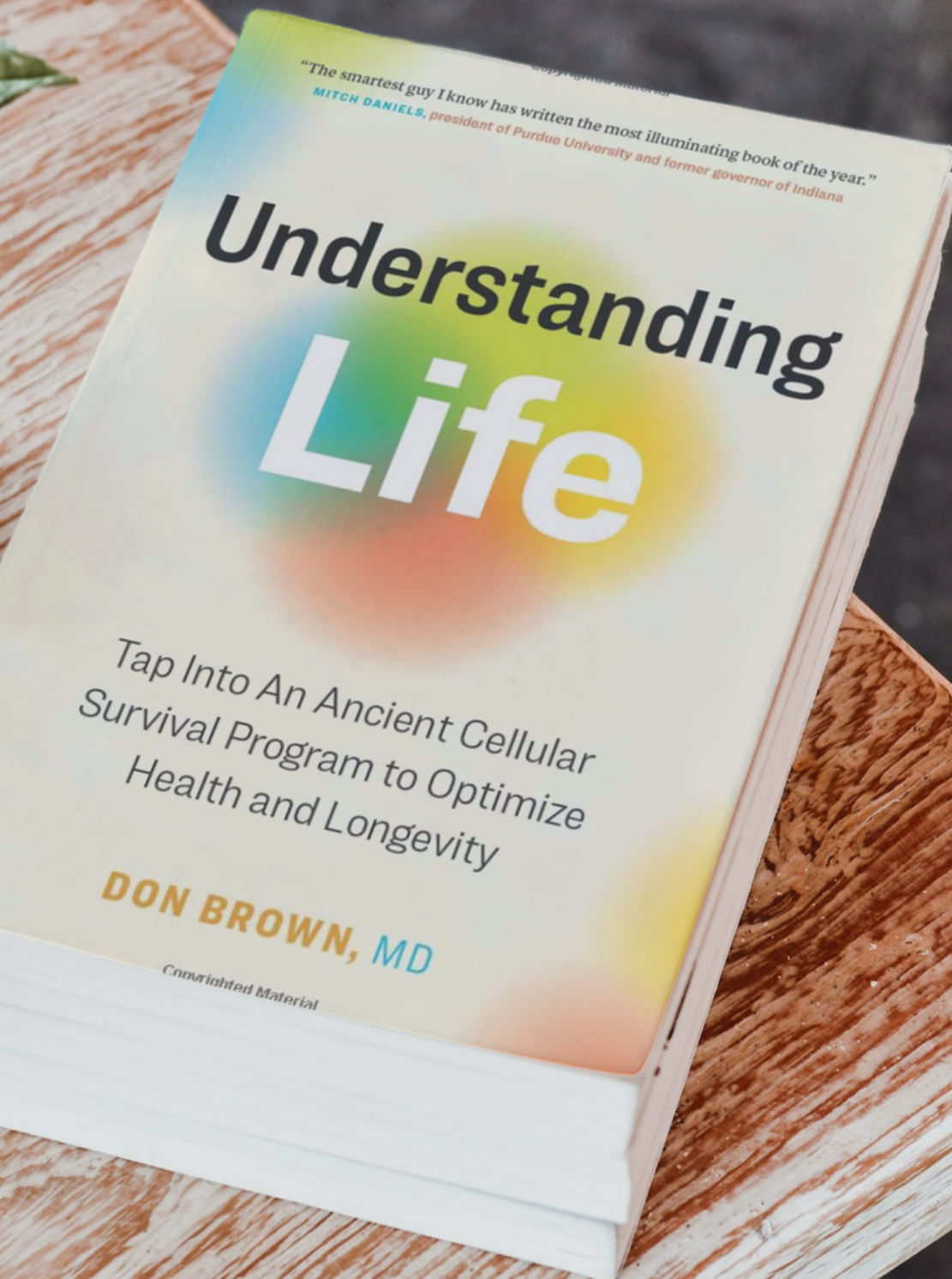
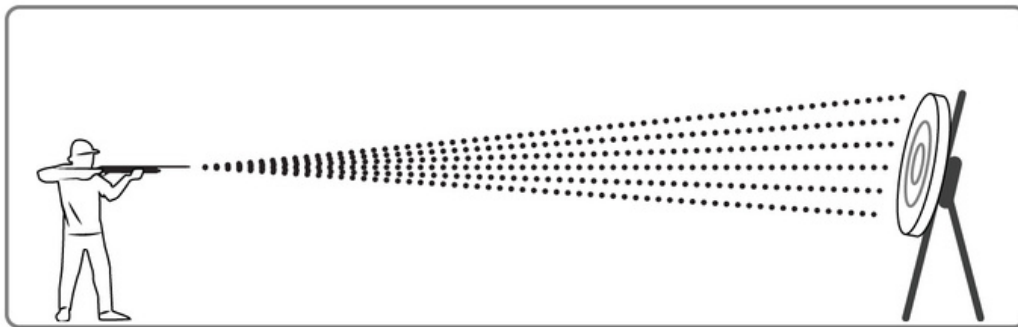


