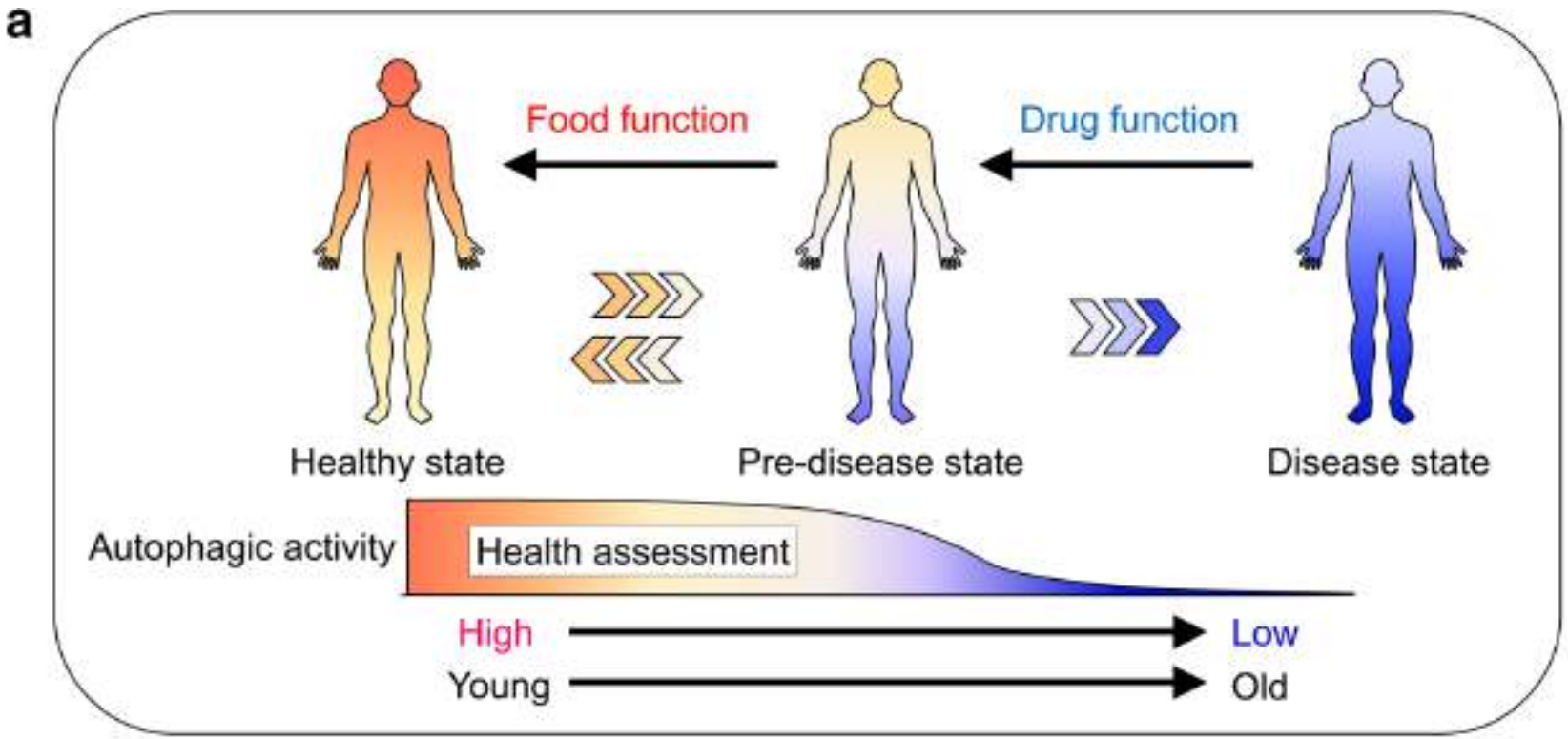
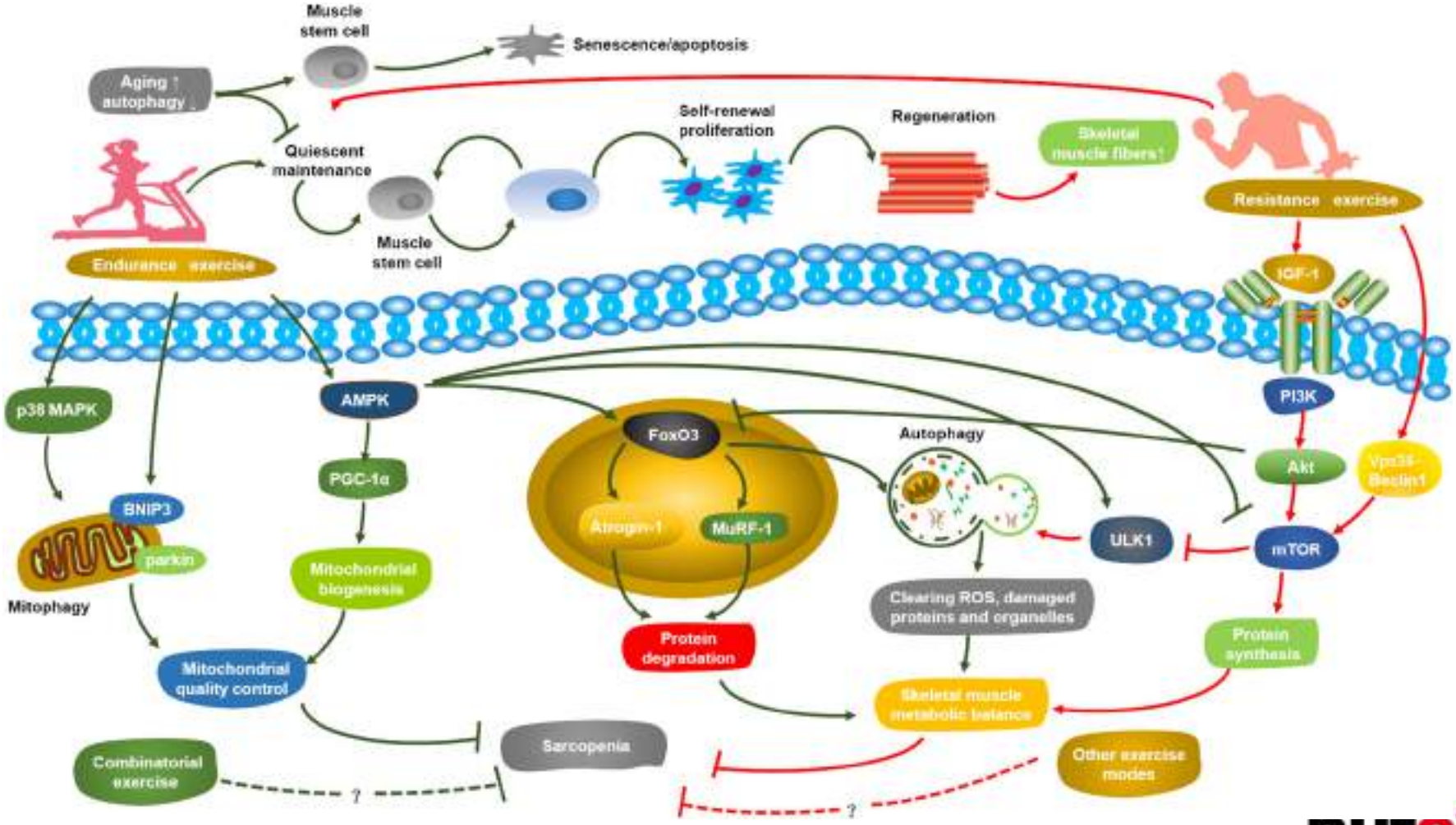
Invecchiamento e autofagia



