Running head: 2D:4D and Aerobic Fitness in Young Adults: **THE RELATIONSHIP BETWEEN DIGIT RATIO (2D:4D), VO_{2MAX}, VENTILATORY THRESHOLD, AND RUNNING PERFORMANCE**

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ABSTRACT

The ratio of the second to fourth finger length (2D:4D) in the right and left hand shares a negative relationship with prenatal testosterone concentrations and endurance running performance. The underlying mechanisms explaining this relationship are unclear. The objective of this study was to investigate the relationship between 2D:4D and physiological parameters of cardiorespiratory fitness. We examined the relationship between 2D:4D and VO_2max, ventilator threshold, exercise economy, and fat free mass in young, sedentary and young endurance trained male and female adults. There were no significant correlations between digit ratio and VO_2max or exercise economy, except for negative correlations between 2D:4D and exercise economy ($r \approx 0.60$) and fat-free mass ($r \approx 0.50$) in sedentary men. Correlations between 2D:4D and ventilatory threshold were consistently strong across all groups ($-0.45 \leq r \leq -0.87$). In trained men, lower 2D:4D related to better running performance ($r \approx 0.44$) while cardiorespiratory fitness markers were better predictors of running performance than 2D:4D in trained women. Our results suggest that the relationship between high prenatal testosterone levels and superior endurance running performance is mediated by a high ventilatory threshold, which may be caused by a high Type I muscle fiber type ratio.