

Yksilölliset harjoitusvasteet – mitä jos treeni ei tartu?

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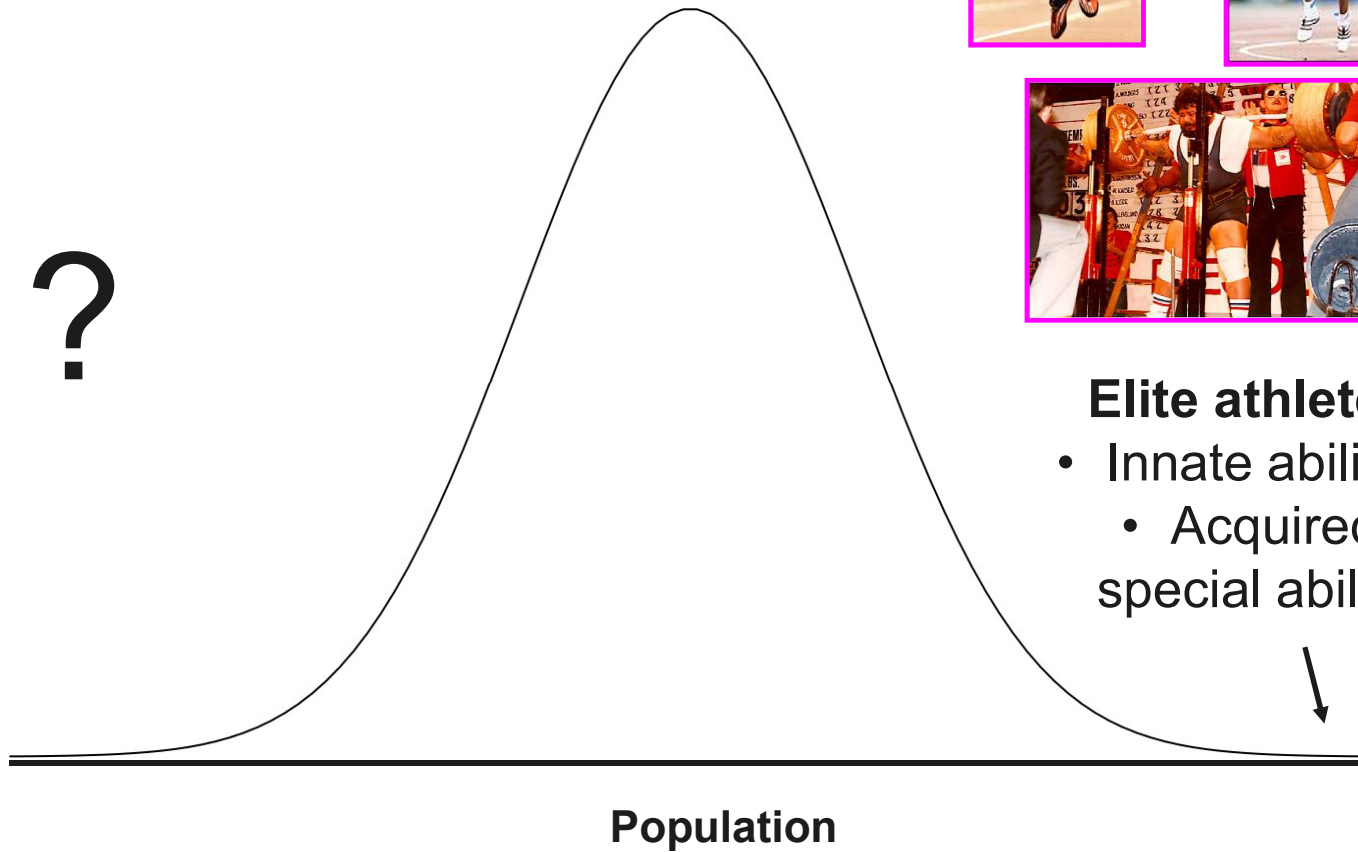
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KUNTOTESTAUSPÄIVÄT 2019
Kuntotestaus näyttöön perustuvassa
personal trainer -toiminnassa

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Many biological phenomena follow Gaussian distribution!

