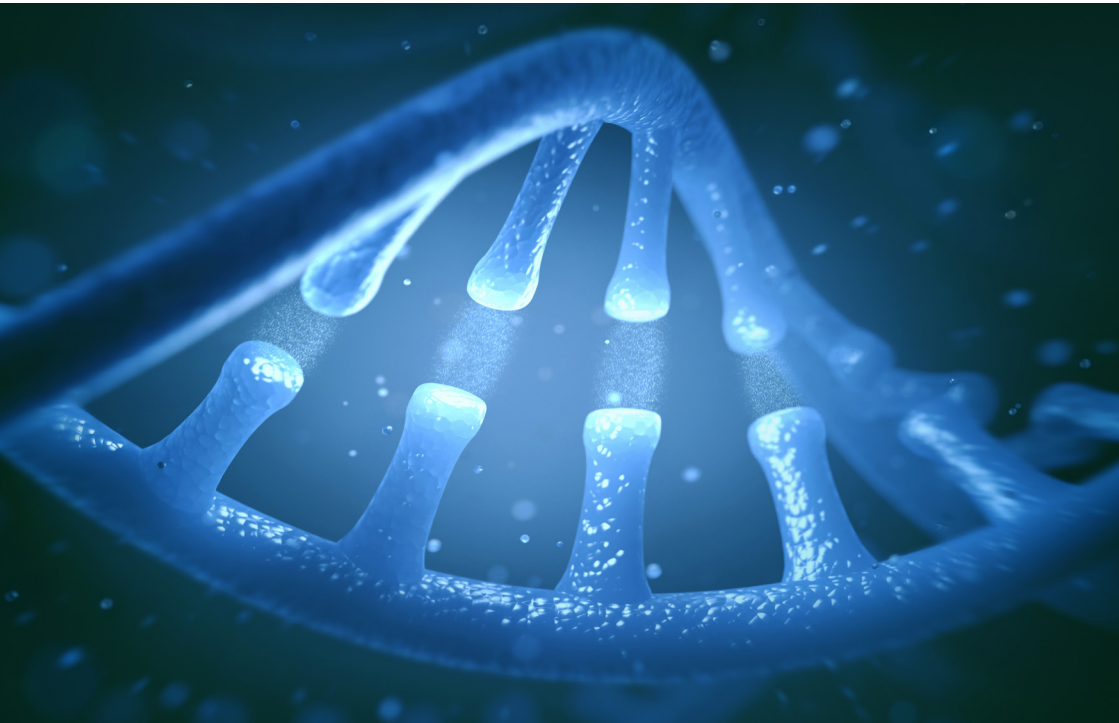




ARC BITE

Brokering Innovation Through Evidence

Influencing genes in the thigh muscles of people with chronic obstructive pulmonary disease (COPD)



Results

In COPD, electrical stimulation affected some genes in the thigh muscles. However more genes were influenced by lifting weights.

Who needs to know?

Pulmonary rehabilitation practitioners, exercise scientists, people living with COPD.



What did we do?

People with COPD often experience weak leg muscles, making daily activities more difficult; resistance exercise can help, but sometimes people are too breathless or weak to start lifting weights. Neuromuscular electrical stimulation is a way of activating the muscles that can be done while resting in bed.

When we exercise, the instructions for making the components of our muscles (genes in our DNA) are read and copies of these instructions are made inside our muscle cells (called mRNA). Changes in the number of copies of mRNA within a cell send signals telling the muscle cell what to do.

We chose genes that are important for muscle adaptations and compared how either resistance exercise or electrical stimulation impact the number of copies of mRNA within the thigh muscle.

What we found and what does this mean?

Resistance exercise influenced more genes than electrical stimulation did, but there were a group of genes that were equally affected by both types of muscle exercise. This suggests that resistance exercise is probably better for stimulating the muscle to adapt (and get stronger) but that electrical stimulation can also trigger adaptive responses.

How did we involve people?

We asked a group of people with COPD to help us when we designed the study to try and make the study as acceptable as possible for our volunteers. Everyone who took part in our study was a volunteer.

What next?

Our study looked at the impact of one session of resistance exercise or electrical stimulation. The next step would be to see the effects of repeated sessions over a period of weeks. We would like to know whether repeated sessions of both types result in bigger and stronger muscles and whether that improves what people can do in their daily lives.

What is NIHR ARC EM?

NIHR Applied Research Collaborations (ARCs) support applied health and care research that responds to, and meets, the needs of local populations and local health and care systems. We do this by working collaboratively with our partners and patient groups to bring the best applied health and care evidence into practice.

Evidence

Latimer LE, Constantin D, Greening NJ, Calvert L, Menon MK, Steiner MC, Greenhaff PL. Impact of transcutaneous neuromuscular electrical stimulation or resistance exercise on skeletal muscle mRNA expression in COPD. *International Journal of Chronic Obstructive Pulmonary Disease* 2019;14 1355–1364