Progressive resistance exercise training decreases ribosomal protein S6 (RPS6) levels in rat muscle

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ABSTRACT (Limited to 300 Words):

- BACKGROUND AND PURPOSE: Strength training is an essential intervention for increasing muscle mass and improving patient function. The understanding of muscle protein dynamics is critical to maximizing strength gains in patients with severe muscle wasting. Signaling proteins such as RPS6 are implicated in modulating protein synthesis and increases in muscle cross-sectional area. The purpose of this study was to compare changes in proteins levels (mTOR, AMPK, Akt, and RPS6) between resistance trained (RT) and sedentary (SED) animals.
- SUBJECT(S): Male, Sprague-Dawley Rats (n=16)
- METHODS AND MATERIALS: Animals were randomly assigned to resistance training (RT) or sedentary (SED) group. RT animals were trained to climb a ladder apparatus with progressively heavier loads over a 10 week period. SED animals were not given any exercise training. Following this period, the flexor hallucis longus (FHL) muscle was excised and analyzed for protein levels via immunoblotting.
- ANALYSES: Group comparison was analyzed by one-way ANOVA with post-hoc analysis using the Tukey Honestly Significant Different test to determine significant differences in protein levels (p < 0.05)
- RESULTS: FHL muscle increase in cross-sectional area by almost 20%. There was a ten-fold decrease in RPS6 protein levels in the RT group. No differences were observed in mTOR, AMPK, and Akt protein levels
- CONCLUSIONS: RPS6 levels are reduced following 10-weeks of progressive RT. This is in contrast to prior observations following acute bouts of RT.
- IMPLICATIONS: RPS6, which has been implicated in modulating protein synthesis in response to resistance training, is down-regulated following 10 weeks of training. How this dynamic facilitates muscle adaption to progressive RT requires further study.