Figures & Images

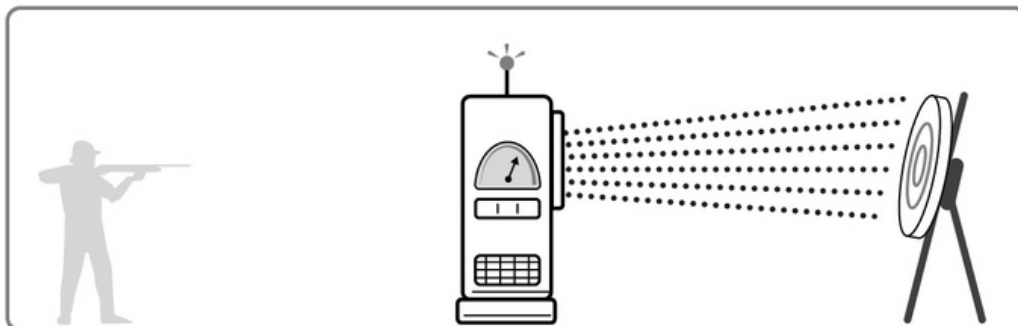


Introduction

Introduction, Fig. 1: Shooter/Target

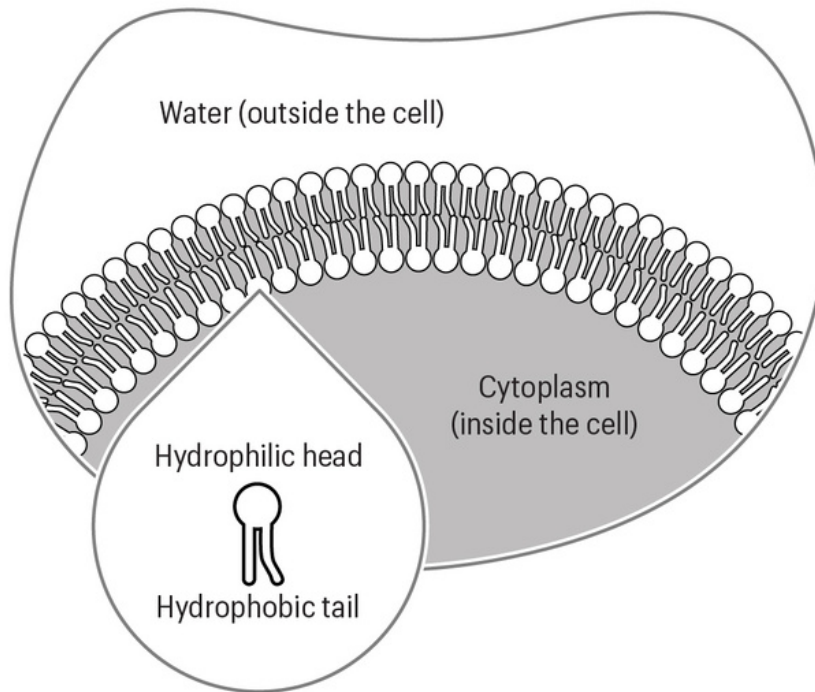


Introduction, Fig. 2: Shooter/Machine/Target

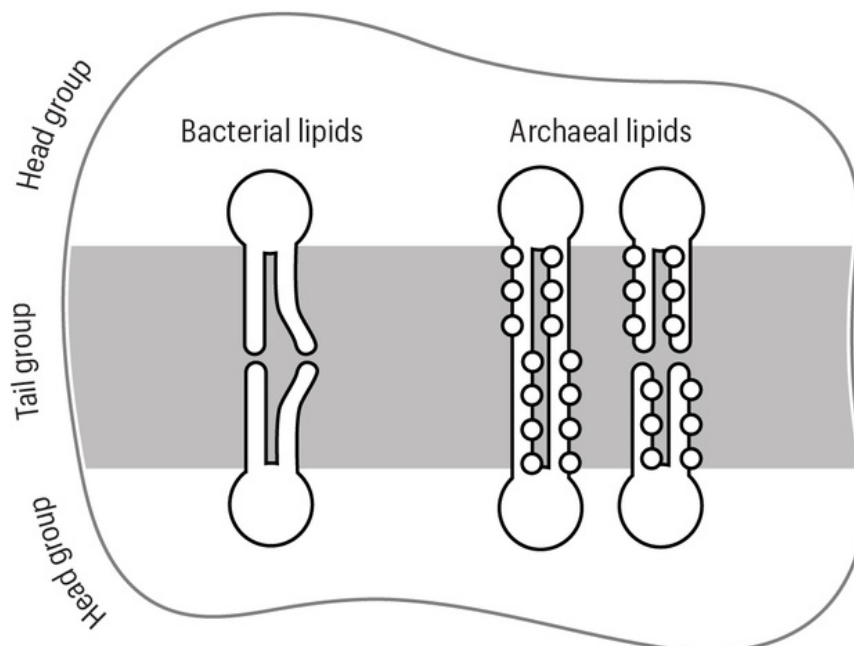


