



ALMA
ACADEMIA LATINOAMERICANA DE MEDICINA DEL ADULTO MAYOR

**VI CURSO DE EGRESADOS DE ALMA
“ACTIVIDAD FÍSICA, CAÍDAS Y FRACTURAS”
SANTA MARTA, COLOMBIA**

Del 24 al 28 de febrero de 2020

La inactividad y el
envejecimiento.
¿Qué produce
qué?

Roberto A.
Lourenço

Sumário

- O que é o envelhecimento?
- O que é inatividade?
- O conceito de *Inherent Human Aging Process*
- *A Set Point Theory*
 - The graded effects of physical activity/exercise on ageing
- Discussão
 - A amostra
 - Master champions
 - A unicidade do conceito
 - Fator de risco e chance

Charles Eugster, Athlete



O que é o envelhecimento?

Envejecimiento

- Ageing is the gradual and progressive deterioration in physiological functions that results in age-related frailty, disability, and disease, leading ultimately to death.

[Kirkwood. In: Oxford Textbook of Geriatric Medicine (p. 471)]

Envejecimiento

- Ageing can be defined as a progressive loss of anatomic and physiological integrity across multiple systems and organs, leading to impaired function and higher vulnerability to adverse health outcomes and death.

[Fabri et al. In: Oxford Textbook of Geriatric Medicine (p. 481)].

Envejecimiento

- Aging is the process that converts young adults, most of them healthy and in no need of assistance from physicians, into older adults whose deteriorating physiologic fitness leads to progressively increasing risks of illness and death.

[Halter, Jeffrey B.. Hazzard's Geriatric Medicine and Gerontology, Seventh Edition (p. 3). McGraw-Hill Education.]

Envejecimiento

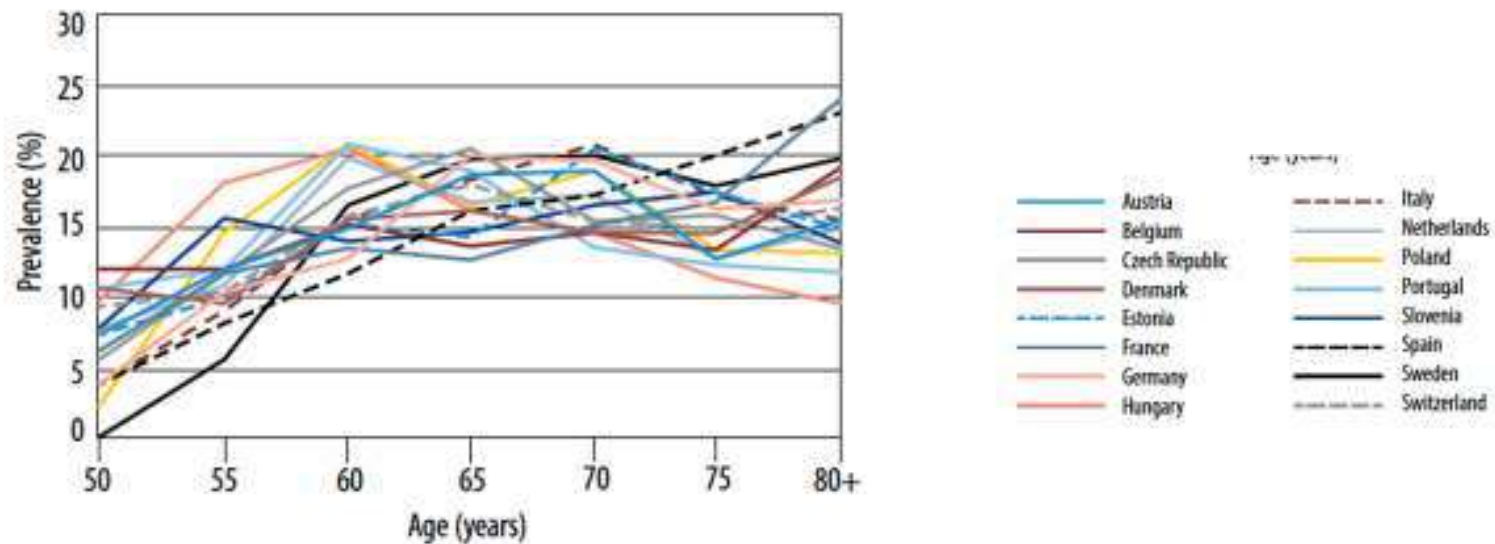
- Normal ageing is characterized by progressive and interactive changes that affect multiple systems and organs, and slowly and progressively reduce the capacity of the organism to maintain the homeostatic equilibrium, with consequent increased entropy, difficulty to cope with internal and environmental stress factors, and high vulnerability to adverse health outcomes.

Envejecimiento: síntesis

- Deterioro de las funciones fisiológicas
- Vulnerabilidad a desenlaces adversos de salud
 - Morbilidad
 - Fragilidad
 - Discapacidad
- Aumento progresivo de los riesgos de enfermedad y muerte
- Dificultad para hacer frente a los factores de estrés internos y ambientales

Multimorbidity in Europe

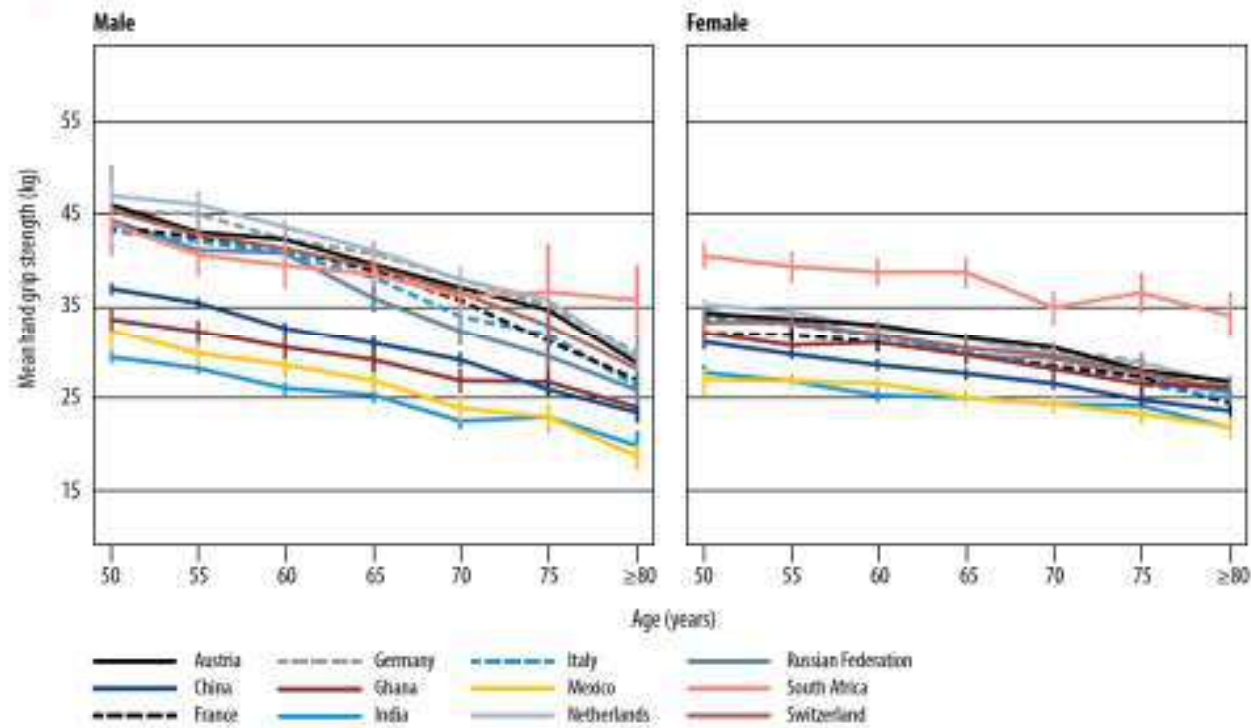
Fig. 3.15. Prevalence of multimorbidity among people aged 50 years and older, 2010–2011



OMS. Informe mundial sobre el envejecimiento y la salud. USA: Organización Mundial de Saúde; 2015.

