
Citation:

Wood, N and Peters, R and Balchin, C and Price, OJ and Campbell, M and Johnson, D and Stavropoulos-Kalinoglou, A (2019) MicroRNA responses to acute resistance exercise protocols: a pilot study. In: European College of Sport Science, 03 July 2019 - 06 July 2019, Prague.

Link to Leeds Beckett Repository record:

<https://eprints.leedsbeckett.ac.uk/id/eprint/5858/>

Document Version:

Conference or Workshop Item (Accepted Version)

The aim of the Leeds Beckett Repository is to provide open access to our research, as required by funder policies and permitted by publishers and copyright law.

The Leeds Beckett repository holds a wide range of publications, each of which has been checked for copyright and the relevant embargo period has been applied by the Research Services team.

We operate on a standard take-down policy. If you are the author or publisher of an output and you would like it removed from the repository, please [contact us](#) and we will investigate on a case-by-case basis.

Each thesis in the repository has been cleared where necessary by the author for third party copyright. If you would like a thesis to be removed from the repository or believe there is an issue with copyright, please contact us on openaccess@leedsbeckett.ac.uk and we will investigate on a case-by-case basis.

MicroRNA responses to acute resistance exercise protocols: a pilot study

1Carnegie School of Sport, Leeds Beckett University, UK

2School of Food Science and Nutrition, University of Leeds, Leeds, UK

3Multidisciplinary Cardiovascular Research Group, University of Leeds, Leeds, UK

4School of Clinical and Applied Sciences, Leeds Beckett University, Leeds, UK

INTRODUCTION:

MicroRNAs (miRNAs) are non-coding RNAs that have an important role in regulating gene expression. Although circulating miRNAs are considered good markers of response to acute resistance training (RT) (1), change in expression according to the applied stimulus (e.g. high-intensity low-volume vs. low-intensity high-volume) has yet to be investigated. The aim of this study was therefore to evaluate the impact of RT protocols on circulating miRNA levels. We selected miRNA 29a, 128a, 486 as they have been previously shown to be implicated in skeletal muscle regeneration and structural adaptation (i.e. hypertrophy) (2).

METHODS:

Following local research ethics approval and written informed consent ten healthy recreationally active males (accustomed to resistance exercise) (age = 24 ± 3 years; BMI = 25.5 ± 2.8) were enrolled into the study. Participants attended the laboratory on three occasions separated by a period of 3-7 days. During visit 1, baseline maximal strength (1-RM) was determined via a 10 sub-maximal repetition protocol (3). Subsequently, in randomised order (i.e. visit 2 and 3) participants completed 3 sets of seated leg-press to volitional exhaustion at a workload equivalent to 30% or 70% 1-RM. Venous blood samples were obtained pre and 10-min post exercise. Real-time polymerase chain reactions (RT-PCR), using Qiagen RT-PCR kits and protocols were conducted to quantify the change in selected miRNA (29a, 128a, 486) levels between RT protocols. Log2 fold expression for each miRNA was calculated from the RT-PCR data.

RESULTS:

Baseline 1-RM did not correlate with changes to miRNA levels (70%: 29a $R=-0.207$, 128a $R=-0.006$, 486 $R=0.311$, 30%: 29a $R=-0.268$, 128a $R=0.092$, 486 $R=0.384$) and no significant difference was observed in miRNA expression between RT protocols ($P<0.05$) (miRNA 29a $P=0.230$; 128a $P=0.178$; 486 $P=0.379$). Importantly, however, a trend in data was observed to suggest circulating levels of all miRNAs were lower following high-intensity low-volume RT (29a $\bar{x}=-1.843$, 128a $\bar{x}=-1.508$, 486 $\bar{x}=-2.231$) in comparison to low-intensity high-volume RT (29a $\bar{x}=0.148$, 128a $\bar{x}=0.296$, 486 $\bar{x}=-0.433$).

CONCLUSION:

For the first time, our findings indicate that high-intensity low-volume RT induces a greater reduction in miRNA levels in comparison to low-intensity high-volume RT. The absence of statistical significance between protocols may be related to the low sample size of our population and/or acute study design. Further research is required to confirm our findings, determine if other miRNAs may be affected by RT and what the longer-term adaptations to different RT protocols may be.

REFERENCES:

1. D'Souza, et al., PLoS ONE. 12(7), 1-15. (2017)
2. Hitachi, et al., Frontiers in physiology. 4(408), 1-7. (2013)
3. Reynolds, et al., Journal of Strength and conditioning research 20(3), 584-592. (2006)