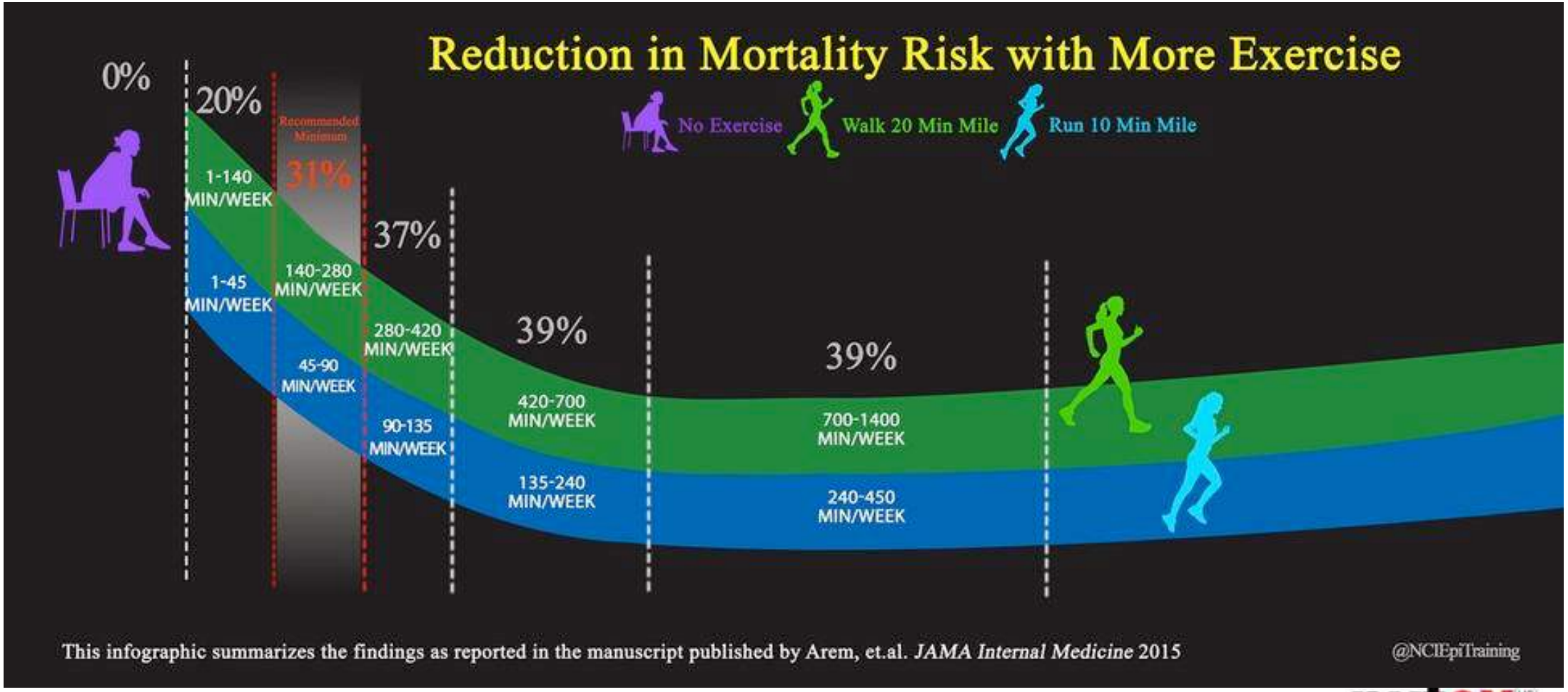
Yano et al. Curr Pharmacol Rep 2020, dec; 5: 335–345

Stile di vita...



Liang et al. Exp Gerontol. 2020 Feb;130:110789

STILE DI VITA: ESERCIZIO



Arem et al. JAMA Intern Med. 2015 Jun;175(6):959-67

Che esercizio

- Miglioramento capillarizzazione
- Riduzione pressione arteriosa
- Miglioramento composizione corporea
- Miglioramento sensibilità all'insulina
- Effetto su SNC
- Miglioramento efficienza SCV

- Aumento massa muscolare
- Miglioramento sensibilità all'insulina
- Miglioramento DMO
- Miglioramento forza e riduzione rischio cadute
- Miglioramento composizione corporea
- Effetto su SNC
- Effetti su pressione arteriosa

Effetti a lungo termine

Exercise is powerful! but is it long lasting?

J Am Coll Cardiol. 2014 August 5; 64(5): 472–481. doi:10.1016/j.jacc.2014.04.058.

Leisure-Time Running Reduces All-Cause and Cardiovascular Mortality Risk

Duck-chul Lee, PhD[*], **Russell R. Pate, PhD**[†], **Carl J. Lavie, MD**[‡], **Xuemei Sui, MD, PhD**[†], **Timothy S. Church, MD, PhD**[§], and **Steven N. Blair, PED** [‖]

[*]Department of Kinesiology, College of Human Sciences, Iowa State University, Ames, Iowa