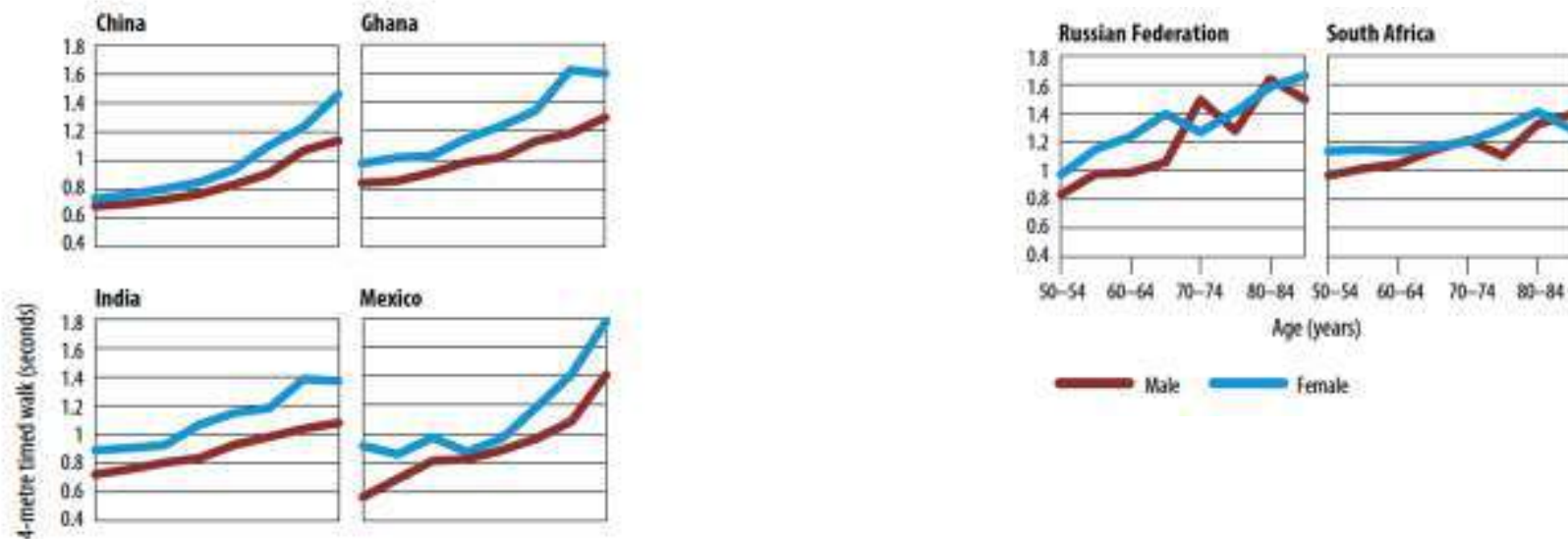
Fuerza de garra

Fig. 3.11. Hand grip strength, males and females aged 50 years and over



Velocidad de marcha

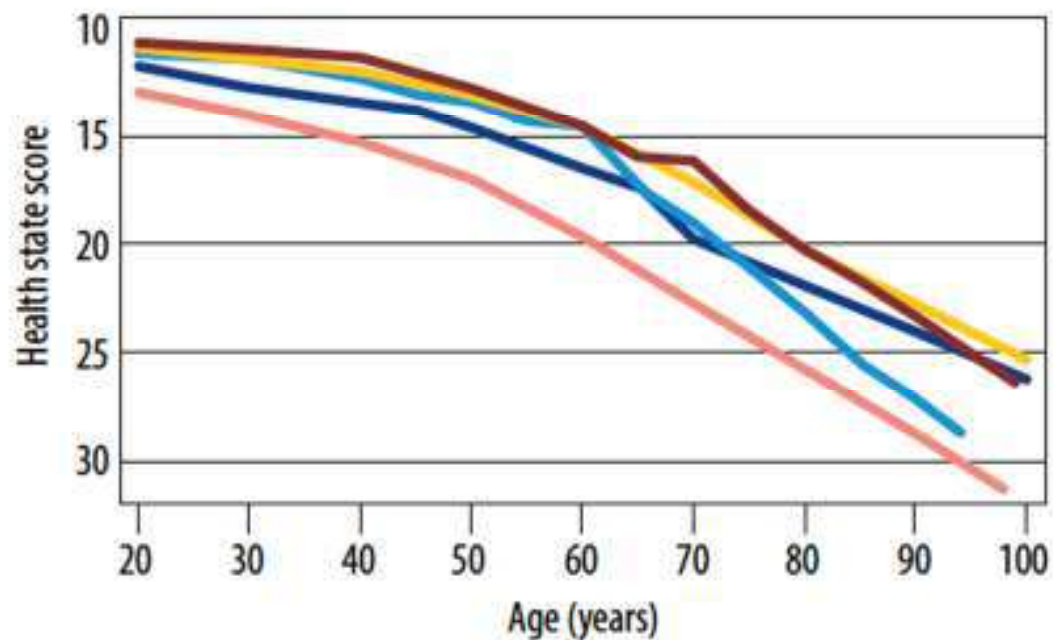
Fig. 3.12. Gait speed (time needed to walk 4 metres), by age, sex and country



Atividade de vida diária

Salud

Fig. 3.19. Health state by age, 2002–2004



Countries

- High-income OECD
- High-income non-OECD
- Upper-middle-income
- Lower-middle-income
- Low-income

Funções fisiológicas: o rim

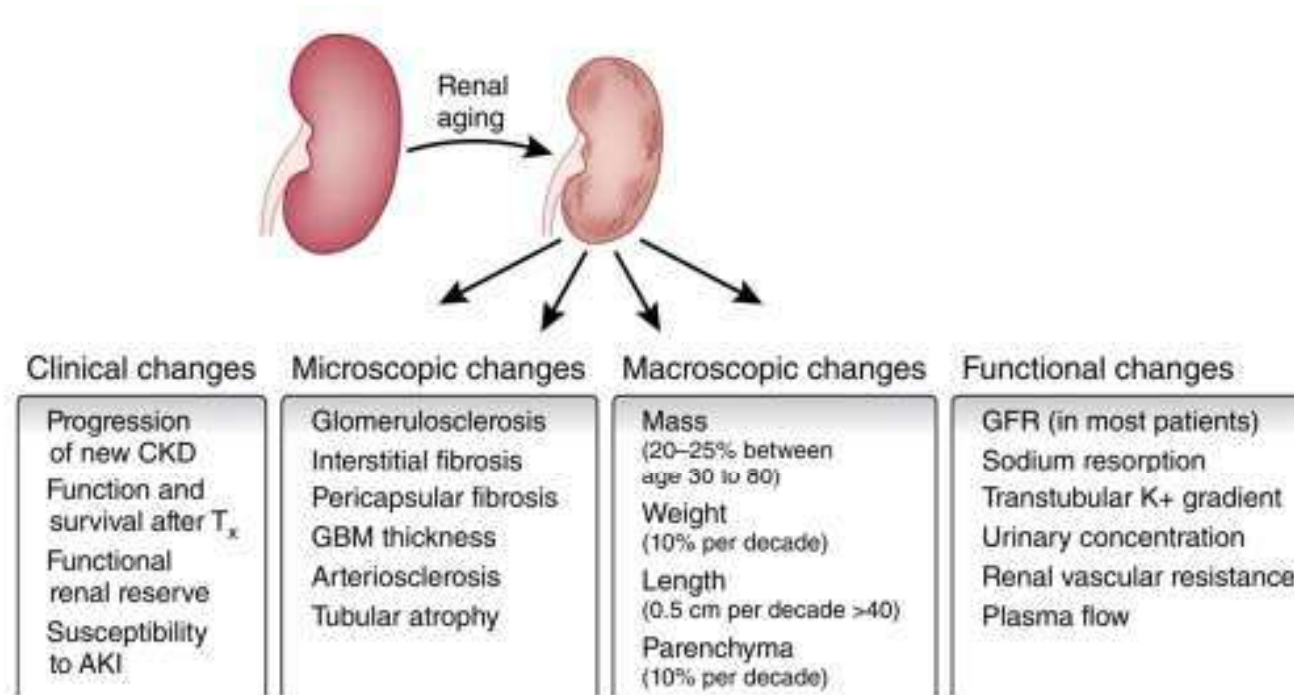
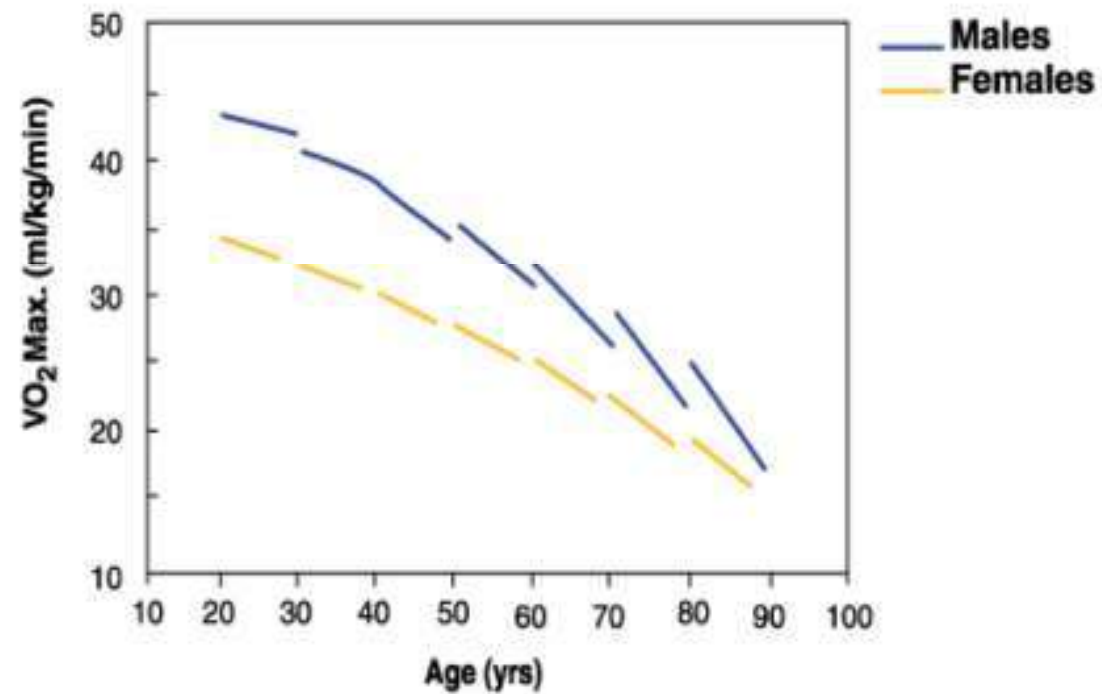


