

## **Inter-individual variation in predictors of CVD risk following high intensity interval training**

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*Introduction:* Low level of physical activity and cardiorespiratory fitness are associated with increased risk of cardiovascular disease (CVD). Current recommendations are that adults should be physically for 150 minutes at moderate intensity per week. Few people meet these guidelines, hence shorter, more intense, HITT regime has been postulated for increasing compliance while still reducing CVD risk. There is considerable individual variability in the ability to improve CVD risk in response to exercise, with many showing adverse changes.

*Methods:* Young healthy volunteers were subjected to 6 weeks of HITT. A range of physiological CVD risk predictors were measured before and after HITT. Individuals were divided into positive, negative, and non-responders.

*Results:*  $\dot{V}O_{2\max}$ , high levels of which are a positive prognostic factor, increased from 48 to 55 ml/min/kg ( $p=0.113$ ) following HITT. Positive responders showed an increase from 47 to 60 ( $p<0.001$ ) and negative responders a decrease (54 to 42;  $p=0.034$ ). Glucose tolerance, an indicator of insulin action, decreased from 784 to 739 mol/L.min ( $p=0.041$ ). Positive responders showed a decrease (845 to 773;  $p=0.031$ ) and negative responders an increase (669 to 746;  $p=0.245$ ). High plasma levels of adiponectin are associated with a lower risk of T2DM. Mean adiponectin levels increased over the training period (4.2 to 4.6 ug/ml;  $p=0.718$ ). Positive responders increased from 2.7 to 6.1 ( $p=0.001$ ), and negative responders decreased ( $p>0.05$ ).

*Conclusions:* Increasing activity levels over a 6 week period gave positive mean outcomes for cardiovascular risk indicating exercise is beneficial for the majority of individuals. Just as individuals respond differently to drugs, they also respond differently to exercise many individual showed adverse cardiovascular risk responses to HITT. Identifying individual who are predicted to respond adversely to one or more disease risk factors following exercise should lead to the development of more personalised disease prevention and personalised exercise prescription. Likewise, high intensity interval training may provide a cost and time effective method for T2DM and cardiovascular disease prevention.