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PHYSIOLOGICAL ADAPTATIONS TO INTERVAL EXERCISE TRAINING IN HEALTH AND DISEASE

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Interval exercise involves alternating periods of relatively intense effort and recovery within a single training session. Coaches and athletes have employed the practice for over a century as a means to improve performance[1]. From a scientific perspective, the last two decades have seen a resurgence of interest into the physiological adaptations to interval training and the associated impacts on health indices[2,3]. The method is infinitely variable but can be broadly classified into two categories: high-intensity interval training (HIIT) generally refers to submaximal efforts that elicit at least ~80% of peak heart rate, whereas sprint interval training (SIT) involves 'all out' efforts or an intensity corresponding to ≥100% of the workload that elicits maximal oxygen uptake (VO_{2max})[4]. Both HIIT and SIT induce physiological adaptations that resemble, and can be superior to, changes typically associated with traditional moderate-intensity continuous training (MICT) as reflected in public health guidelines. Systematic reviews and meta-analyses comparing MICT and HIIT, matched for total work or energy expenditure, have found that intermittent exercise elicits superior adaptations in both healthy individuals and people with cardiometabolic diseases, with respect to VO_{2max}[4,5] and health-related indices such as glycemic control[6] and vascular function[7]. Recent work has shed new light on the potential for SIT, which involves a small total volume of exercise, to elicit physiological adaptations that are comparable to MICT despite a smaller total exercise volume and time commitment[8]. These findings are noteworthy given that lack of time is a commonly cited barrier to regular physical activity. The behavioural implications are less clear and the subject of intense debate[9], although emerging data support the viability of interval exercise as an alternative to continuous exercise[10]. With respect to underlying mechanisms, the precise roles of exercise intensity, duration and volume in regulating physiological adaptations to training remain to be fully elucidated[11,12]. Within-subject, matched-work comparisons of interval and continuous exercise using acute[13] and short-term training interventions[14] suggest that intensity and/or the pattern of contraction is a critical determinant of exercise-induced metabolic fluctuations and skeletal muscle remodelling. This session will consider the physiological basis of adaptation to interval training and the practical application of the method in healthy individuals and people with cardiometabolic diseases.

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