Chapter 1: The Grand Timeline of Life

Chapter 1, Fig. 1: Bilayer Structure

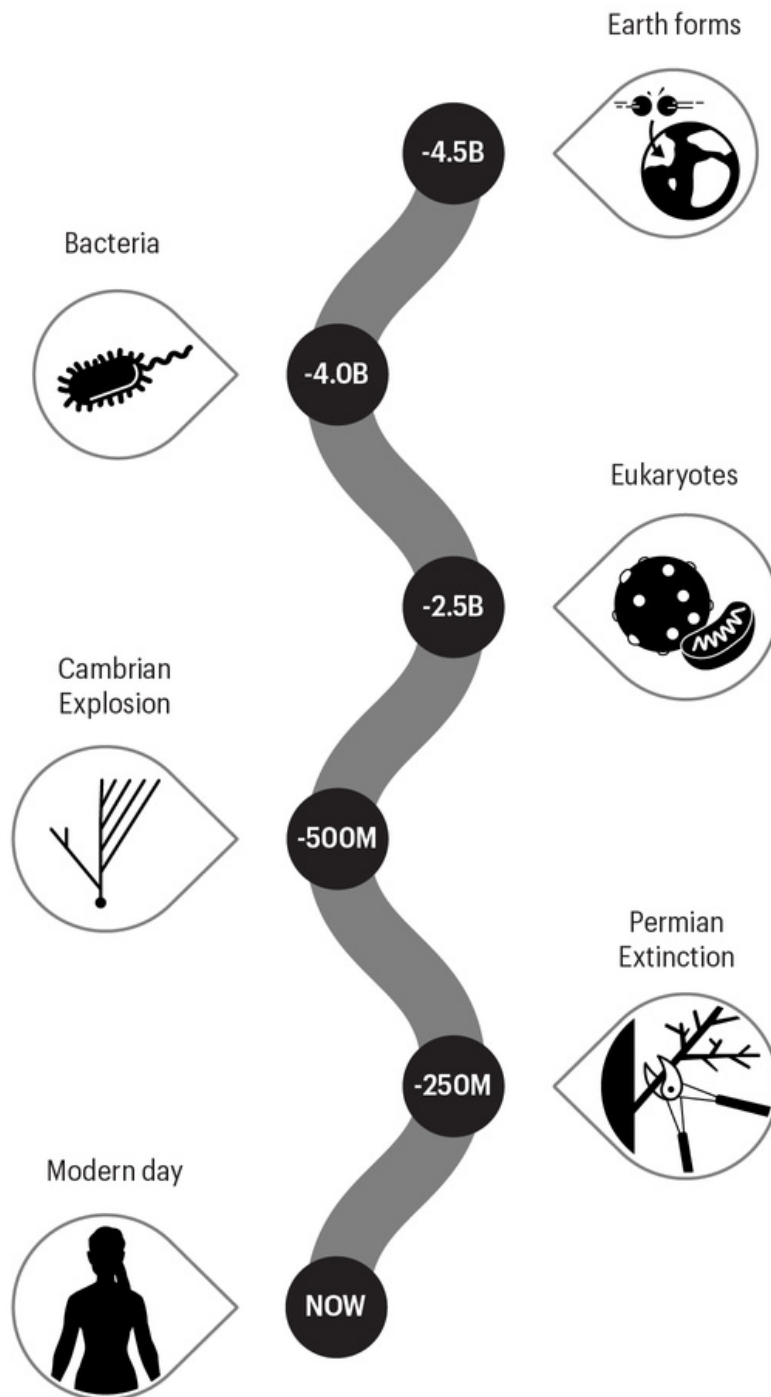


Chapter 1, Fig. 2: Archaeal Membranes



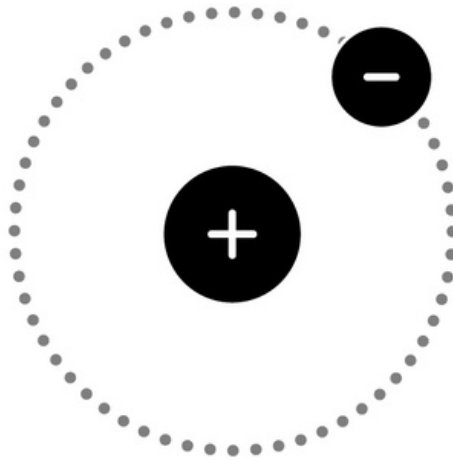
Chapter 1: The Grand Timeline of Life

Chapter 1, Fig. 3: Timeline