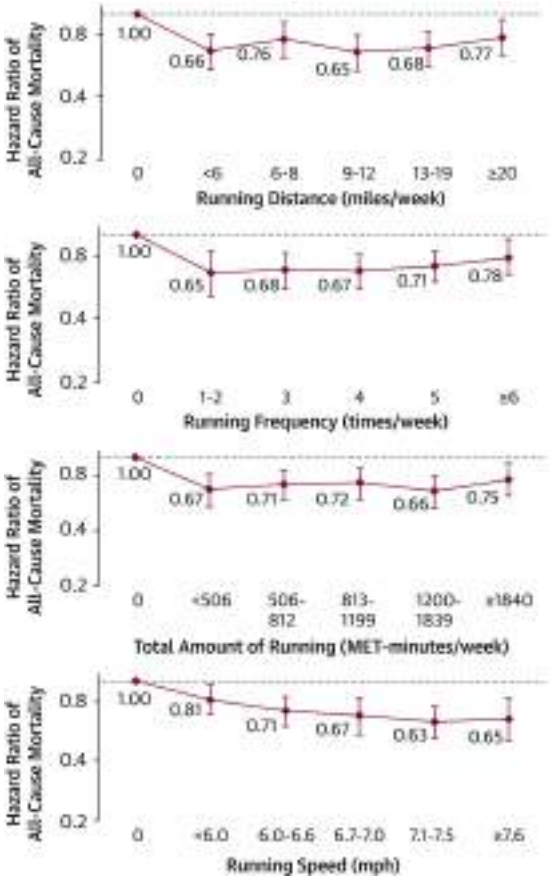
[†]Department of Exercise Science, Arnold School of Public Health, University of South Carolina, Columbia, South Carolina

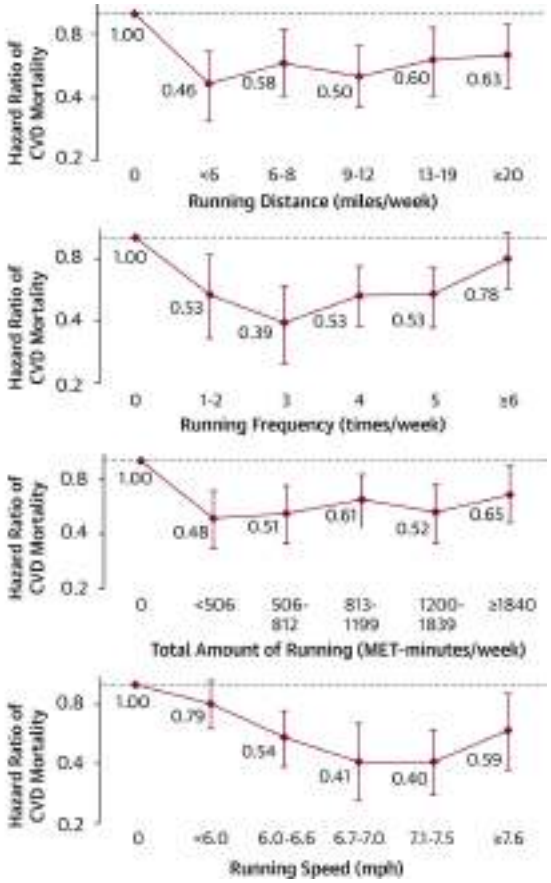
[‡]Department of Cardiovascular Diseases, John Ochsner Heart and Vascular Institute, Ochsner Clinical School-The University of Queensland School of Medicine and Department of Preventive Medicine, Pennington Biomedical Research Center, Louisiana State University System, Baton Rouge, Louisiana

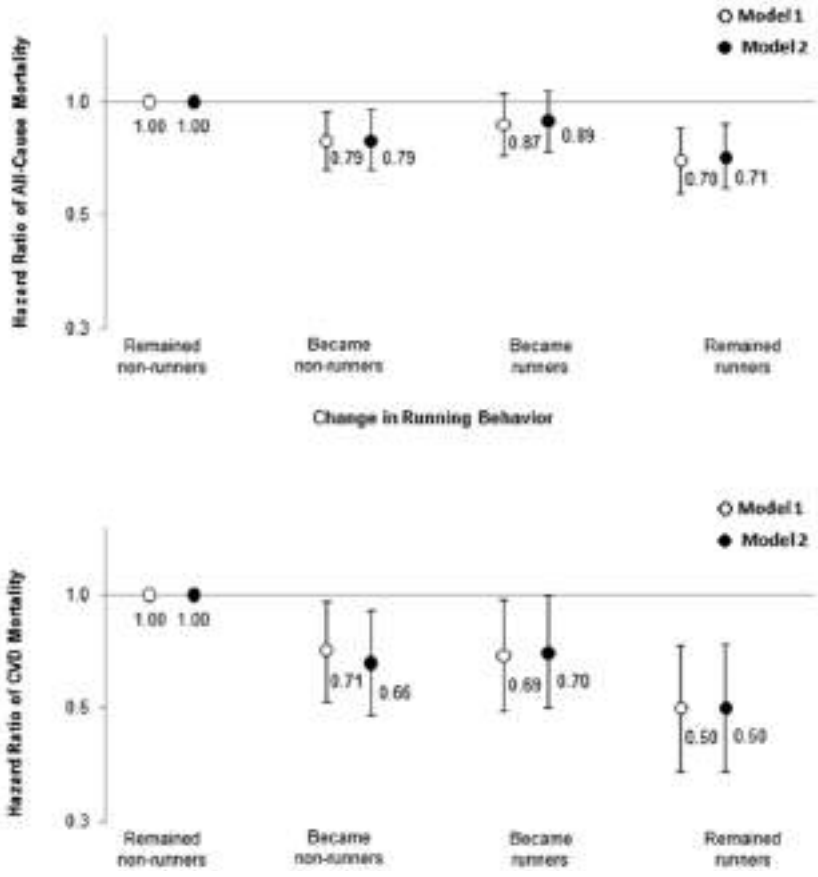
[§]Department of Preventive Medicine Research, Pennington Biomedical Research Center, Louisiana State University System, Baton Rouge, Louisiana, South Carolina

[‖]Departments of Exercise Science and Epidemiology/Biostatistics, Arnold School of Public Health, University of South Carolina, Columbia, South Carolina

