

NOTUM-- Transcriptomic Evidence of an Exercise-Responsive Myokine Toward the Preservation of Bone Health: An Exploratory Study



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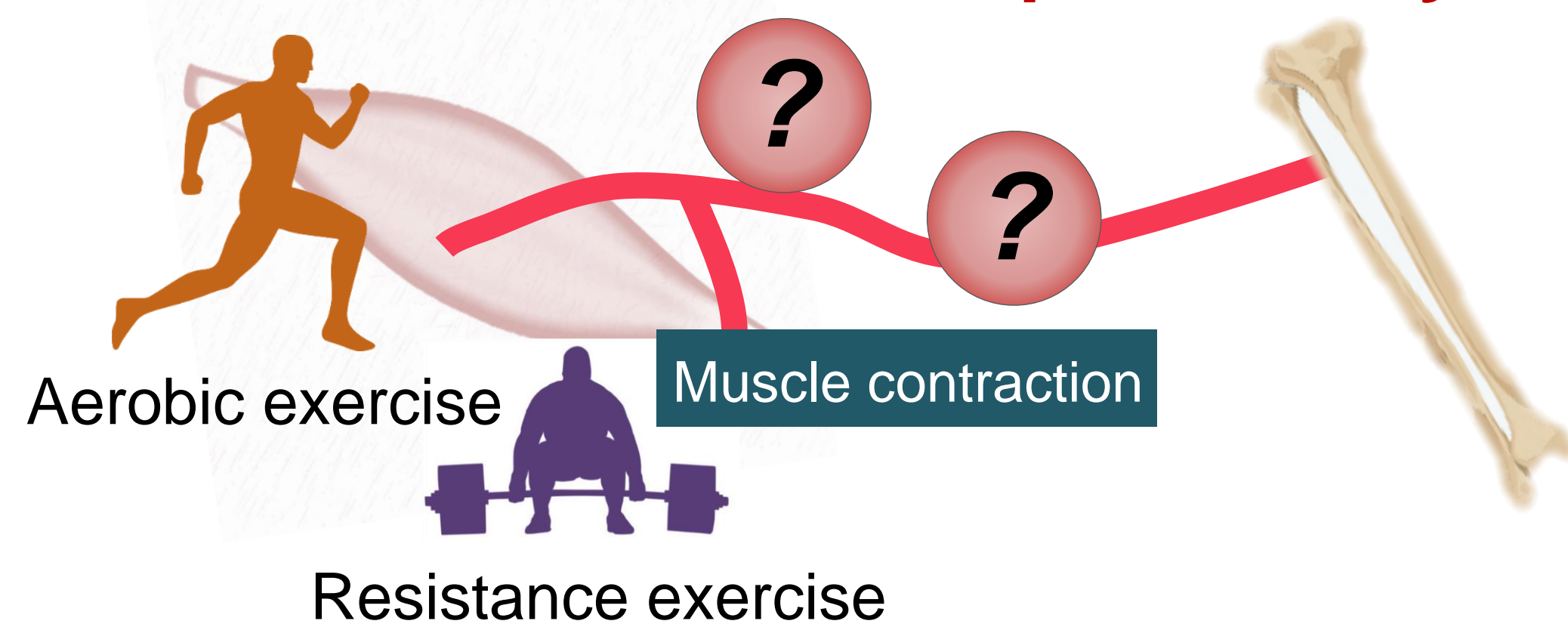


Skeletal muscle is an endocrine organ that releases myokines that affect the health of distal organs, such as bones. While past research has discovered several myokines that influence osteogenic processes, there is a paucity of literature regarding whether and how varying modes of exercise may differentially affect the myokines that mediate the muscle-bone crosstalk.

Objectives:

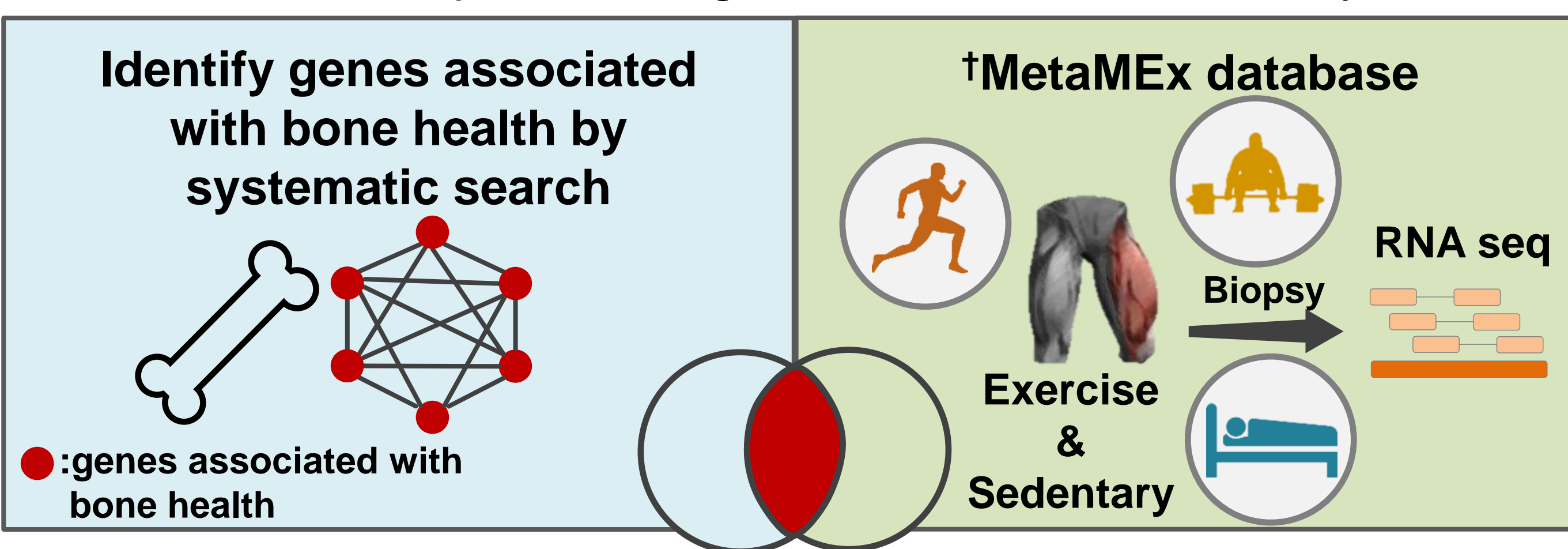
To evaluate muscle transcriptomic response to two types of exercise (aerobic or resistance) versus a sedentary lifestyle with the goal of identifying novel myokines that mediate "muscle-bone crosstalk".

