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Circulating myostatin is reduced with aging in humans but not altered by short-term, high intensity training

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Poster Communications

Introduction: Ageing involves a loss of muscle mass and function. The rate of decline is associated with negative health outcomes and increased mortality (1). Muscle atrophy is observed at a predictable rate from 30 years of age (2), however maintenance of function is seen in masters athletes > 60 years of age (3). Myostatin acts as a negative regulator of muscle mass (4) and underlies hypertrophy with chronic resistance training (5) and atrophy in chronic conditions (4). Experiment 1: Declared healthy participants (n = 83, 18 - 75 years of age, 36 male, 47 female) were recruited. Body composition, metabolic rate, grip strength and 6-minute walk test were recorded. Venous blood was collected and total myostatin concentration (herein referred to as myostatin) quantified by enzyme-linked immunosorbent assay. Total myostatin was lower in females compared with males (2176.1 [135.3] vs. 2788.7 [180.2] pg.mL⁻¹ [p = 0.007]). Stepwise regression observed that myostatin concentration is best predicted firstly by gender, then by age (r = 0.399, p = 0.02), and was not further improved by the addition of measures of metabolism, muscle mass or function. Experimental 2: A cohort of aged sedentary (SED) males (n = 14; 63.9 [5.6] years of age) and masters athletes (lifelong exerciser [LEX]; n = 10, 61.1 [5.8] years of age) completed 6 weeks of high intensity interval training (HITT). Two way ANOVA suggested no group (SED, LEX) × time (pre, post) interaction on myostatin concentration (p = 0.649), nor a main effect of time (p = 0.757), however there was a trend towards increased myostatin in the LEX group relative to SED (p = 0.083). Discussion: Loss of muscle mass and function occurs at a predictable rate from ~30 years of age, however the rate of loss differs between active and inactive populations. Here we demonstrate that total circulating myostatin decreases as age increases, and differs significantly between males and females. Total circulating myostatin negatively correlates with increasing age, however alterations in myostatin do not appear after short term training interventions. Longer term activity may alter myostatin, thus our next work will follow up experiment 2 with a 3 year longitudinal analysis.