A Prelude on the Aging Phenotype

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Aging and Trajectory of Function
Aging Phenotypes and the Genesis of Geriatric Syndromes

Aging Phenotypes
- Changes in Body Composition
- Energy Imbalance Production/Utilization
- Homeostatic Dysregulation
- Neurodegeneration

Disease Susceptibility
- Reduced Functional Reserve
- Reduced Healing Capacity and Stress Resistance
- Unstable Health
- Failure to Thrive

Physical and Cognitive FRAILTY

Geriatric Syndromes
- Gait Disorders
- Falls
- Disability
- Comorbidity
- Urinary Incontinence
- Sleep Disorders
- Cognitive Impairment
- Delirium
- Decubitus Ulcers

The Domains of Energy
Fitness, Resting Metabolic Rate, and Efficiency

- Reserve energy for sustained or intense activity
  - <0-33 ml O₂/kg/min
- Energy for casual walking
  - <0-11 ml O₂/kg/min
- Instability, infirmity & inefficiency
  - 0-5 ml O₂/kg/min
- Repair, recovery & regulation
  - 0-5 ml O₂/kg/min
- Minimum energy to sustain life in “good health”
  - 3-6 ml O₂/kg/min

Basal Energy: 60-70% of 24 h consumption

Sources of Energy Waste
- Excess cost of Movement due to Energetic Inefficiency
- Homeostatic Effort due to Diseases and/or Aging
High Basal Metabolic Rate Is a Risk Factor for Mortality: The Baltimore Longitudinal Study of Aging

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The Domains of Brain Resources

Total Capacity, Resource Allocation, Plasticity, Functional Reserve

- Functional Reserve
- Attention
- Cognitive function
- Motor Function
- Balance
- Hearing
- Vision
- Cardiovascular Control
- Metabolic Control

- Dual Task creates competition for brain resources
- In young and healthy individuals, additional resources can be pulled from reserve (plasticity)
- In older individuals functional resources and plasticity are constrained, leading to dysfunction
Conclusion

• Older age is often associated with a state of brain susceptibility, reduced plasticity and depauuperated functional reserve.

• Additional requests to the brain compete with finite resources, may have functional consequences and increase fragility.

• Because of the reduced plasticity, effective adaptation is less likely to occur.

• Hearing loss may have a negative impact on unexpected functional domains.