Identification of exercise-responsive myokines

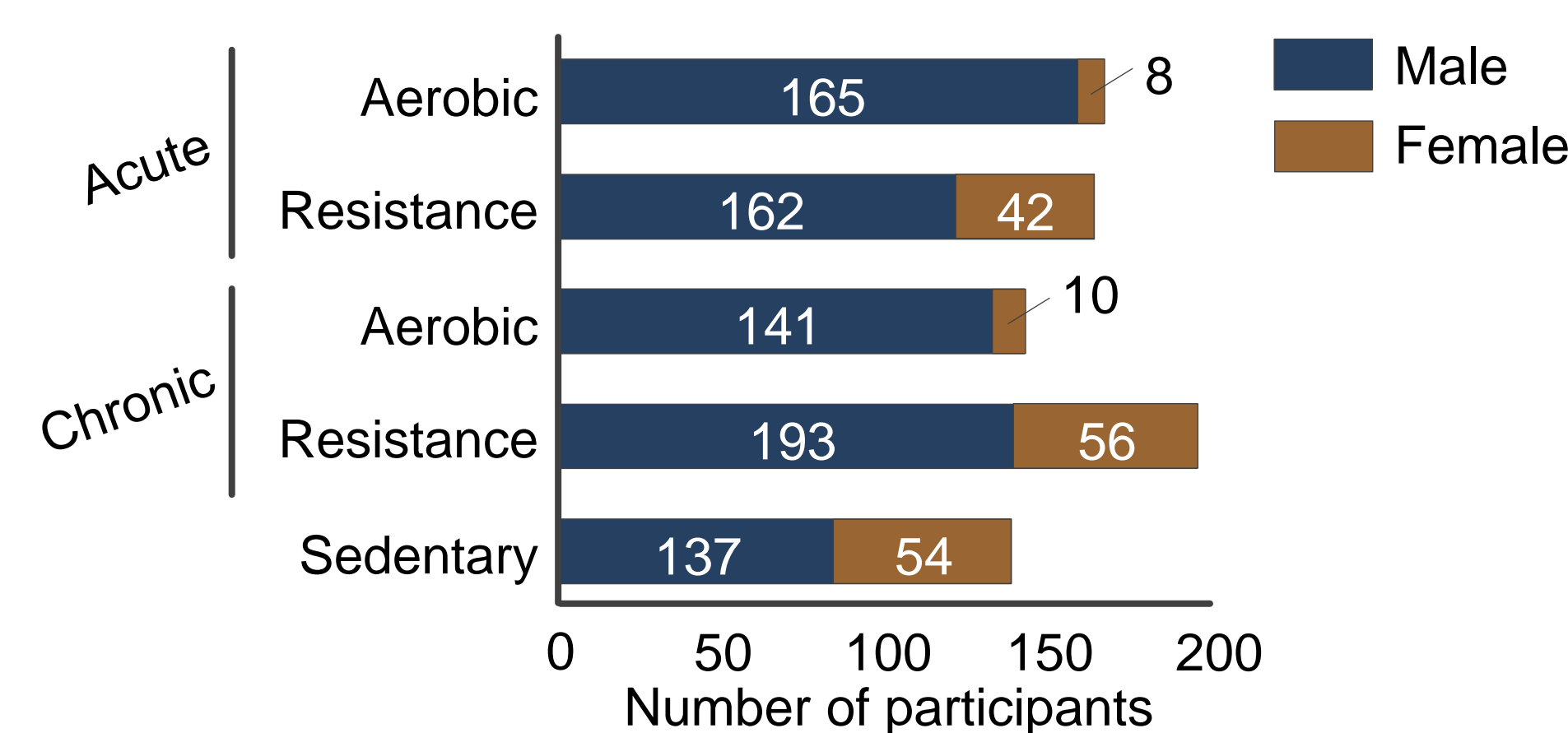


Approach:

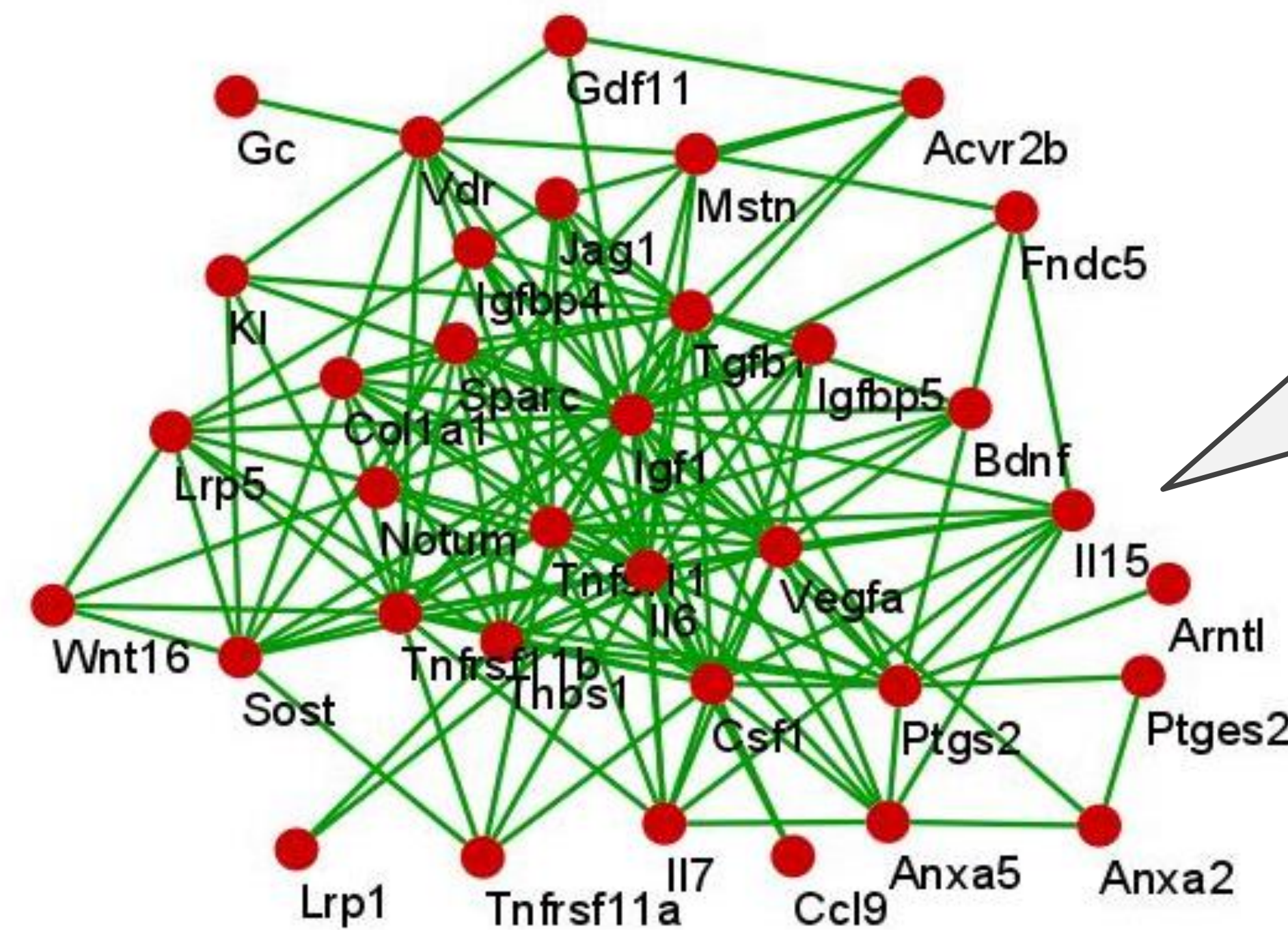
We used integrated approach of systematic search with meta-analysis of muscle transcriptome changes to exercise and sedentary.