Figure 1. Functional and structural changes in the aging kidney. With increasing age, there are alterations in the function of the kidney. These are accompanied by both macroscopic and microscopic changes and result in an alteration in the response of the kidney to diverse insults. GBM, glomerular basement membrane; T_x , transplant.

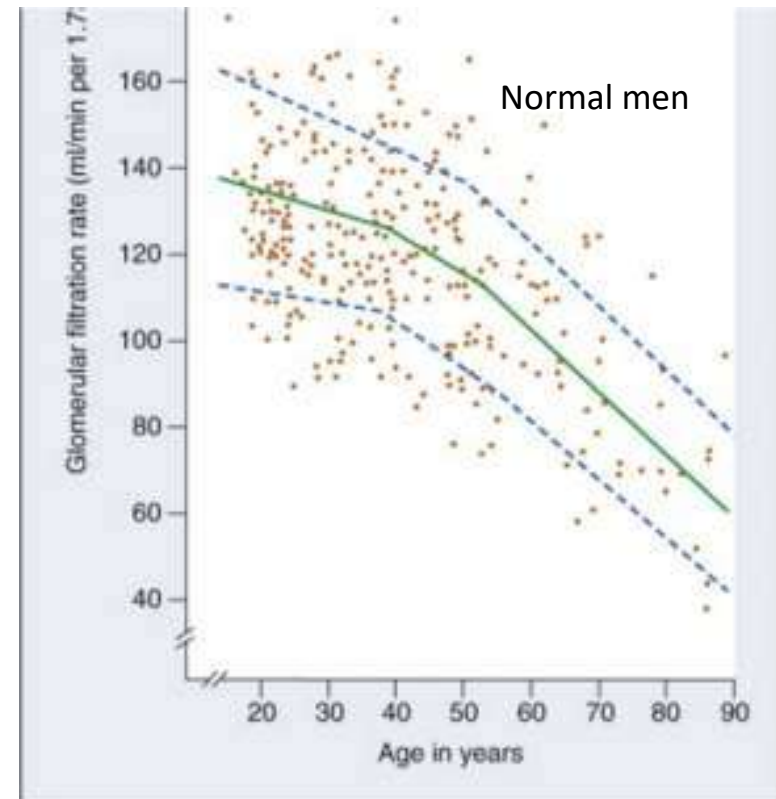
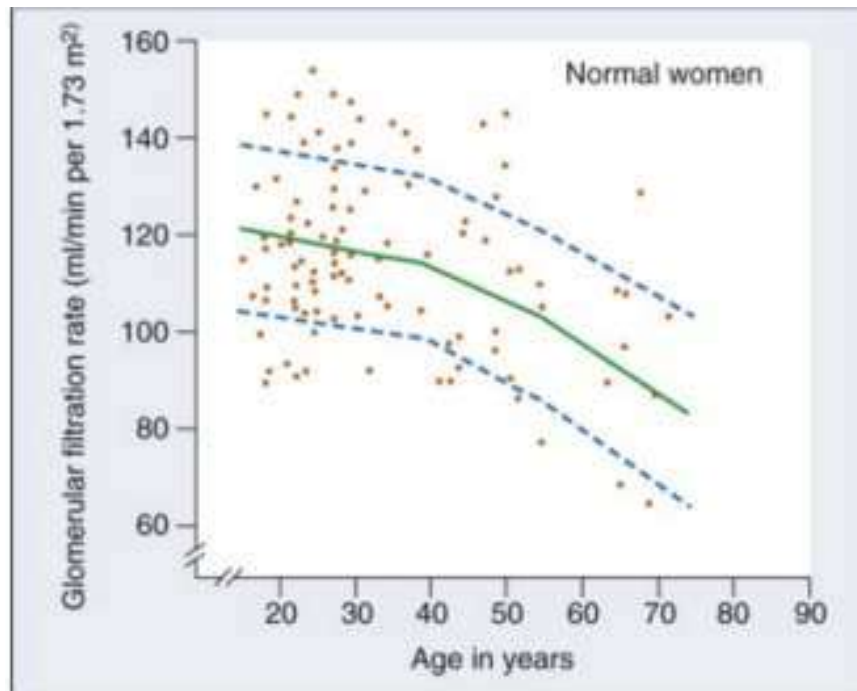
VO_{2max} y envejecimiento

Picture 4: Relation between age and VO_{2max} in healthy adults

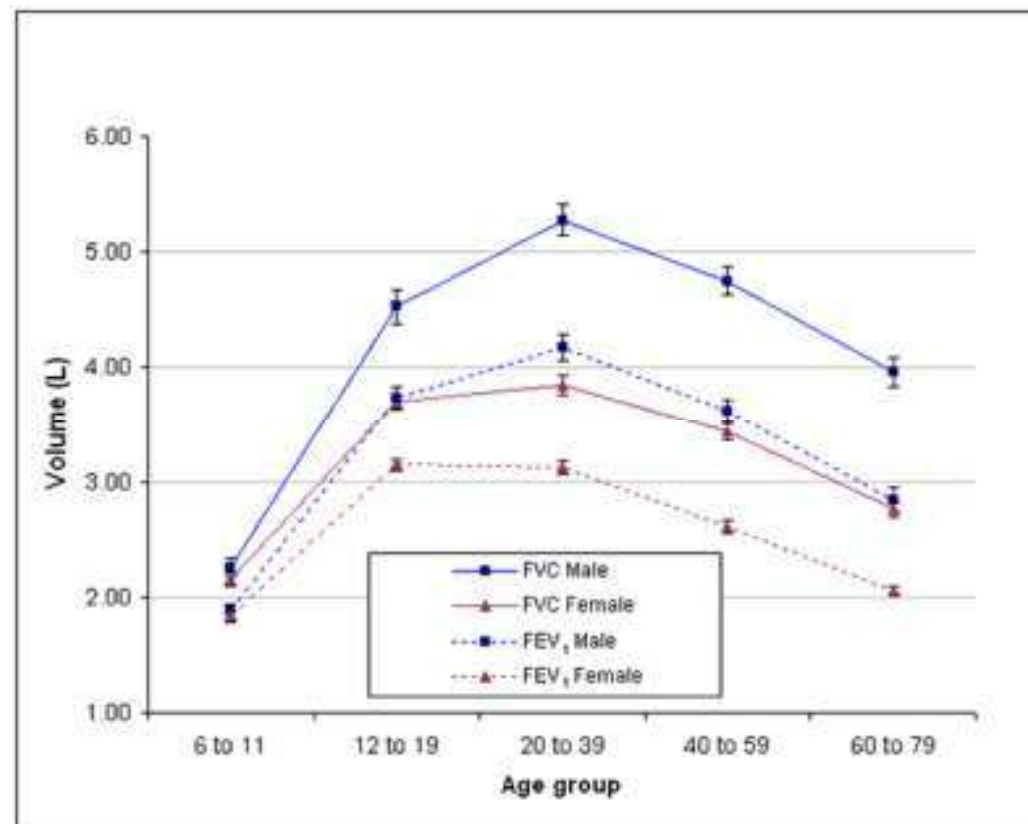


Kyriazis I, Saridi M. Health Science Journal. 2010;4(2)