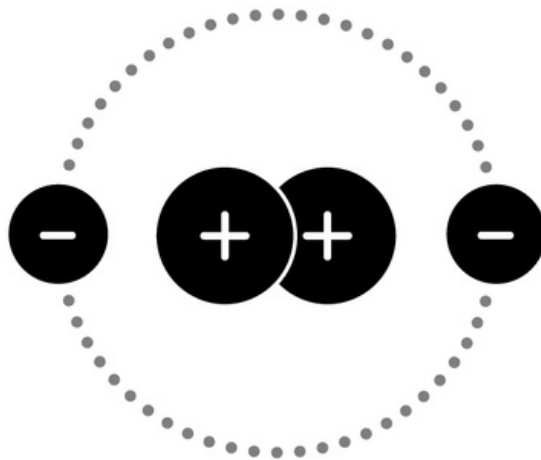


Chapter 2: A Crash Course in Chemistry

Chapter 2, Fig. 1: Hydrogen Atom

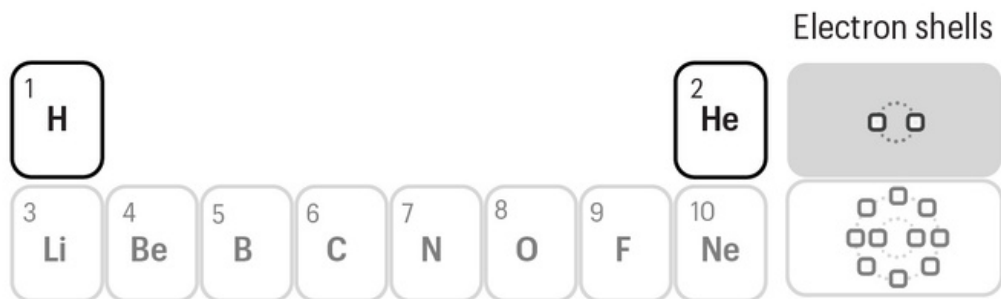


Chapter 2, Fig. 2: Helium Atom

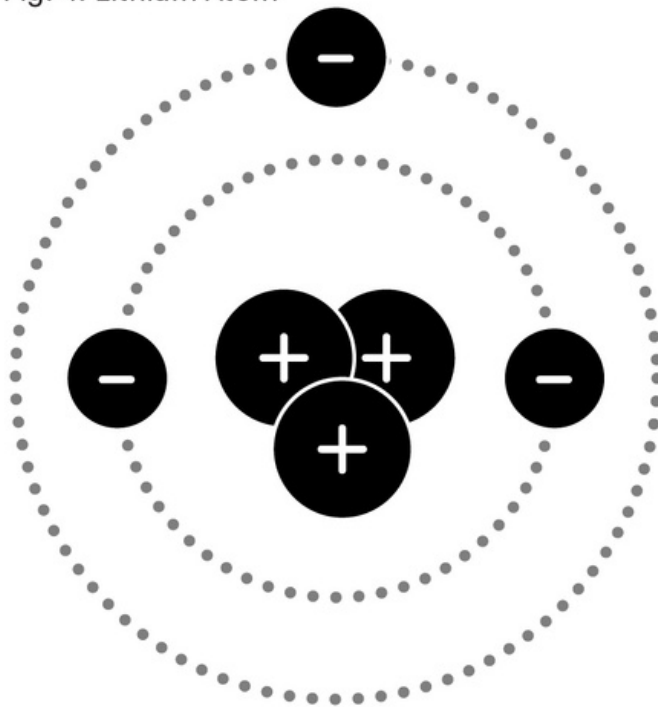


Chapter 2: A Crash Course in Chemistry

