines, have a predominant **fast** muscle typology. **Muscle carnosine quantification** by proton magnetic resonance spectroscopy (¹H-MRS) was developed as a **non-invasive alternative to estimate muscle typology**². The validity of this technique was initially demonstrated in track-and-field, where muscle carnosine levels in elite athletes gradually decrease with increasing running distance. Also in **cycling**, it is anticipated that the various disciplines span a range of muscle typologies, but **solid data are scarce**.



AIMS

- 1 To compare the **muscle carnosine levels** of elite cyclists, excelling in **different cycling disciplines**.
- 2 To investigate **transfer possibilities** between cycling disciplines, **based on muscle typology**.

METHODS

Muscle carnosine levels of **85 elite cyclists** excelling in 8 different cycling disciplines were measured with the Muscle Talent Scan (¹H-MRS) in the 2 calf muscles: m. soleus and m. gastrocnemius.

Elite cyclist | European/World Championship participant
UCI WorldTour Team
Pro Continental Cycling Team



5 multi stage riders



14 single stage riders



5 road sprinters



4 BMX riders



29 track endurance cyclists



9 track-sprinters

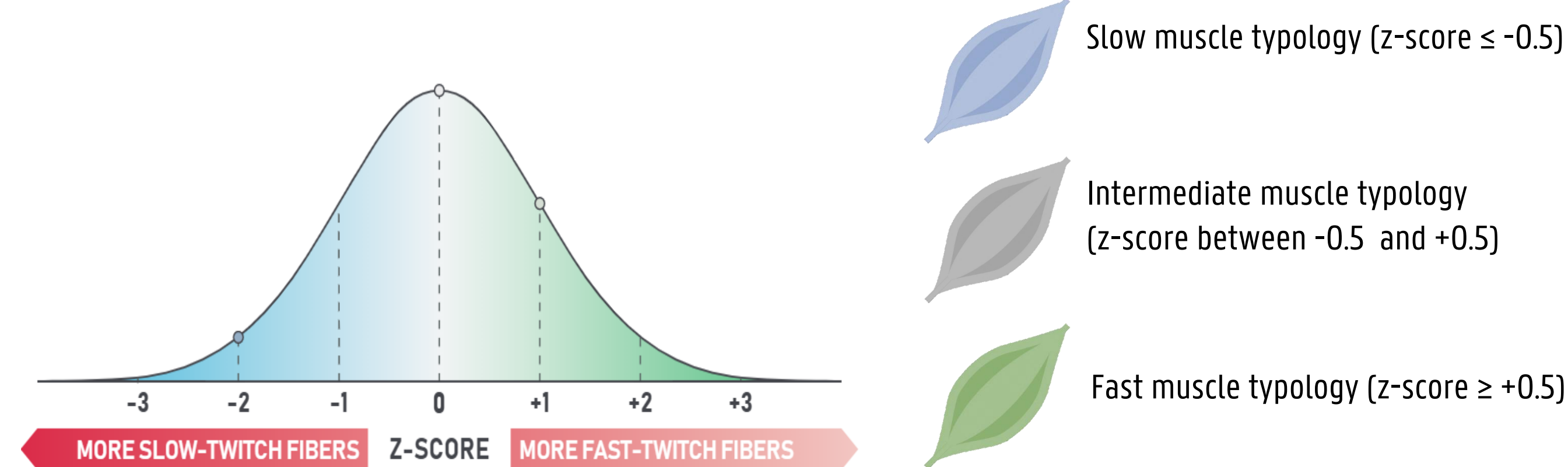


11 mountain bikers



9 cyclo-crossers

To investigate the muscle typology of the cyclists, their muscle carnosine levels were converted to z-scores, based on the normal carnosine distribution of a control population (112 women, 163 men).