GFR decreases with aging



Canadian Health Measures Survey (CHMS), 2007 to 2009: lung volumes



Intrinsic capacity across the life course

Fig. 3.16. Changes in intrinsic capacity across the life course

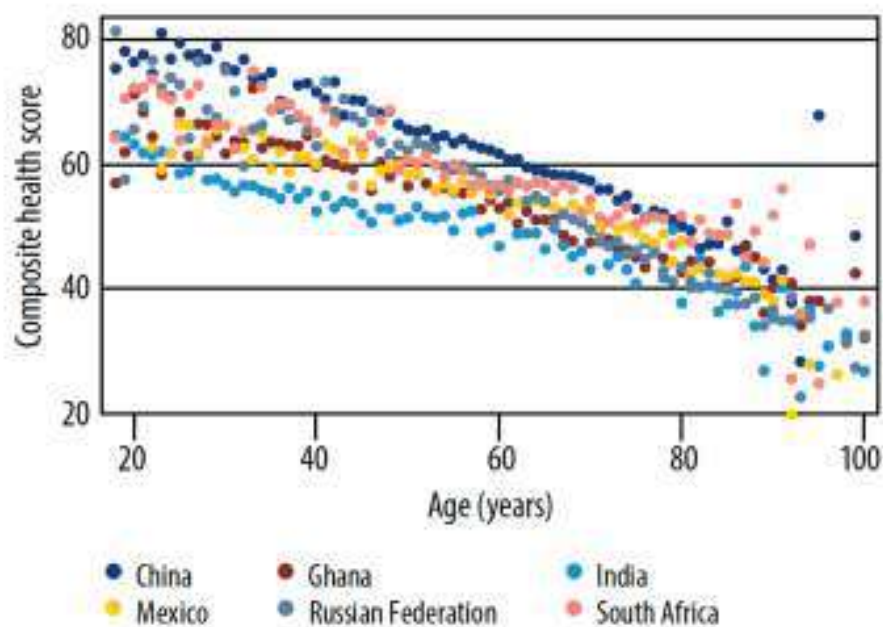
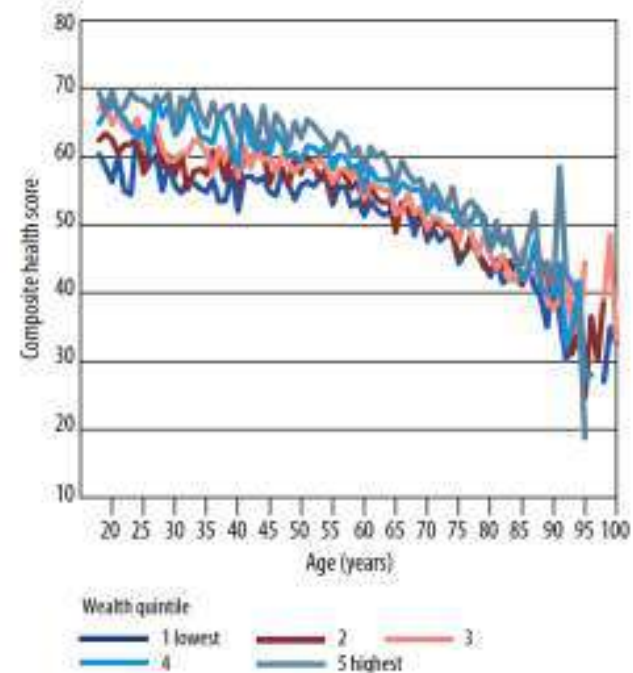


Fig. 3.18. Intrinsic capacity, by wealth quintile and age



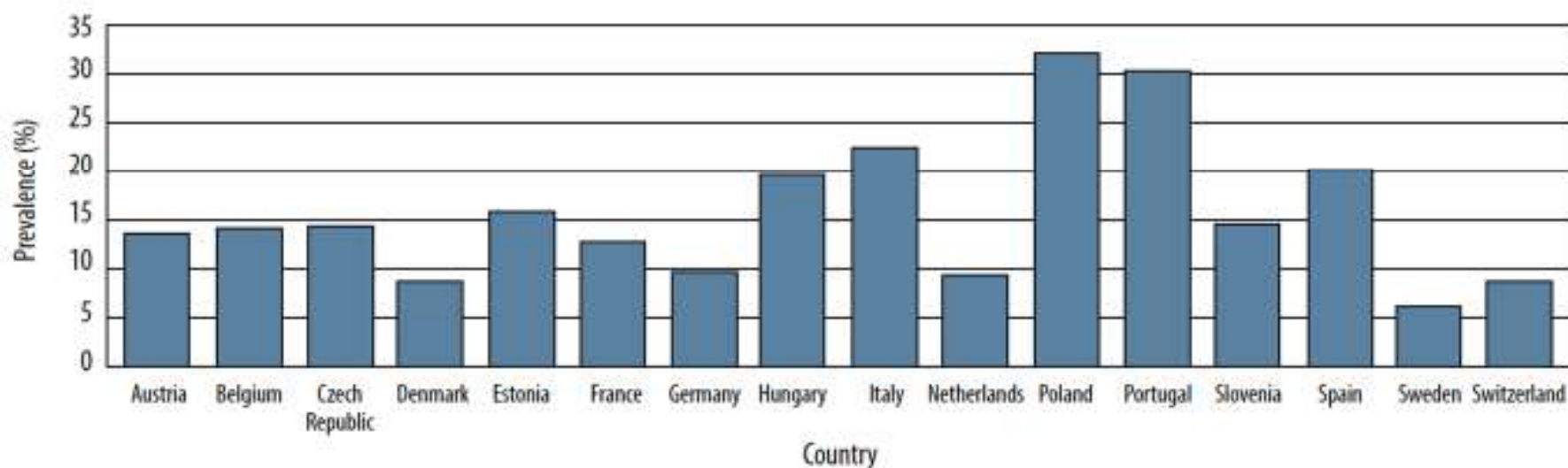
O que é inatividade?

Physical activity and exercise

- Physical activity
 - Structured and unstructured forms of leisure, transport, domestic and work-related activities
- Exercise
 - Subset of structured physical activities designed to improve health

Physical activity

Fig. 3.22. Age-adjusted prevalence of physical inactivity in people aged 60 years and older, by country



OMS. Informe mundial sobre el envejecimiento y la salud. USA: Organização Mundial de Saúde; 2015.

Atividade física, exercícios e
envelhecimento

Atividade física e envelhecimento

Consensus statement



OPEN ACCESS

Copenhagen Consensus statement 2019: physical activity and ageing

Jens Bangsbo,¹ Joanna Blackwell,¹ Carl-Johan Boraxbekk,² Paolo Caserotti,³ Flemming Dela,⁴ Adam B Evans,¹ Astrid Pernille Jespersen,⁵ Lasse Gliemann,¹ Arthur F Kramer,⁶ Jesper Lundbye-Jensen,¹ Erik Lykke Mortensen,⁷ Aske Juul Lassen,⁵ Alan J Gow,^{8,9} Stephen D R Harridge,¹⁰ Ylva Hellsten,¹ Michael Kjaer,^{11,12} Urho M Kujala,¹³ Ryan E Rhodes,¹⁴ Elizabeth C J Pike,¹⁵ Timothy Skinner,¹⁶ Thomas Skovgaard,¹⁷ Jens Troelsen,³ Emmanuelle Tulle,¹⁸ Mark A Tully,¹⁹ Jannique G Z van Uffelen,²⁰ Jose Viña²¹

Older people

- The term 'older adults' represents a highly heterogeneous population.
- It encompasses those that remain highly active and healthy throughout the life course with a high intrinsic capacity to the very old and frail with low intrinsic capacity.

Copenhagen Consensus statement 2019: physical activity and ageing

- Theme 1: functional capacity and health
- Theme 2: brain health and cognitive function
- Theme 3: behavior change, intention and habits
- Theme 4: sociological perspectives

The Inherent Human Aging Process and the Facilitating Role of Exercise

*Norman R. Lazarus and Stephen D. R. Harridge**

Declines in physiological functional capacity with age: a longitudinal study in peak swimming performance

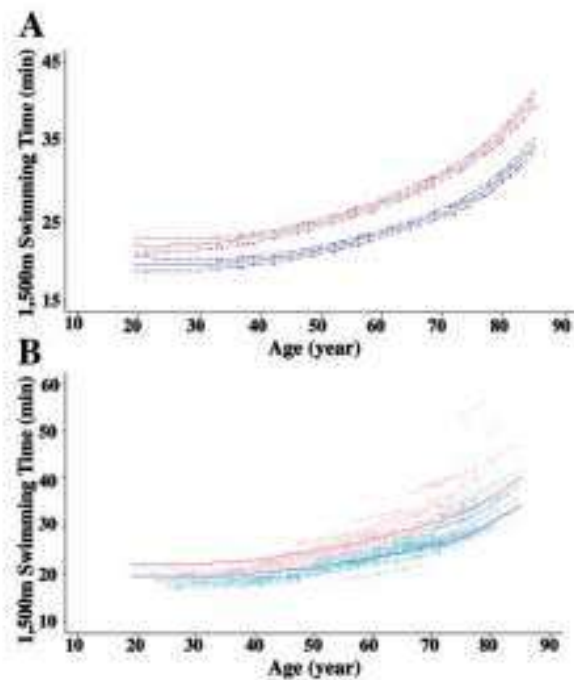


Fig. 1. US Masters Swimming 1,500-m freestyle performance times with advancing age. *A*: mean (population) quadratic line and 95% confidence intervals. *B*: average quadratic line and individual regression lines. Pink identifies women, and blue identifies men.