†MetaMEx: muscle RNAseq from human exercise cohort

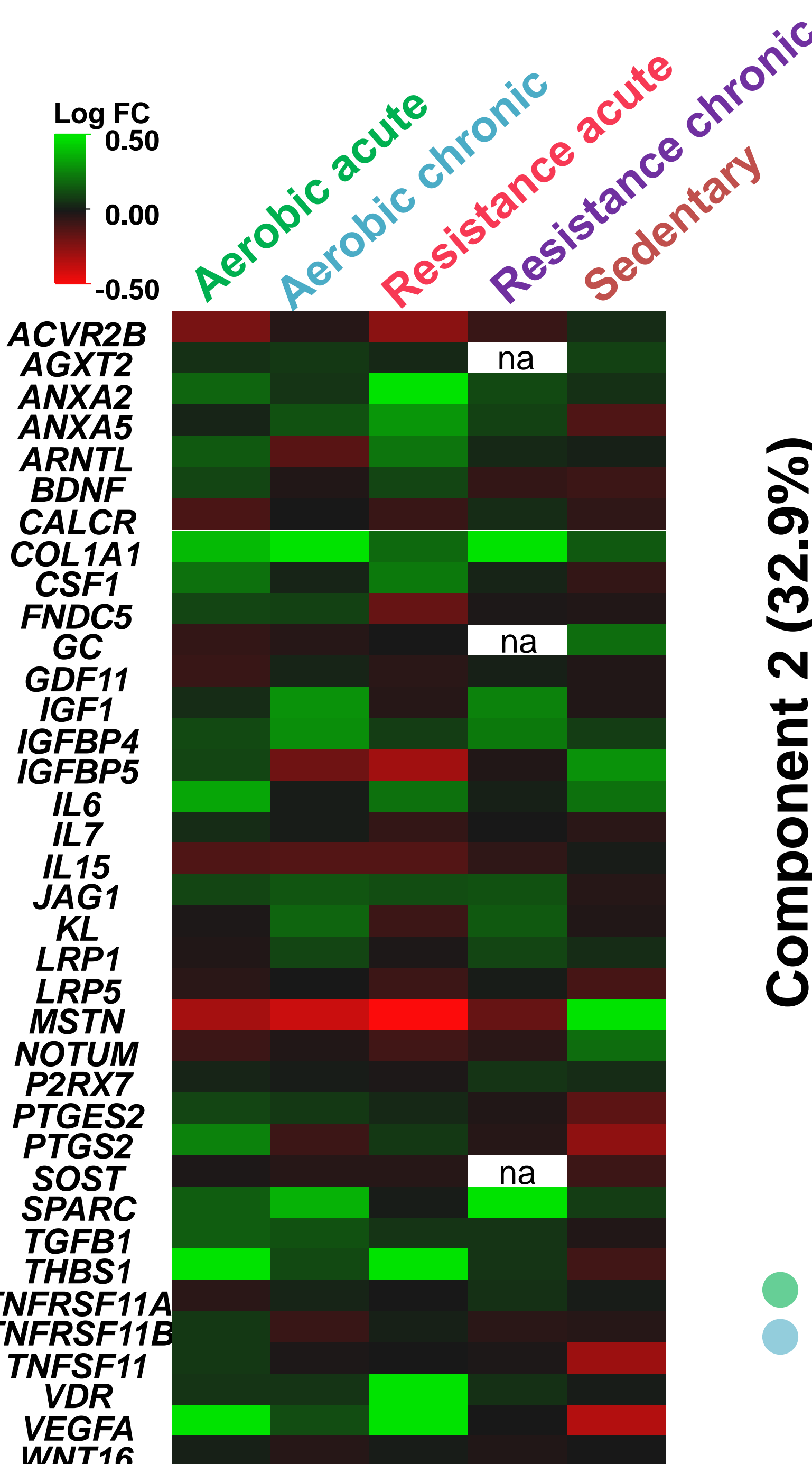


Bioinformatic analysis identifies three clusters across acute exercise, chronic exercise, and sedentary groups