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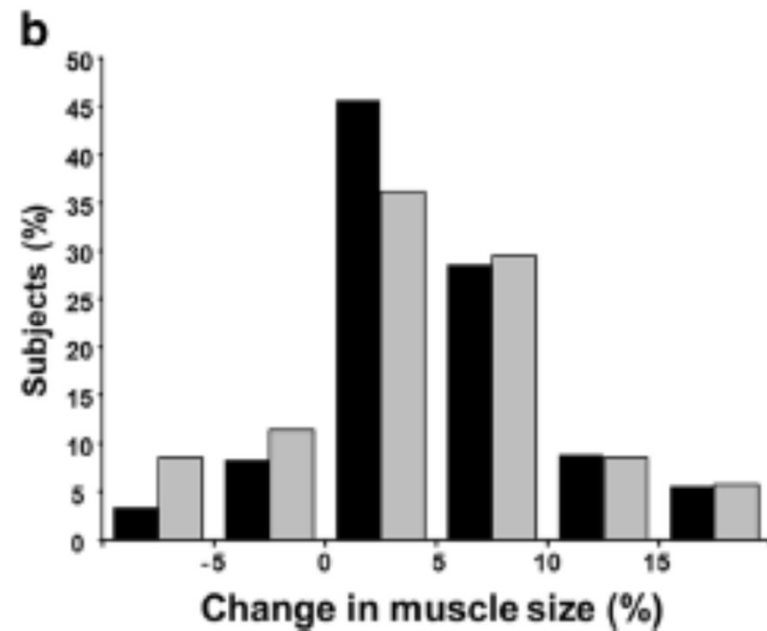
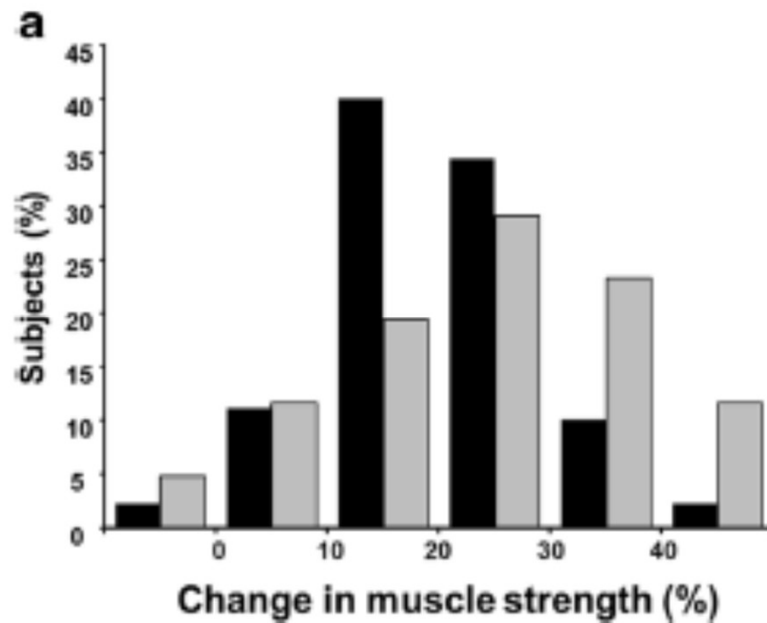
Elite athletes

- Innate abilities
 - Acquired special abilities

Heterogeneity in resistance training-induced muscle strength and mass responses in men and women of different ages

Juha P. Ahtiainen • Simon Walker • Heikki Peltonen • Jarkko Holviala • Elina Sillanpää •
Laura Karavirta • Janne Sallinen • Jussi Mikkola • Heli Valkeinen • Antti Mero •
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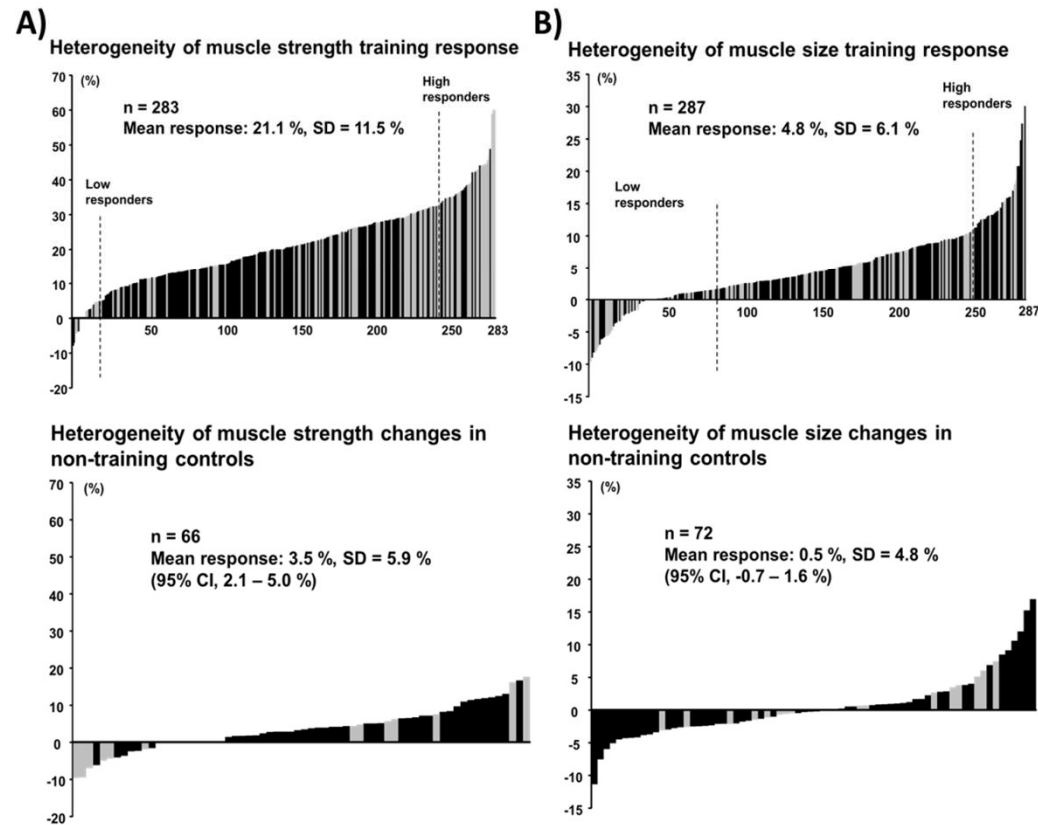
AGE (2016) 38:10