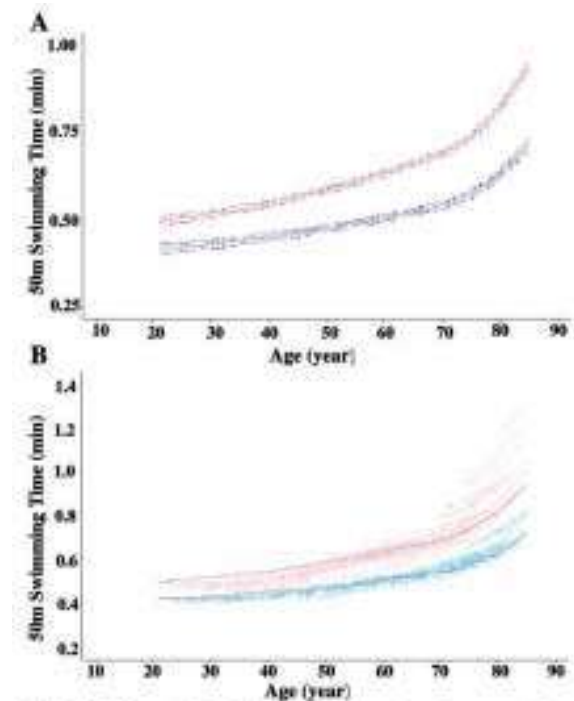


Fig. 2. US Masters Swimming 50-m freestyle performance times with advancing age. *A*: mean (population) quadratic line and 95% confidence intervals. *B*: average quadratic line and individual regression lines. Pink identifies women, and blue identifies men.

Performance decline with age for male and female Masters sports

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A. B. Baker and Y. Q. Tang

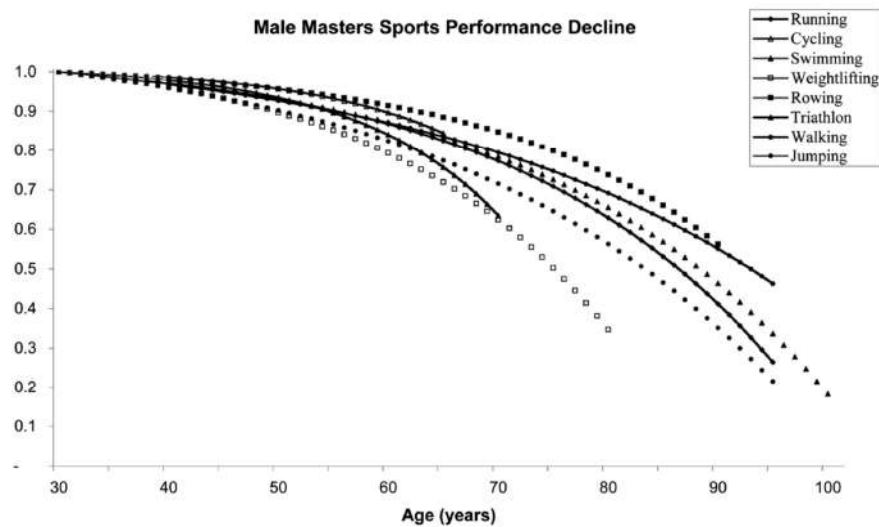


Figure 1. Fractional performance decline with age for male Masters sports.

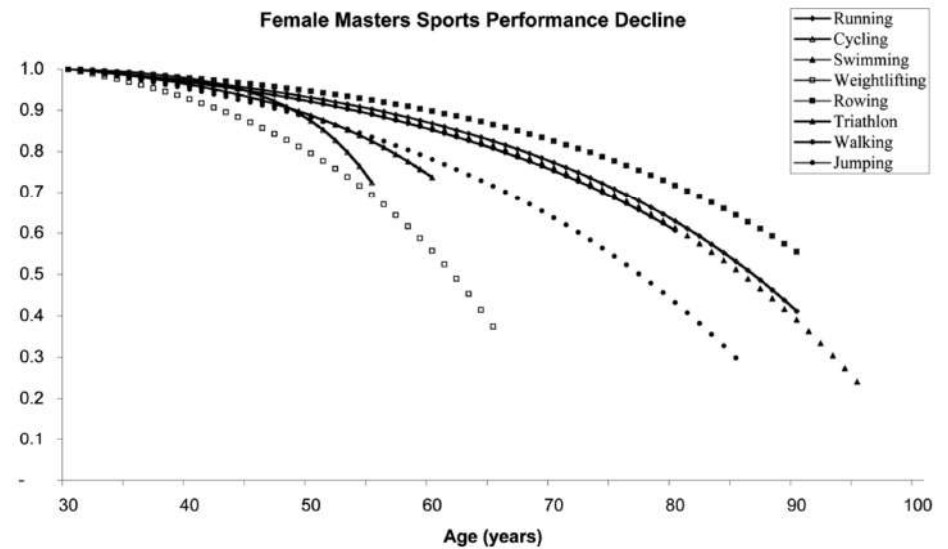


Figure 2. Fractional performance decline with age for female Masters sports.

The Inherent Human Aging Process and the Facilitating Role of Exercise

*Norman R. Lazarus and Stephen D. R. Harridge**

- We hypothesize that with adequate training this same profile and trajectory, but with lower performance times, would be generated by all individuals who engage in sufficient physical activity/exercise.

The Inherent Human Aging Process and the Facilitating Role of Exercise

*Norman R. Lazarus and Stephen D. R. Harridge**

- It appears that aging affects nearly all physiological systems. In order to follow these changes a measure of global physiological function is necessary.
- Such a measure is maximal athletic performance where many systems must be integrated to be able to perform at their limits.



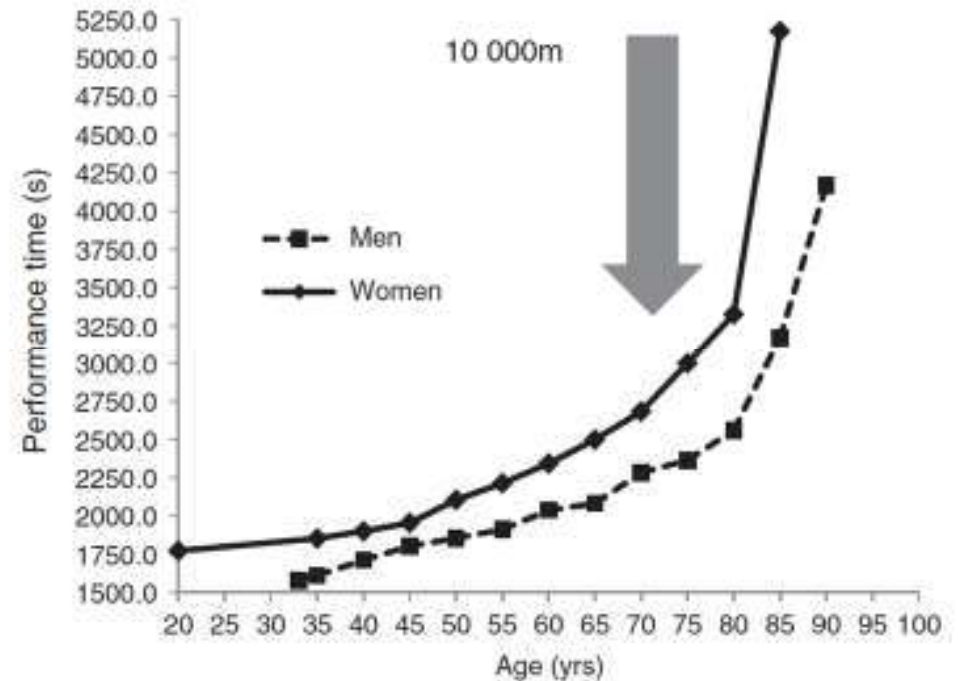
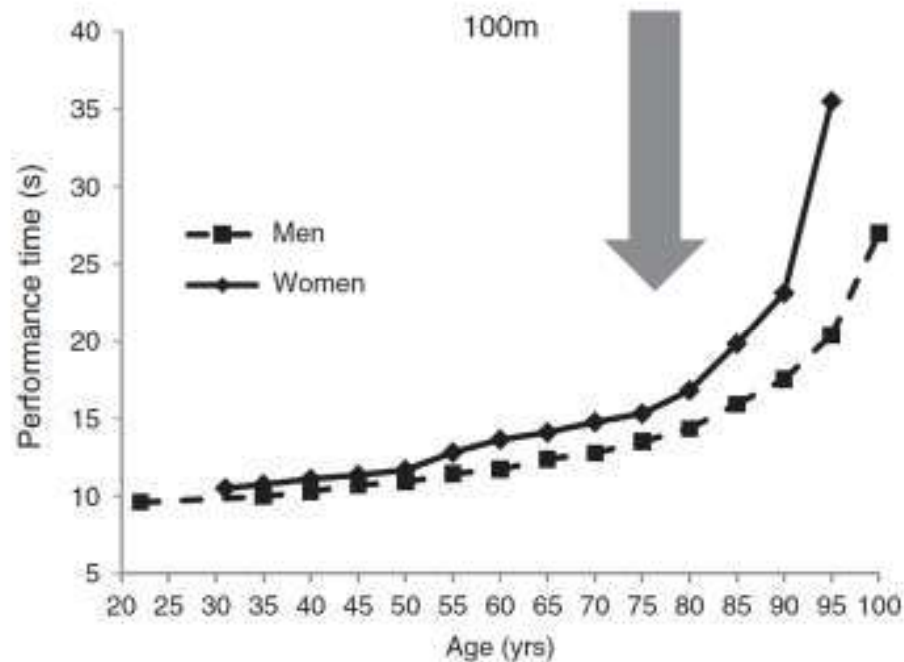
The set point theory

