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INCREASED SKELETAL MUSCLE IL-15R α IS ASSOCIATED WITH MYOFIBRILLAR PROTEIN SYNTHESIS IN RESPONSE TO A SINGLE SESSION OF RESISTANCE EXERCISE

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KEYWORDS: Myokines, IL-15/IL-15R α axis, strength training, muscle protein synthesis/breakdown

INTRODUCTION

In vitro and *in vivo* studies described interleukin-15 (IL-15) and its cognate receptor alpha (IL-15R α) as agents implicated in the regulation of the anabolic/catabolic balance in skeletal muscle^(1,2). IL-15R α may have a role in determining the phenotype and fatigability of muscle fibers *per se*^(2,3). Despite the potential role of IL-15 and IL-15R α as anabolic/anti-atrophy agents, direct evidence is lacking and no human study has assessed IL-15R α expression in skeletal muscle. The aim of the study was to determine skeletal muscle IL-15 and IL-15R α

• 221

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responses to a resistance exercise session and to analyse their association with myofibrillar protein synthesis (MPS).

METHODS

Fourteen participants performed a bilateral leg resistance exercise composed of 4 sets of leg press and 4 sets of knee extension at 75%1RM to task failure. Muscle biopsies of vastus lateralis were obtained at rest, 0, 4, 24 and 28h post-exercise during a primed-continuous infusion of L-(ring- $^{13}\text{C}_6$) phenylalanine to determine rates of MPS and skeletal muscle IL-15 and IL-15R α expressions by qRT-PCR and Western blot. Blood samples were drawn at rest, mid-exercise, 0, 0.3, 1, 2, 4 and 24h post-exercise.

RESULTS

Skeletal muscle IL-15R α mRNA and protein expression were increased at 4h post-exercise by ~2-fold ($P<0.001$) and ~1.3-fold above rest ($P=0.020$), respectively. IL-15 and IL-15R α mRNAs increased by ~2-fold ($P=0.003$ and $P=0.002$, respectively) at 24h post-exercise. Myofibrillar fractional synthetic rate increase between 0-4h was associated with IL-15R α mRNA at rest ($r=0.662$, $P=0.019$), 4h ($r=0.612$, $P=0.029$) and 24h post-exercise ($r=0.627$, $P=0.029$). Up-regulation of IL-15R α protein expression was related to leg press 1RM ($r=0.688$, $P=0.003$) and total weight lifted ($r=0.628$, $P=0.009$).

CONCLUSIONS

IL-15R α has been previously suggested to play a role in muscle phenotypic adaptation to resistance training (2, 4). The present study confirms that a single session of resistance exercise elicits the IL-15/IL-15R α signaling pathway activation. The IL-15R α independent association with MPS indicates that the IL-15/IL-15R α axis may have a relevant role in human skeletal muscle remodeling. Further attention is required to understand skeletal muscle IL-15 production from a metabolic and immune perspective.

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