Effetti a lungo termine

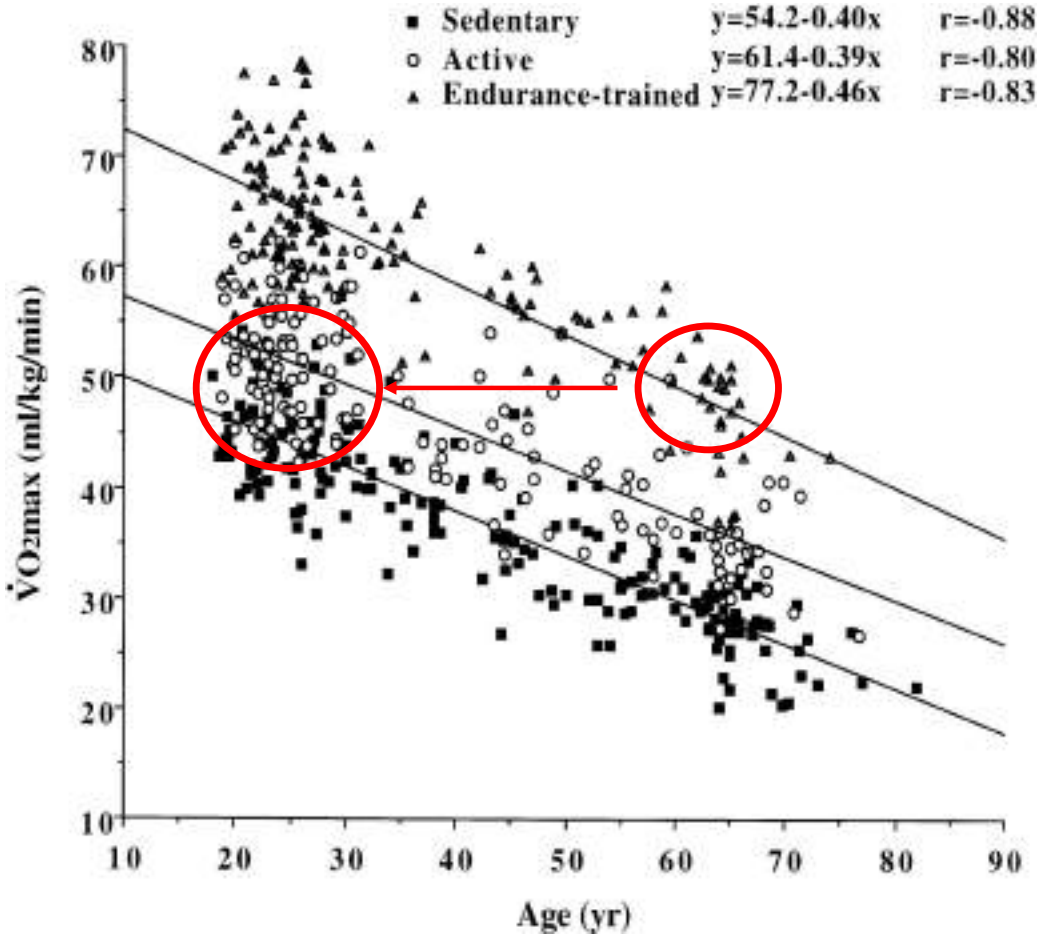






Lee et al. 2014 Aug 5;64(5):472-81. J Am Coll Cardiol. 2014 Oct 7;64(14):1537.

Effetti a lungo termine

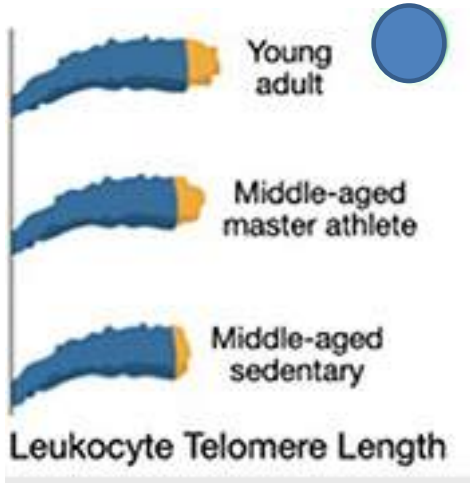


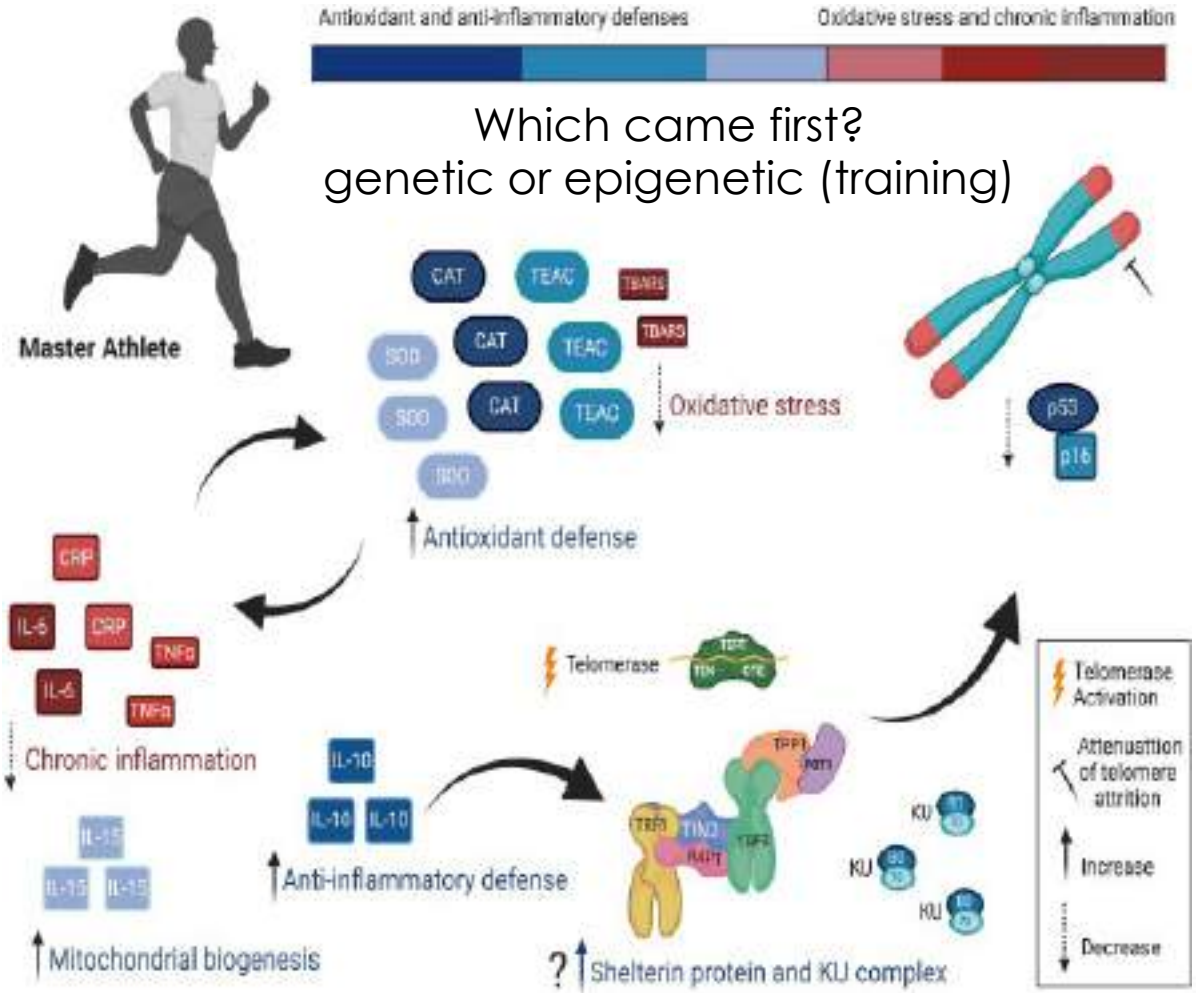
Wilson & Tanaka. Am. J. Physiol. Heart Circ. Physiol. 278: H829–H834, 2000

Effetti epigenetici

Telomere length is genetically determined, with heritability estimates ranging from 44% to 80%, and is highly variable between individuals;

It can not be entirely excluded that master athletes have longer telomeres due to being born with longer telomeres!!