Lazarus & Harridge

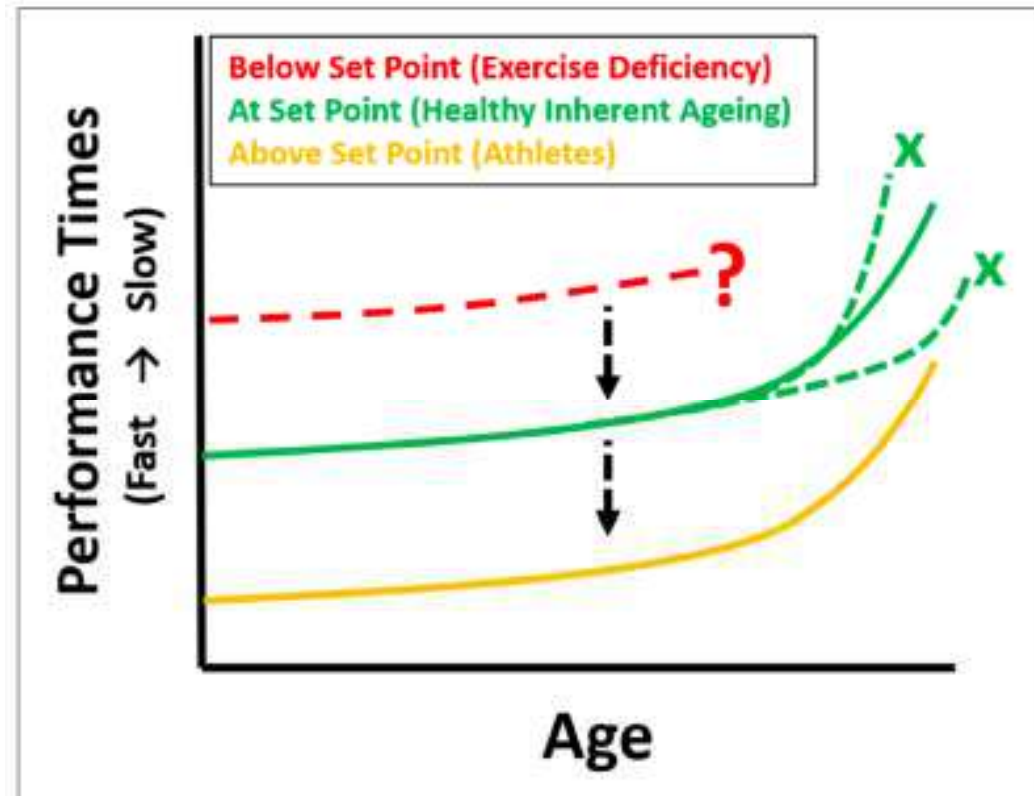
A Set Point Theory

The graded effects of physical activity/exercise on ageing

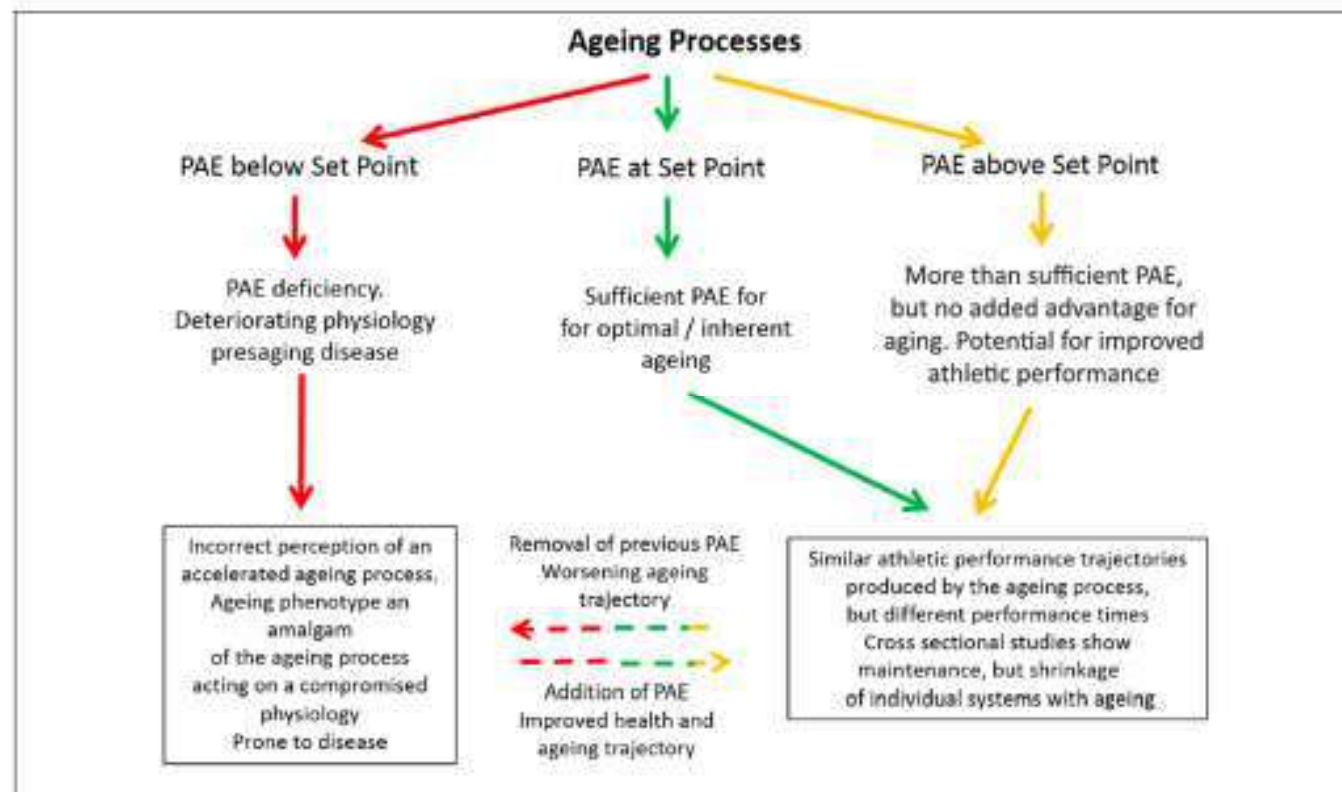
World record performances for the 100 m and 10,000 m track event as of June 2016 for both male and female master athletes