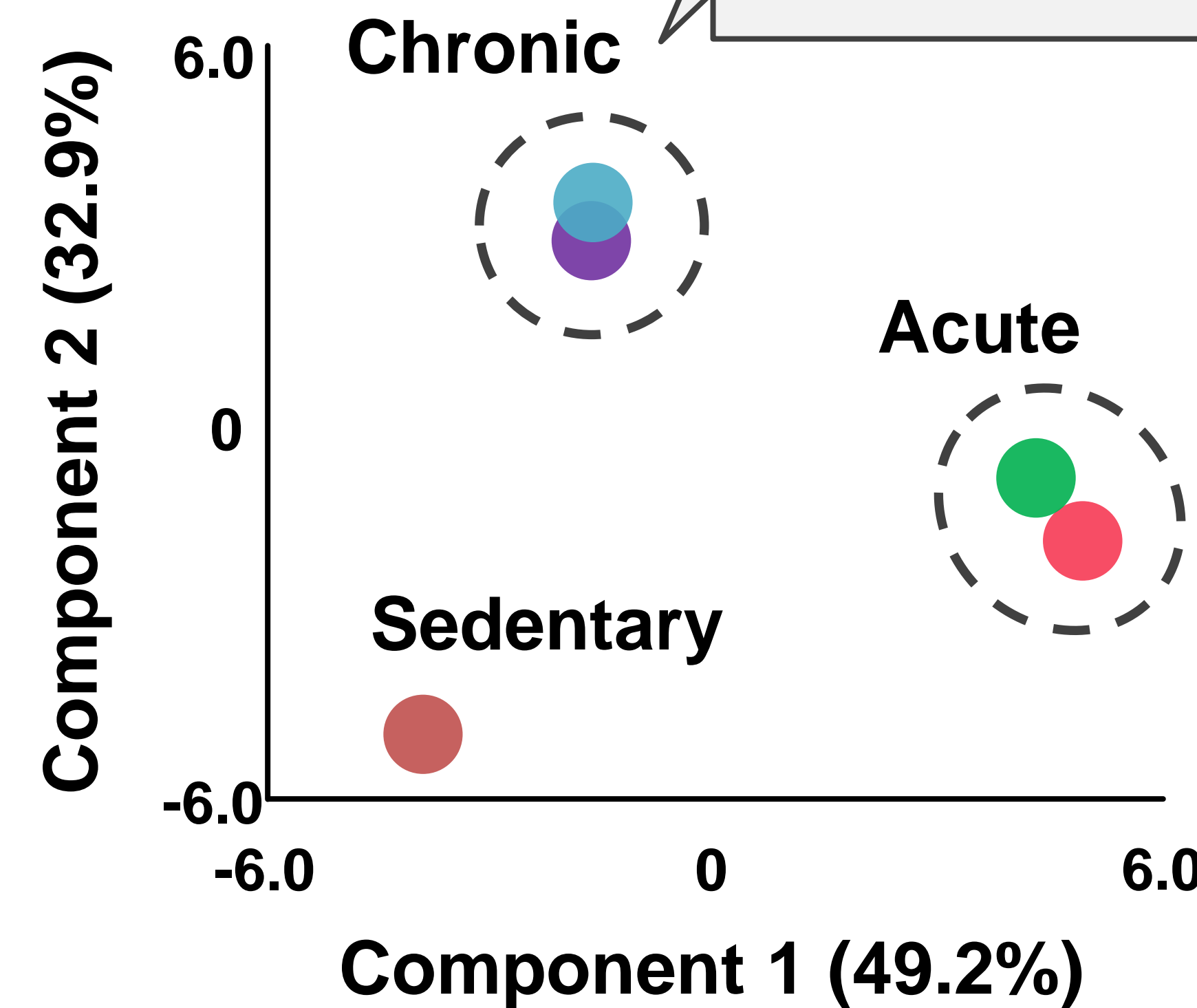


Systematic search identified 38 genes associated with bone health

MetaMEx database analysis

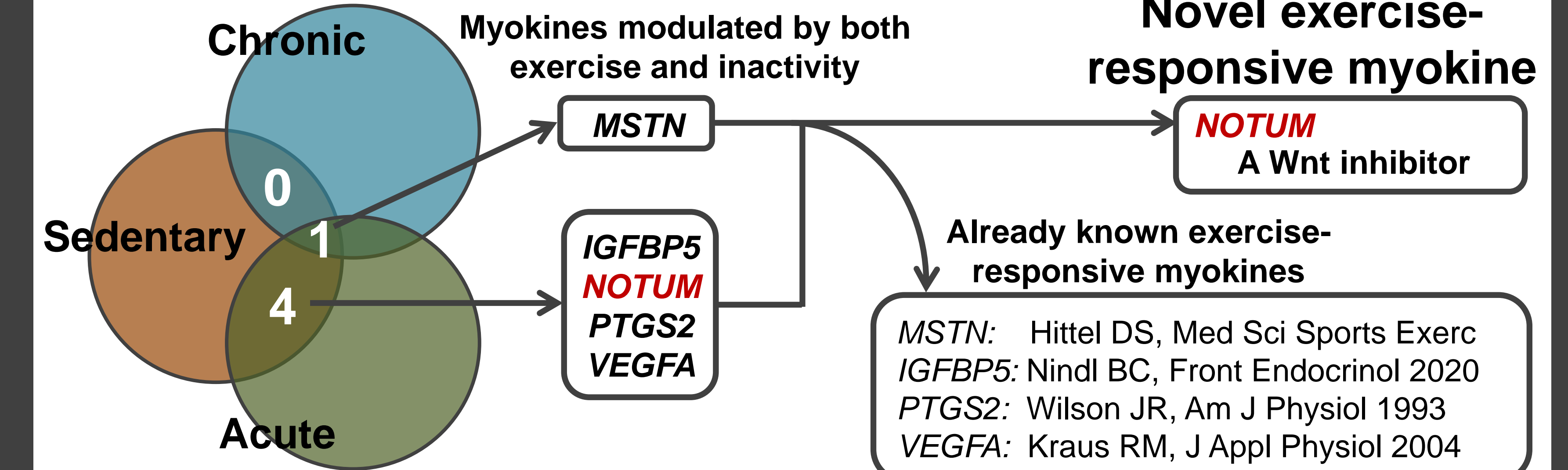


PCA identified three clusters (acute, chronic, sedentary)