Aguiar SS, et al. Exp Gerontol. 2021 Apr;146:111212.

Effetti epigenetici

DNA methylation plays key roles in gene expression and regulation. It is an epigenetic signaling tool that locks genes in the "off position" and is an important component in various cellular processes

People with a lifelong history of physical activity display lower DNAm levels on gene promoters in muscle tissue

Differential methylation occurs mostly in genes involved in the electron transport chain, insulin signaling, and oxidative stress resistance.

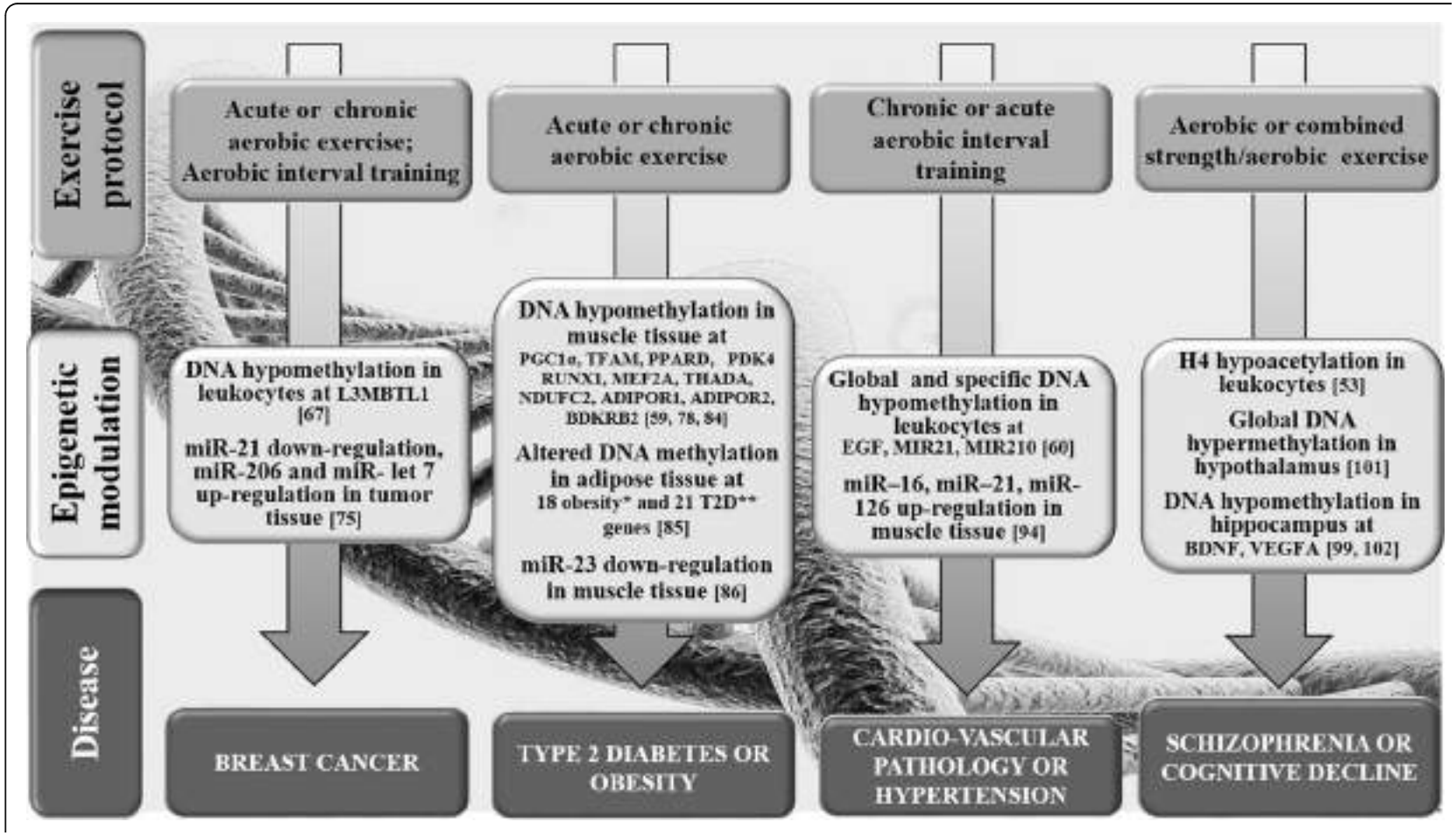
Effetti epigenetici

1) The effect of exercise on the epigenome **is not uniform** across the body;

2) In adipose tissue physical activity has been reported to increase DNAm levels on gene promoters

3) Aging has been associated with global hypomethylation of the genome although a recent study in aging humans suggest that DNA in muscle is generally hypermethylated as we age