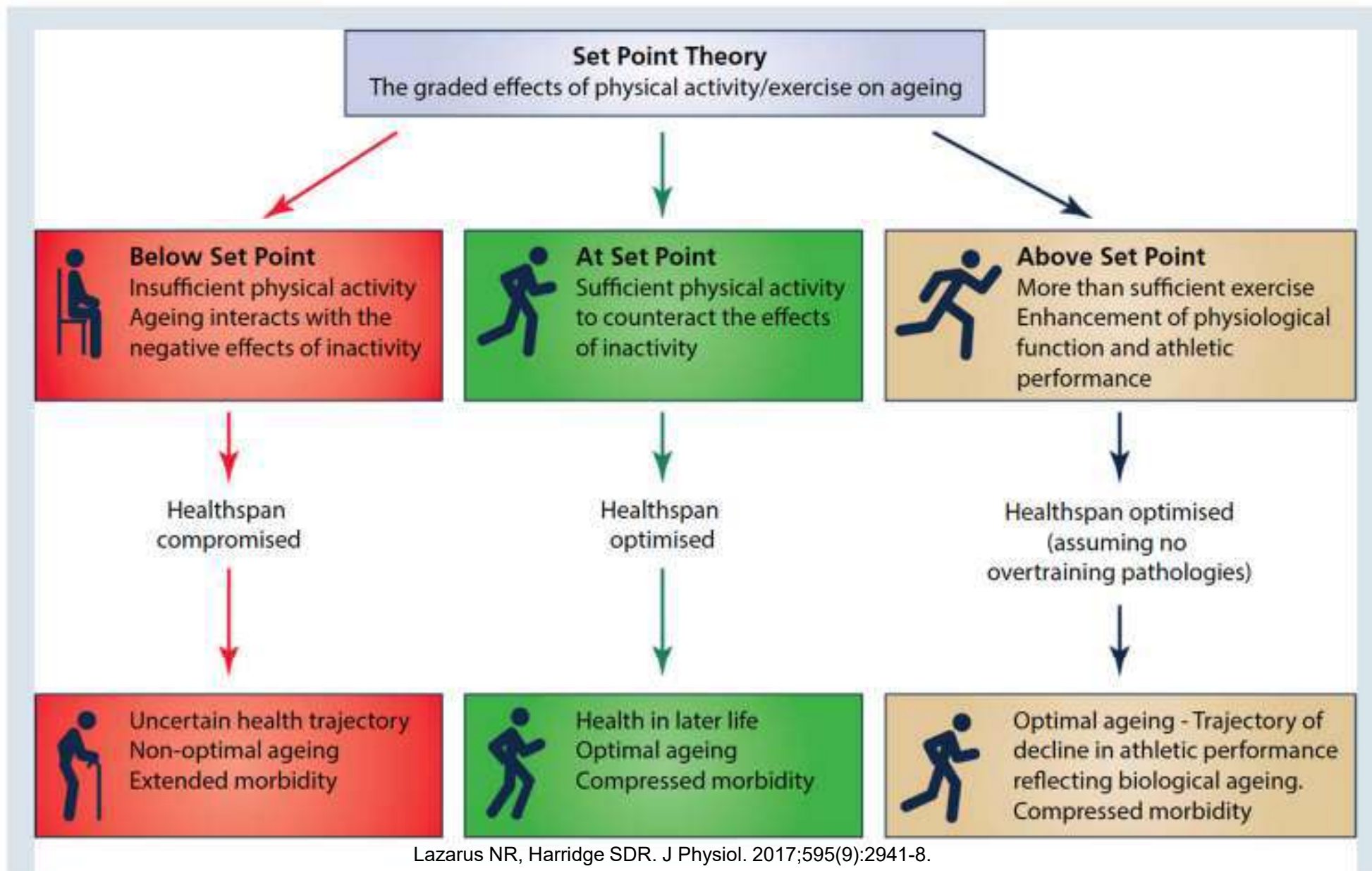


Theoretical longitudinal maximum performance curves for athletes as they age



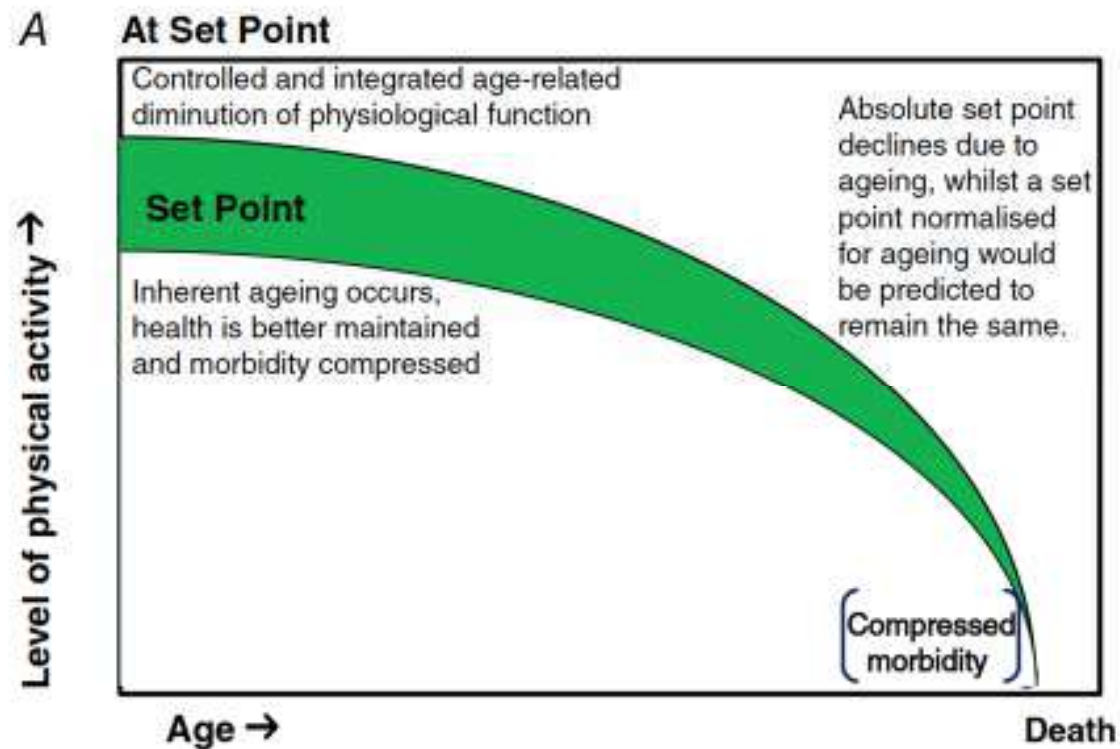
Schematic showing the effects of exercising below (red), at (green), or above (gold) the Set Point





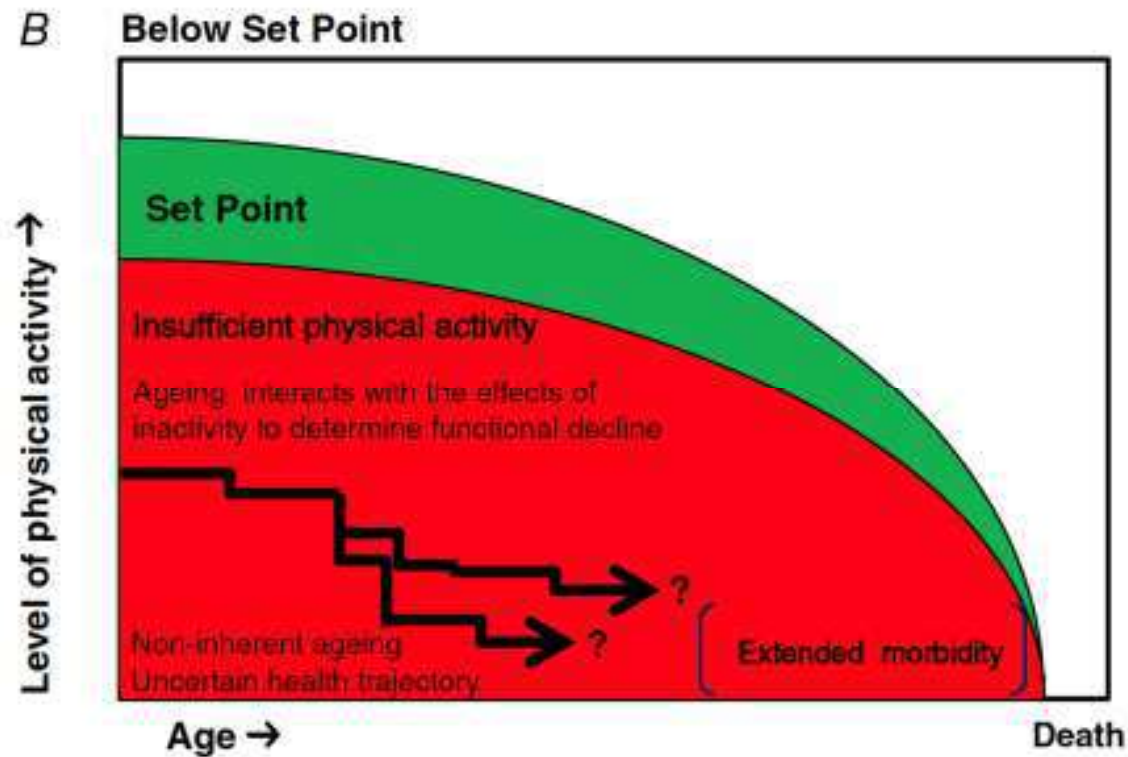
Lazarus NR, Harridge SDR. J Physiol. 2017;595(9):2941-8.