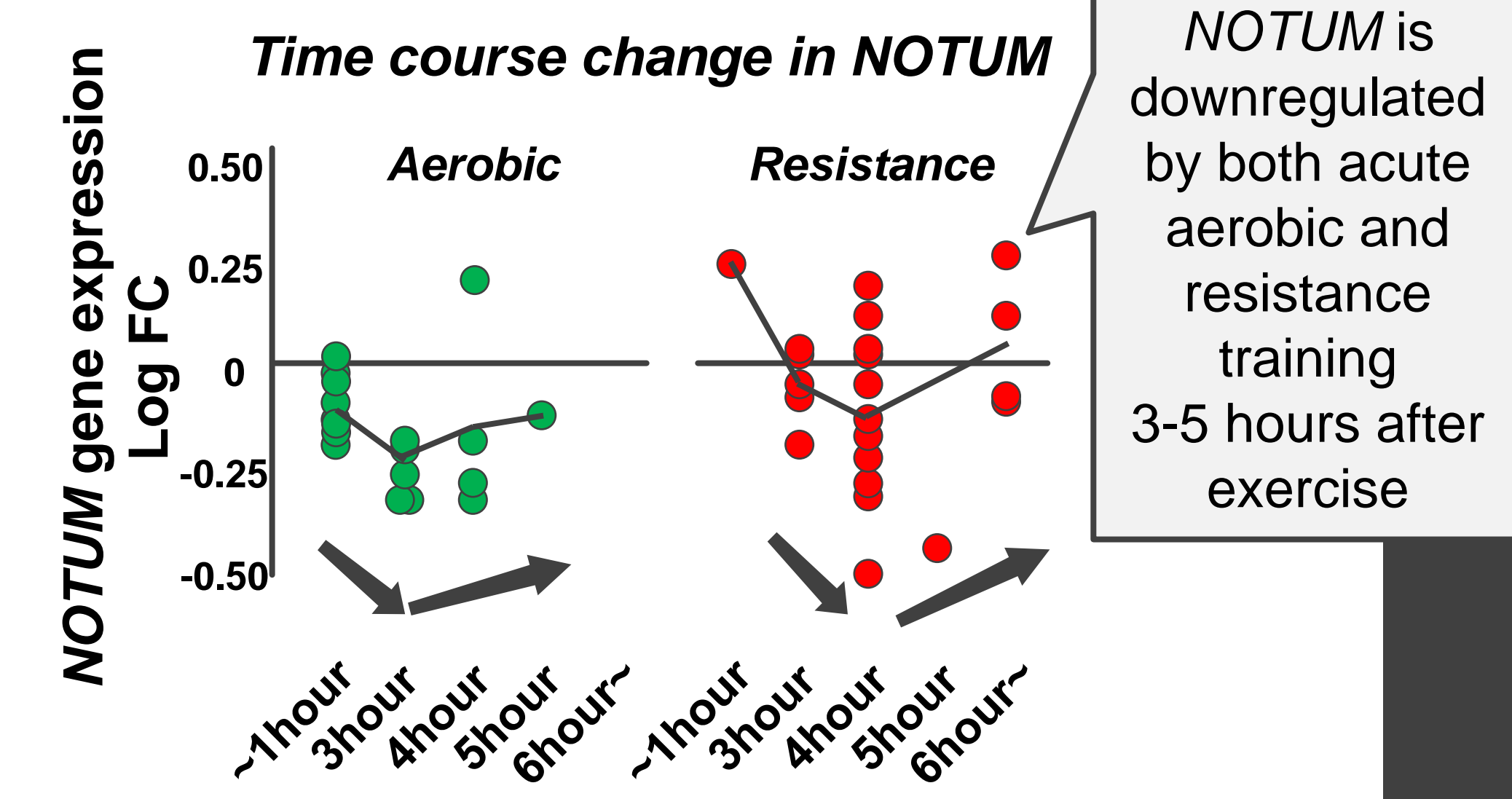
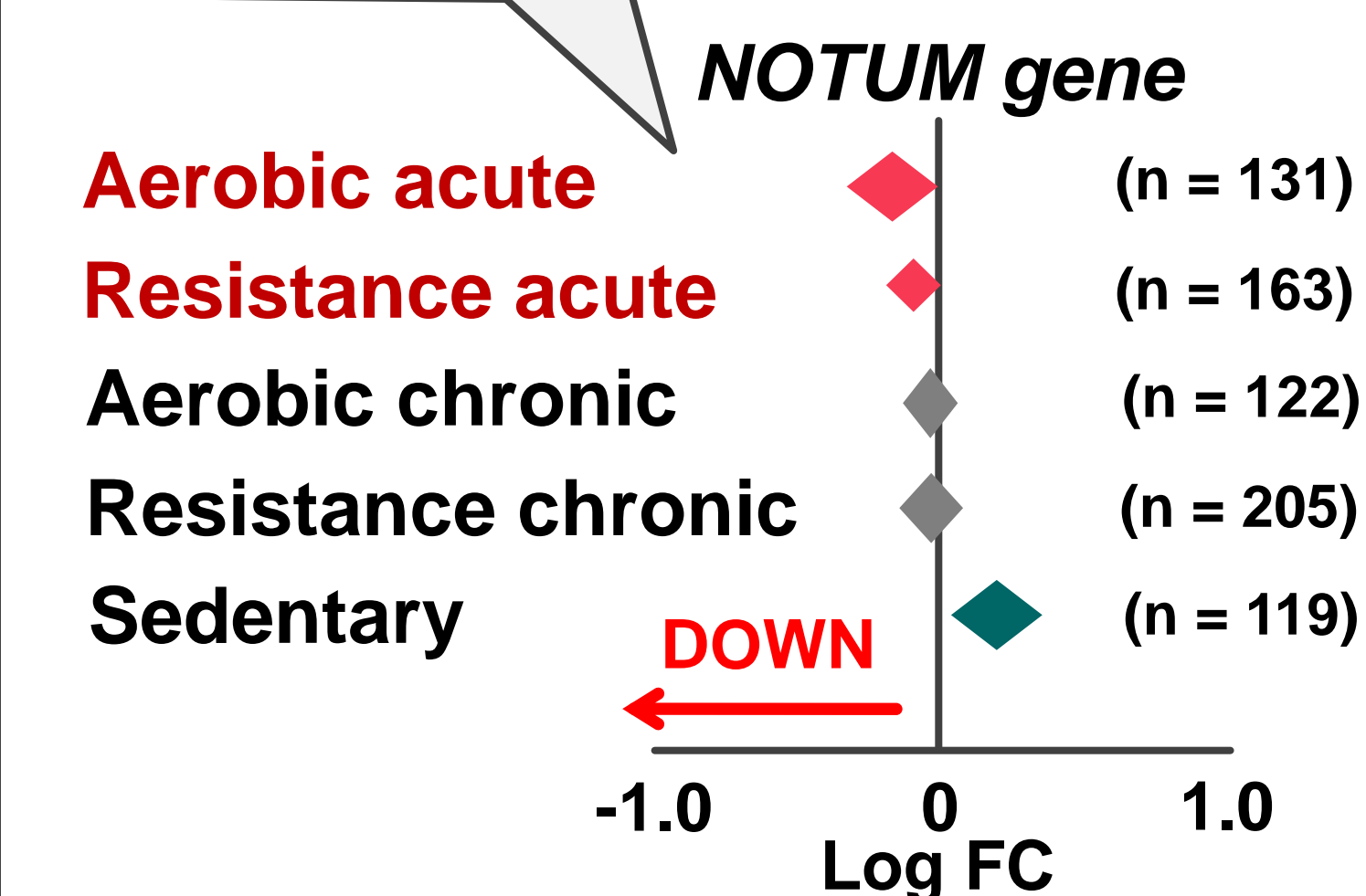