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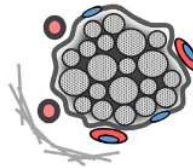
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Physiological Differences Between Low Versus High Skeletal Muscle Hypertrophic Responders to Resistance Training: Current Perspectives

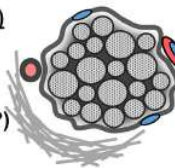
High Responders (HR)



Potential/unknown contributors (pre-training)

- satellite cell ↑ HR (?)
- SNP differences (???)
- rDNA copy # differences (???)
- Fascia or ECM thickness differences (???)
- mitochondrial volume differences (???)
- Capillary # differences (???)

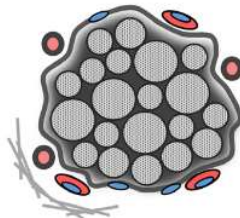
Low Responders (LR)



Legend

- Muscle fiber cross section
- Myonucleus
- Satellite cell
- Capillary
- Connective tissue

Resistance training (weeks to months)



HR outcomes

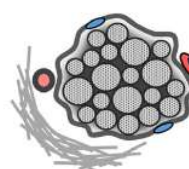
- ~80% fCSA (on average)
- ~20-30% increase in muscle size

Likely contributors

- ↑↑↑ ribosome content
- ↑↑↑ MPS after exercise

Potential/unknown contributors

- ↑↑↑ satellite cell and myonuclear #
- ↑↑↑ myonuclear #
- ↑↑↑ androgen signaling
- alteration in select miRs to ↑ IGF-1 (???)
- ↑ mitochondrial volume (???)
- ↑ capillary # (???)



LR outcomes

- ↔ fCSA (on average)
- 0-4% increase in muscle size

Likely contributors

- ↑ or ↔ ribosome content
- ↑ MPS after exercise

Potential/unknown contributors

- ↑ or ↔ satellite cell #
- ↑ or ↔ myonuclear #
- ↑ inflammation versus HR (???)
- ↔ mitochondrial volume (???)
- ↔ capillary # (???)

Individual variation in response to exercise: Specific comments

Low response to exercise is a normal and natural occurrence

Exercise works through so many different pathways and mechanisms, that it seems unlikely that an individual would exhibit no positive effects from exercise

In any case, exercise is not a poison for anyone

However, for those at risk of certain diseases, chasing a response in a specific variable may be important

Exercise clearly exerts benefits above the physiological, reducing stress and improving mental health, as well as serving as a social aid

Be aware of the measurement error

Did not respond - what should we do about it?

A different training programme (in terms of intensity, volume, frequency duration, or modality) would elicit a positive response:

Add an exercise dosage; volume and/or intensity, or frequency

Low responder = slow responder? Utilizing longer RT intervention

Aerobic vs. resistance exercise; select exercise-type that an individual can more favorably adapt to

Focus on factors that are within the individual's control on exercise response:

Moderating background psycho-emotional stressors

Adequate sleep

Adequate dietary intake

Flexible Training Prescription (based on monitoring stress and recovery of each training session)

Use of genetic information? Pharmaceutical applications?