SWACSM Abstract

Time Course Evaluation of MAPK Phosphorylation to Resistance Exercise: A Systematic Review

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ABSTRACT

Mitogen activated protein kinases (MAPK) are intramuscular cell signaling proteins that regulate adaptations to resistance exercise (RE). The MAPKs extracellular signal-regulated kinase 1/2 (ERK1/2), c-jun N-terminal kinase (JNK), p90RSK, and p38-MAPK increase during and after RE. Despite the well-known increase in post-RE phosphorylation responses of MAPK, the time-course and pattern of their activation remains unclear and poorly described. The ability to clearly define phosphorylation patterns during recovery are limited due to the variety of RE protocols implemented and populations tested when investigating MPAK responses to RE. **PURPOSE**: To systematically review literature on exercise-induced phosphorylation of ERK1/2, JNK, p38-MAPK, and p90RSK in humans following an acute bout of RE. We also reviewed the role of various RE loads, and training statuses on MAPK phosphorylation. **METHODS:** The review was performed according to PRISMA guidelines and a literature search was performed using three electronic databases. A modified version of the Downs and Black checklist was used to evaluate the methodological quality of the studies. The signaling responses were calculated as the percentage change from rest at within 30 minutes post-exercise, and at 1hr, 3hrs, 6hrs and >6 hours post-exercise. **RESULTS**: Forty-four studies met the inclusion criteria, and all were classified as good to moderate methodological quality. All MAPK increased post-exercise, and in general phosphorylation responses were the highest closest to the cessation of exercise. In addition, RE-induced MAPK responses are attenuated following chronic training compared to untrained subjects. MAPK responses also appeared to be greatest at RE loads between 65-85% 1RM. However, there were relatively few published studies that utilized loads outside this range. **CONCLUSION**: MAPK phosphorylation increases after an acute bout of RE and the greatest change occurs closer to the cessation of exercise. Additional studies investigating MAPK should be performed in highly trained subjects as there are limited data on signaling responses to RE in this population. Finally, additional studies using a wider array of RE loads will provide greater insight on MAPK phosphorylation responses to diverse RE stimuli.