Set point theory: at



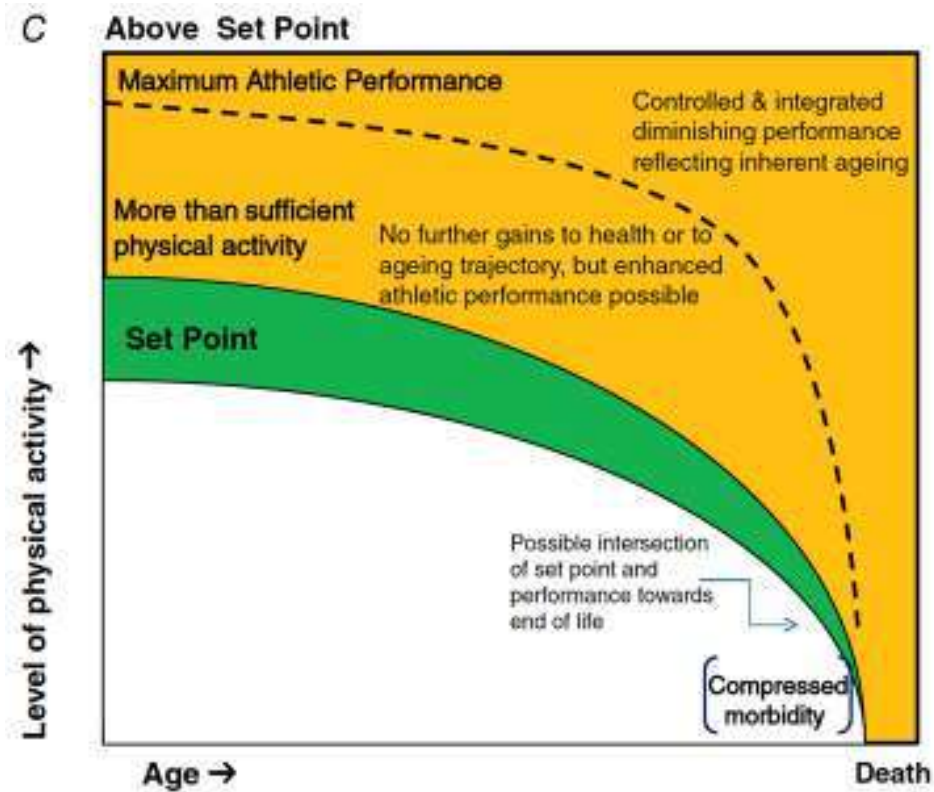
Lazarus NR, Harridge SDR. J Physiol. 2017;595(9):2941-8.

Set point theory: below



Lazarus NR, Harridge SDR. J Physiol. 2017;595(9):2941-8.

Set point theory: above



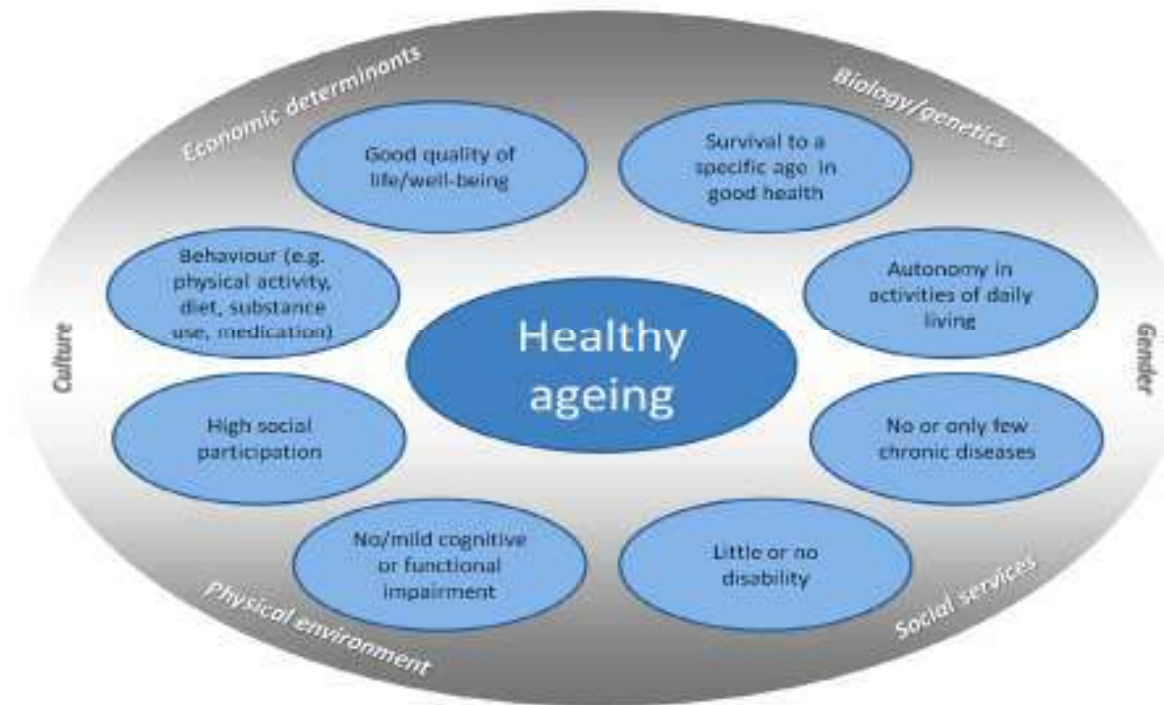
Lazarus NR, Harridge SDR. J Physiol. 2017;595(9):2941-8.

Discussão

Acerca do conceito de *inherent human ageing* e da *Set point theory*

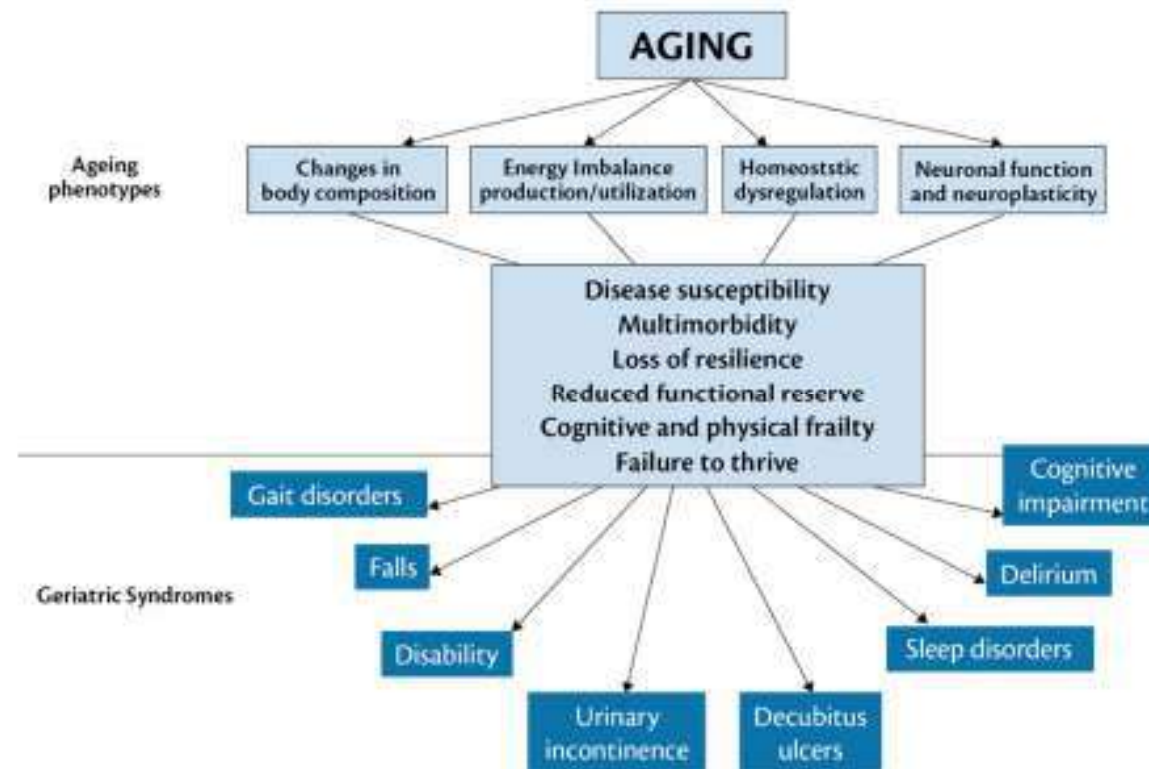
Envejecimiento saludable

Figure 1. Components of healthy ageing.



Fuchs J, et al. Indicators for healthy ageing--a debate. *Int J Environ Res Public Health*. 2013;10(12):6630-44.

Envejecimiento y sus fenotipos



[Fabri et al. In: Oxford Textbook of Geriatric Medicine (p. 495)].

O que pensar de:

- Volume de atividade física
- Volume de exercícios
- Os supercentenários
- Prevalência de EBS entre *champions*
- Prevalência de incapacidade, síndromes geriátricas e doenças associadas a inatividade entre *champions*
- A amostra de *master champions*

obrigado!

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fibra