

## Towards a personalized approach to promote Musculoskeletal and Cardiovascular Fitness

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Human Health and performance depends on constitutional factors and is conditioned by nutritional cues. Specifically metabolic fitness and strength are key variables to protect against morbidity by enhancing mobility and quality of life that are potentially conditioned by the nutritional stimulus of regular intense exercise. In recent decades it has become increasingly evident that a considerable inter-individual capacity resides in the human population regarding the outcome of exercise training interventions on performance. This allows some individuals to improve maximal oxygen uptake efficiently while others nearly fail to respond to the stimulus.

Through the study of the cellular pathways underlying skeletal muscle's malleability to exercise training in

untrained and moderately subjects, and high-level athletes, we have identified that the capacity to improve muscle metabolism is reflected in a specific molecular signature that is graded to the volume and intensity of the impacting mechanical and metabolic stimuli during exercise. We have identified natural variants (i.e. polymorphisms) in the genes of the angiotensin-tenascin-C signaling pathway which modify muscle's exercise response and aerobic performance and mitigate the molecular response of the hypertensive patient to cardiovascular rehabilitation and anti-hypertensive medication. A concept is discussed how genetic, medical and training-log data can be combined to a state-of-the-art approach to maximize muscle performance through tailored exercise interventions.

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