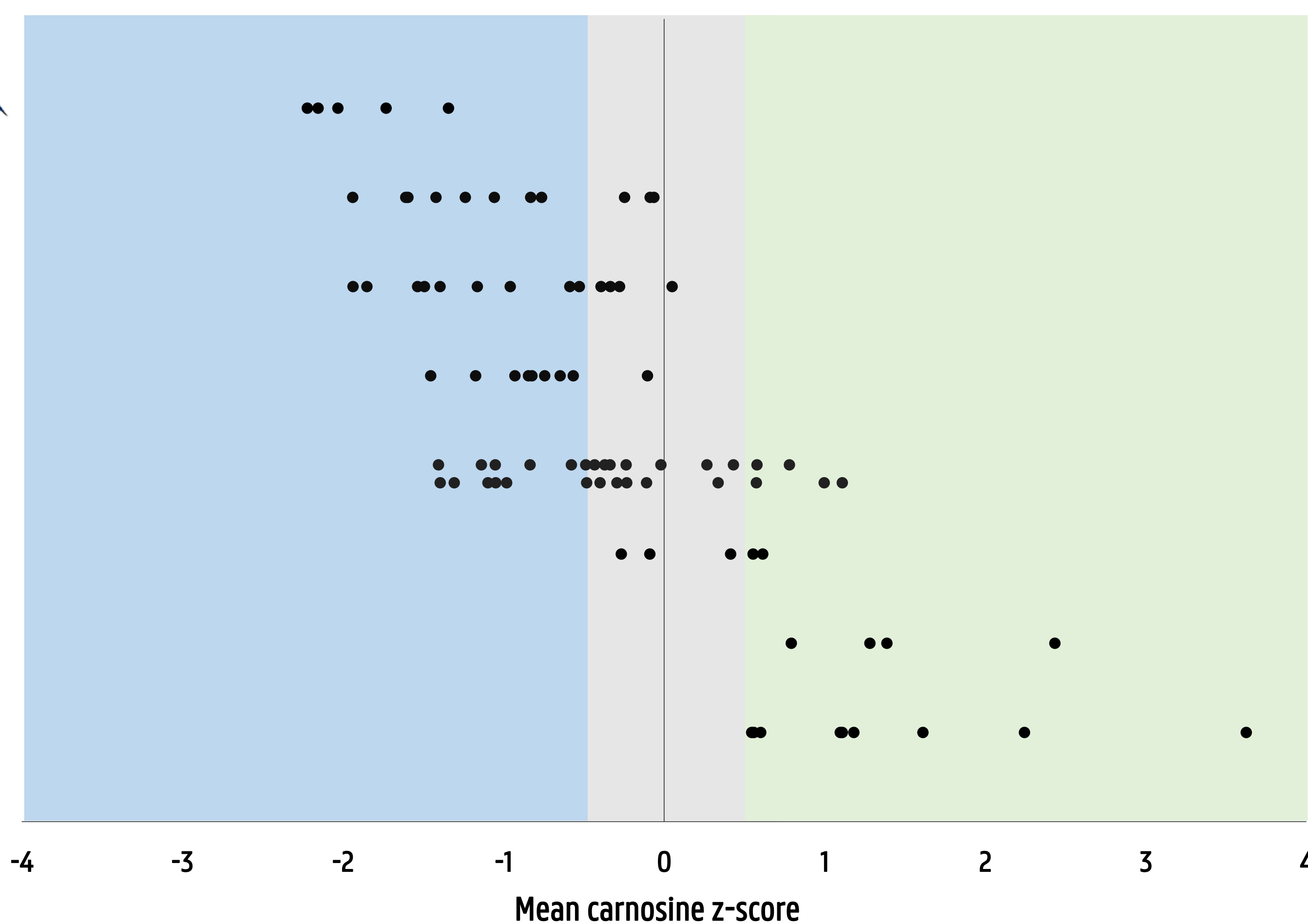


RESULTS

1 Carnosine levels

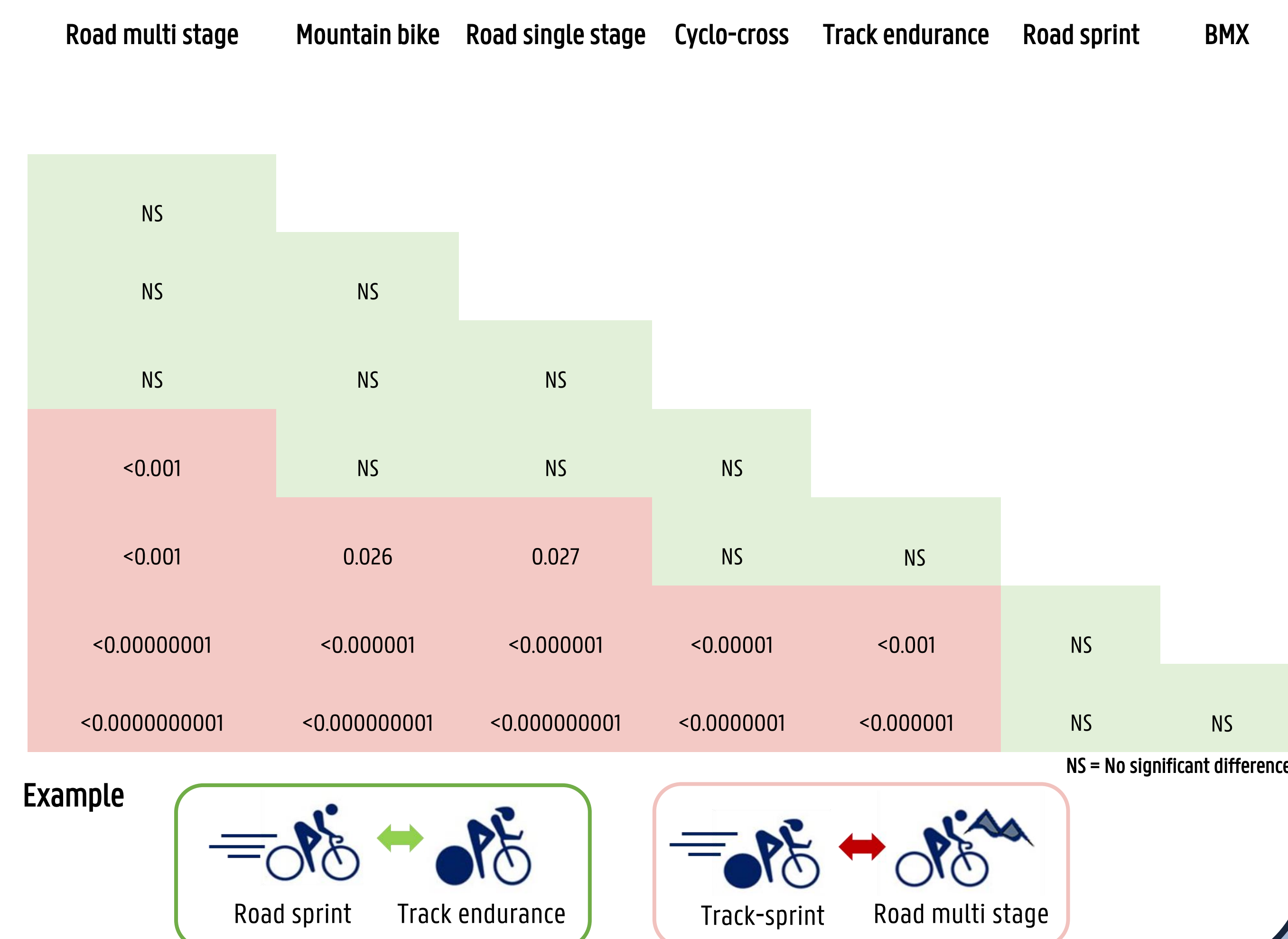
Muscle typology distribution for all cycling disciplines.

Slow Intermediate Fast



2 Talent transfer

Differences (p-values) in mean carnosine levels between the 8 cycling disciplines. The more the disciplines differ from each other, the less transfer seems possible, based on muscle typology.



CONCLUSIONS

- 1 Prominent differences in muscle carnosine levels exist between elite cyclists of various disciplines. Road cyclists, cyclo-crossers and mountain bikers display low carnosine levels, indicative for a slow muscle typology, whereas the carnosine levels of BMX riders and track-sprinters are indicative for a dominant fast muscle typology.
- 2 The non-invasive character of the Muscle Talent Scan opens opportunities for application in transfer and talent orientation in cycling.

REFERENCES