● Aerobic acute ● Resistance acute
● Aerobic chronic ● Resistance chronic
● Sedentary

We identified the NOTUM gene as a novel myokine suppressed by acute exercise but upregulated by inactivity

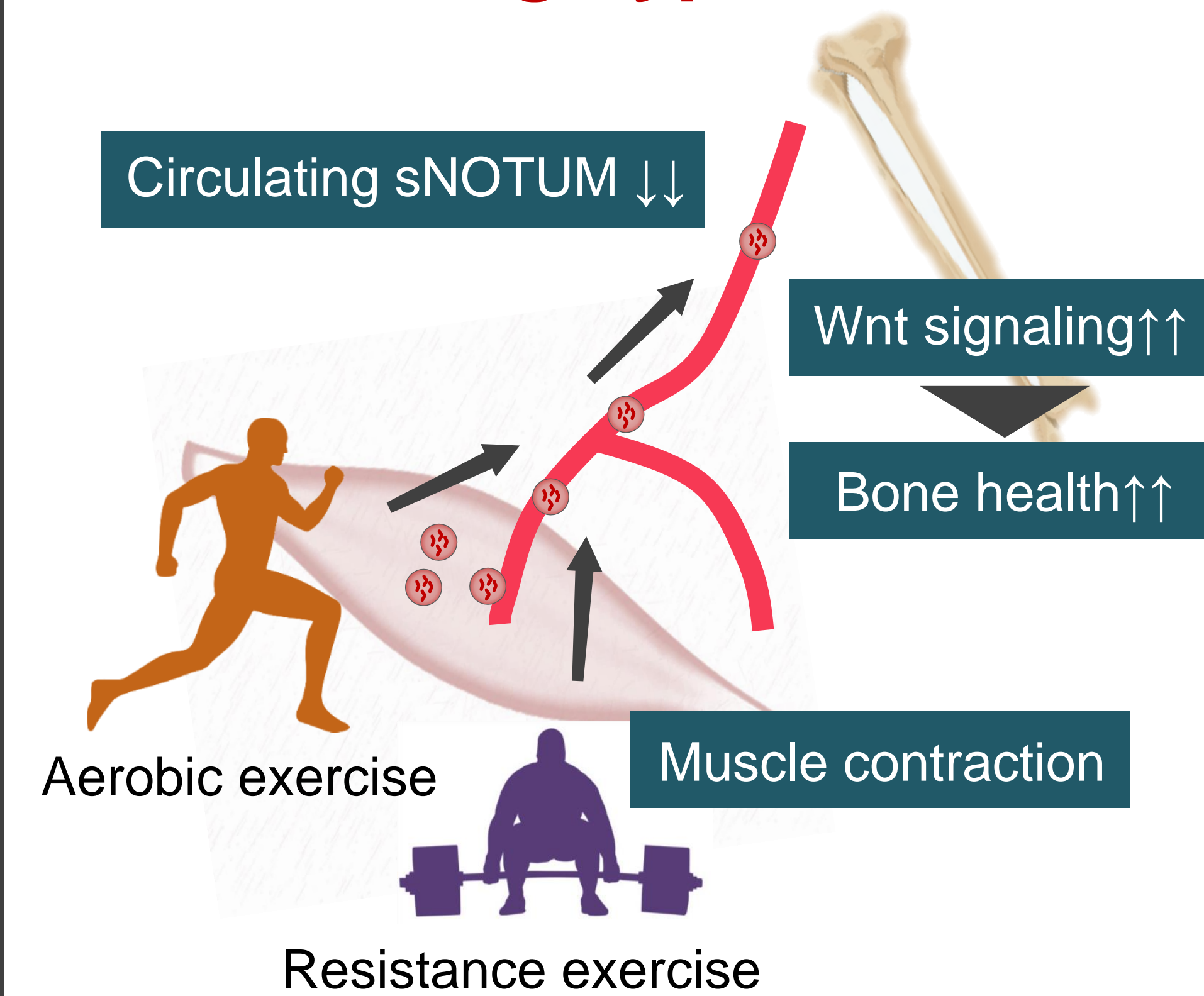


Acute aerobic exercise displays a greater effect on NOTUM gene



NOTUM is downregulated by both acute aerobic and resistance training 3-5 hours after exercise

Working hypothesis



† MetaMEx database

<http://www.metamex.eu/>
Pillon NJ, et al. Transcriptomic Profiling of Skeletal Muscle Adaptations to Exercise and Inactivity. Nature Communications 2020;470.

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