Effetti epigenetici



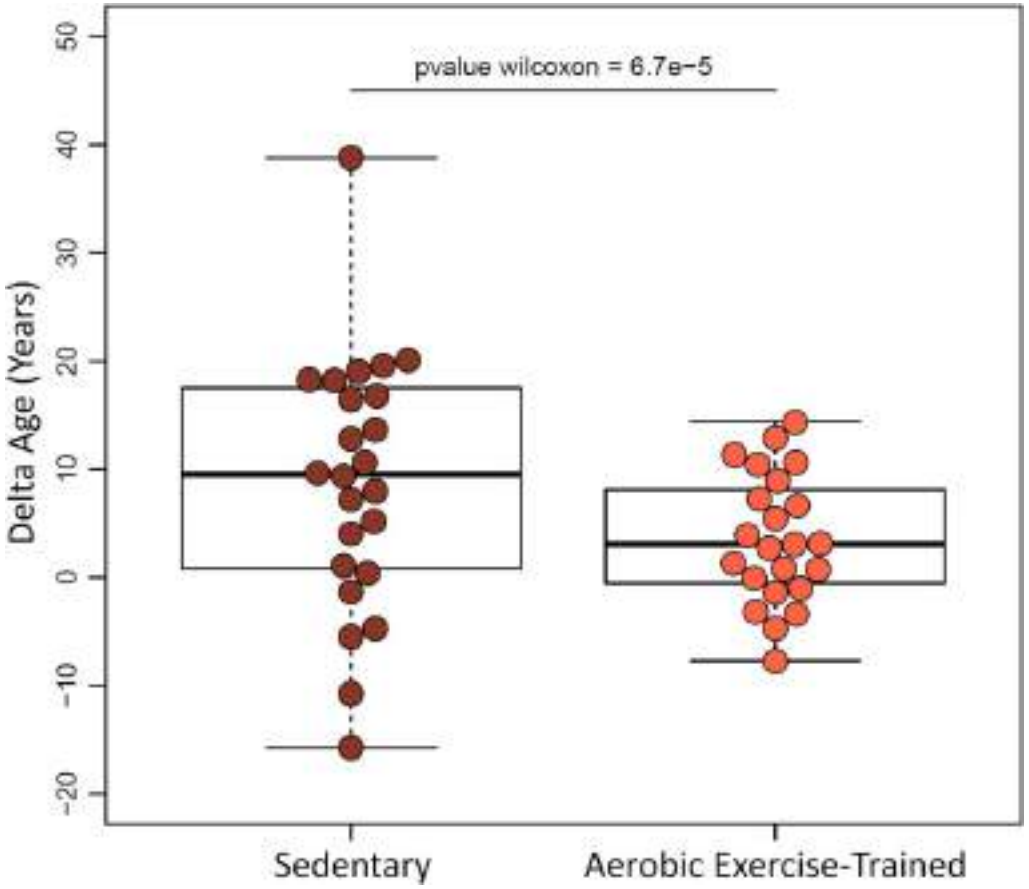
Grazioli et al. BMC Genomics. 2017 Nov 14;18(Suppl 8):802

Effetti su aging clock

Ultra-predictive agingclock to predict age in a human plasma proteomic dataset containing sedentary subjects as well as individuals that are aerobic exercise-trained.

For sedentary subjects, their respective chronological and predicted ages were 37.54 ± 20.88 and 46.34 ± 26.48 years.

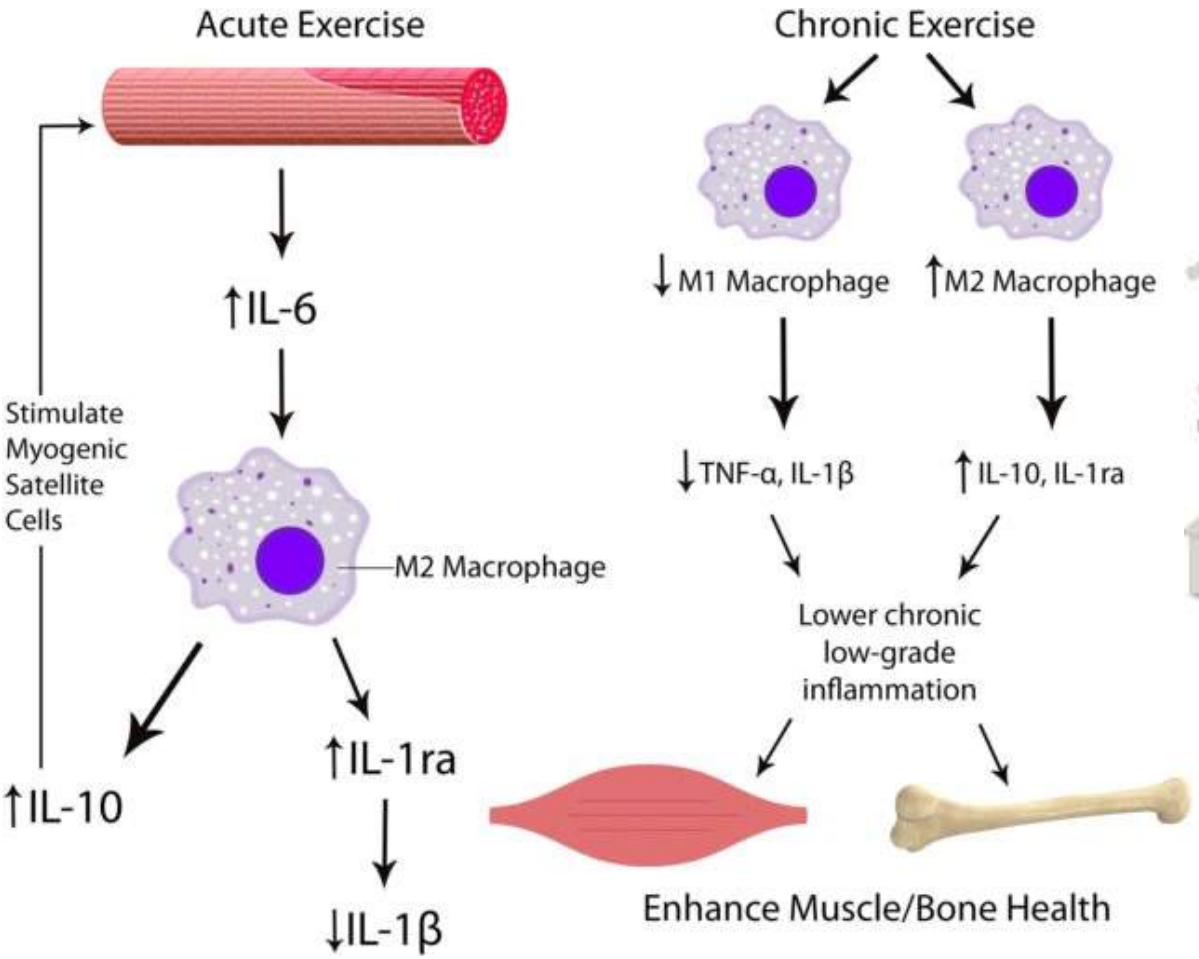
For aerobic exercise-trained subjects, their respective chronological and predicted ages were 37.35 ± 19.82 and 40.91 ± 18.48 years.

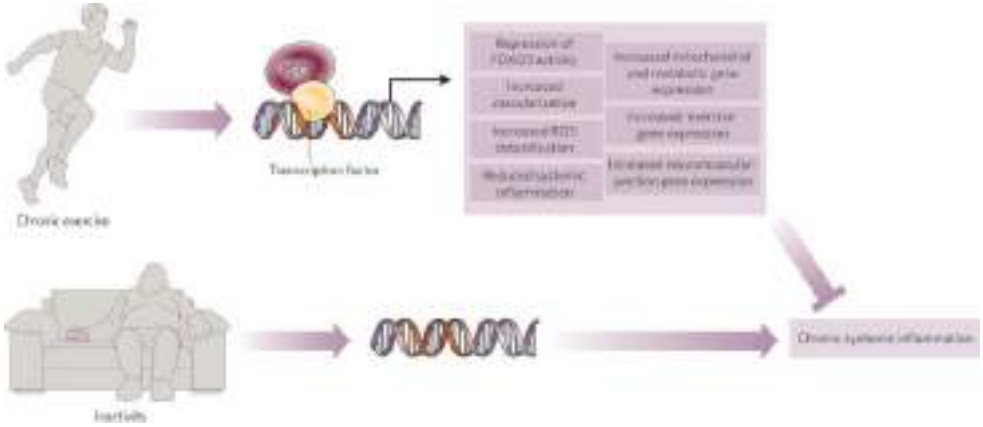


Lehallier et al. Aging Cell. 2020 Nov;19(11):e13256

nutex

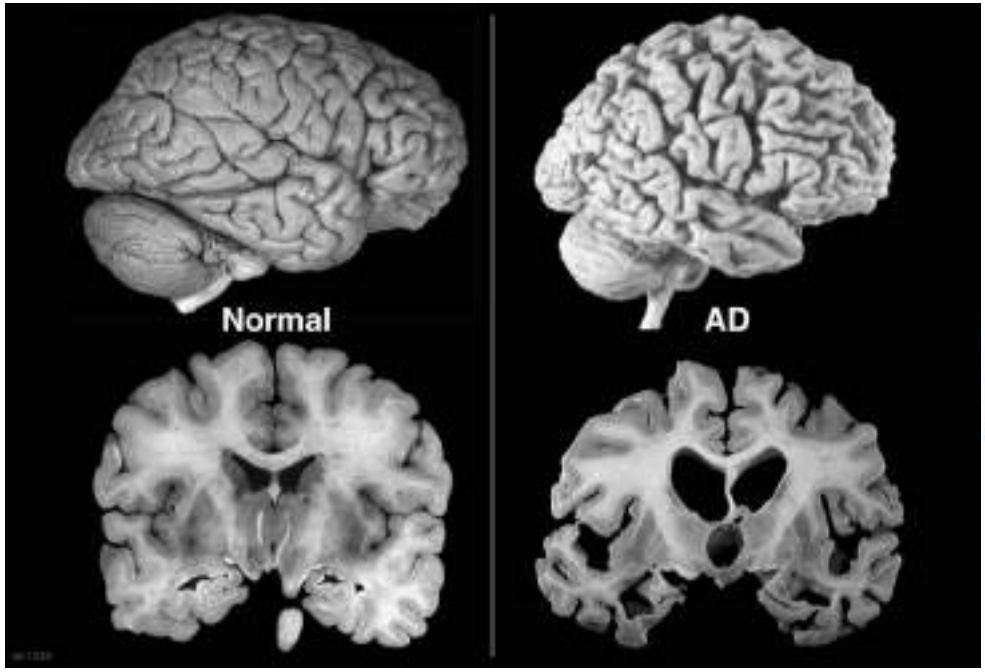
Effetti su infiammazione

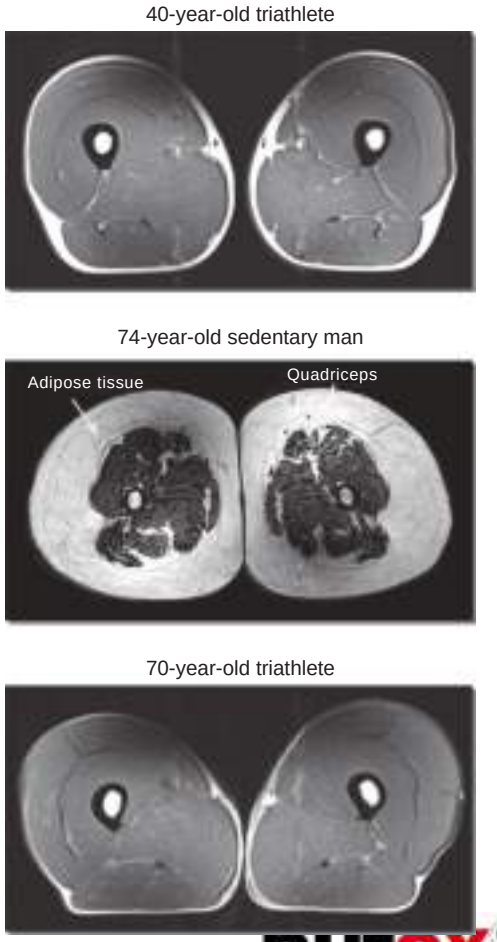




Handschin & Spiegelman. Nature. 2008 Jul 24;454(7203):463-9.

Effetti su cervello ma non solo…



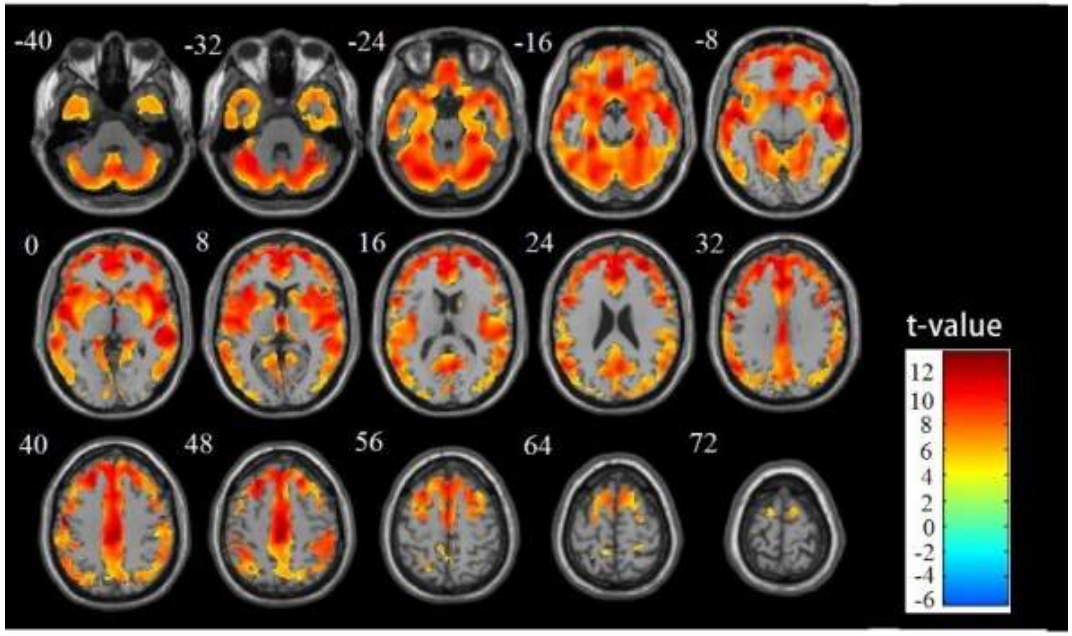


Yang et al. Saudi J Biol Sci. 2020 Feb;27(2):659-665

Wroblewski et al. Phys Sportsmed. 2011 Sep;39(3):172-8

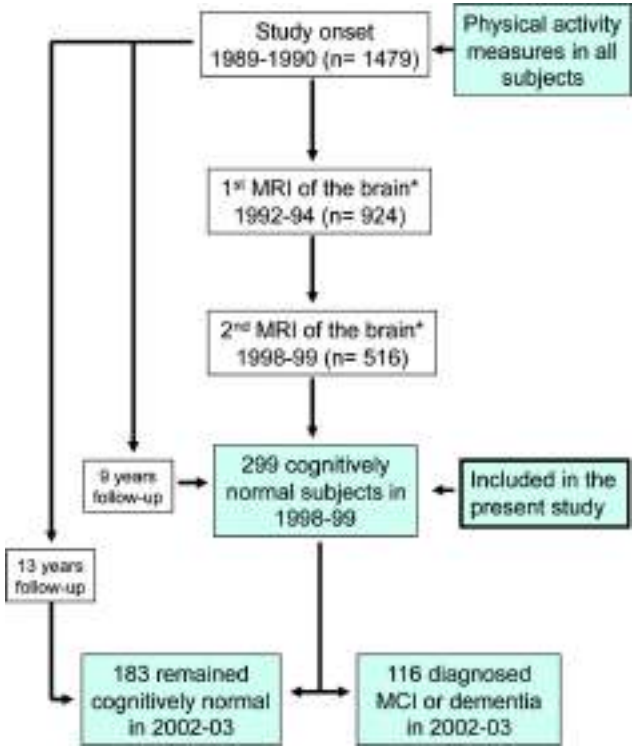
Effetti su cervello ma non solo…

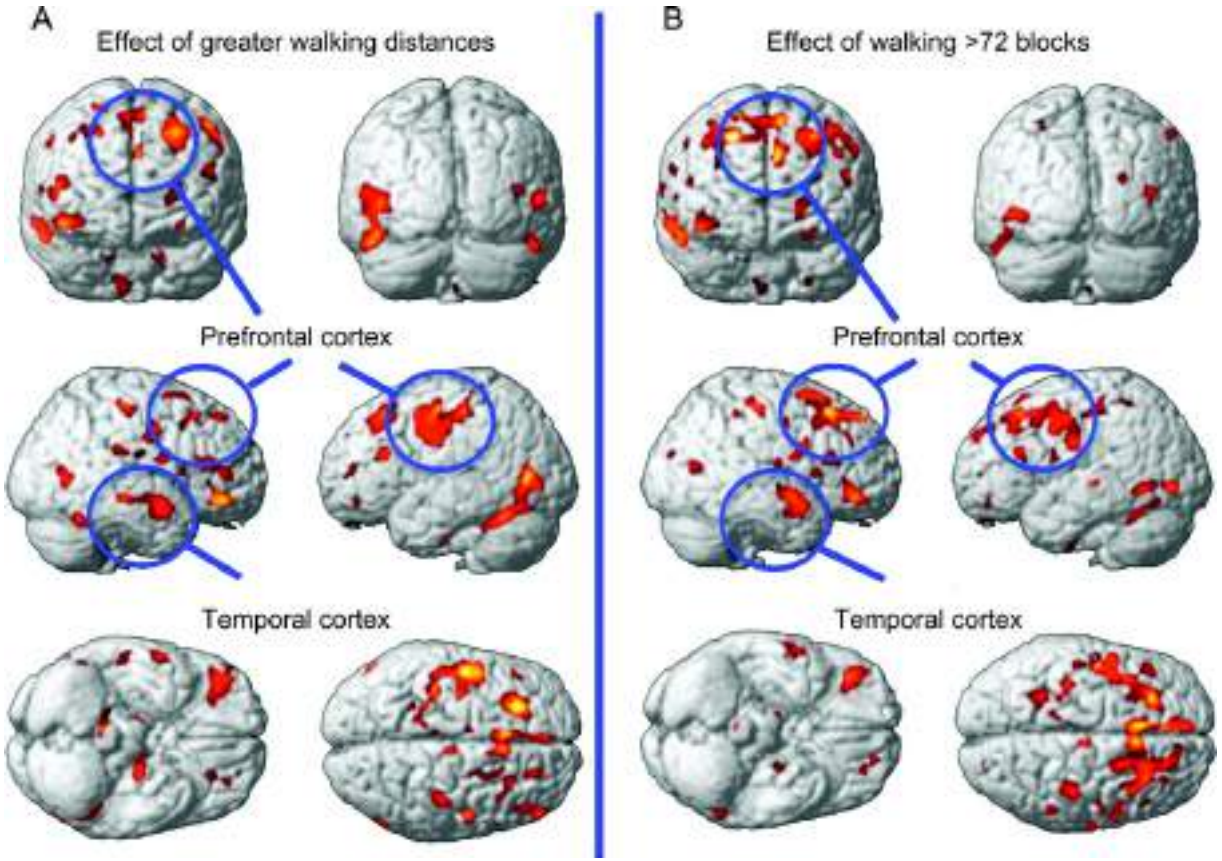
Il volume della materia grigia (GM) si riduce durante l'invecchiamento spesso precedendo e conducendo ad una condizione di decadimento cognitivo. La partecipazione all'attività fisica ed all'esercizio è stato ipotizzato poter agire come fattore preventivo nei confronti del deterioramento del tessuto cerebrale.



Farokhian et al. Aging Dis. 2017 Dec 1;8(6):899-909

Effetti su cervello ma non solo…





Erickson et al. *Neurology*. 2010;75(16):1415–1422

Effetti su cervello ma non solo...

Moon e colleghi hanno dimostrato che la catepsina B (CTSB) (una miochina prodotta durante l'esercizio) ja effeftti positivi sulla funzione cognitiva come un aumento della neurogenesi ippocampale negli adulti ed un miglioramento della memoria spaziale nei topi.

La corsa sul treadmill aumenta I livelli di CTSB in scimmie ed umani.

In quest'ultimi I livelli di CTBS correlano con la fitness e le funzioni di memoria dipendenti dall'ippocampo.

Moon et al., 2016, Cell Metabolism 24, 332–340