Chapter 2, Fig. 3: First row of periodic table

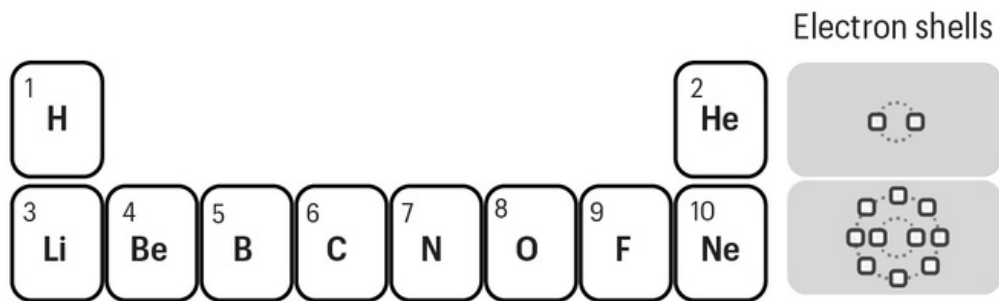


Chapter 2, Fig. 4: Lithium Atom

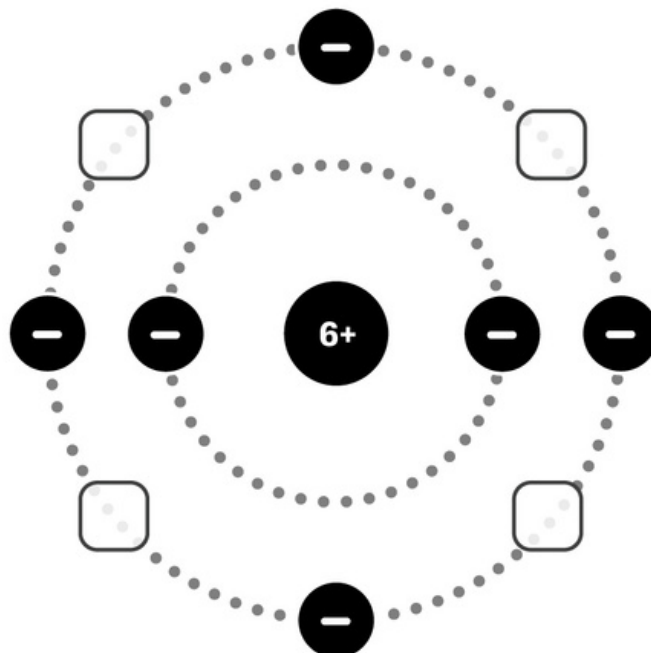


Chapter 2: A Crash Course in Chemistry

Chapter 2, Fig. 5: Periodic table with Lithium

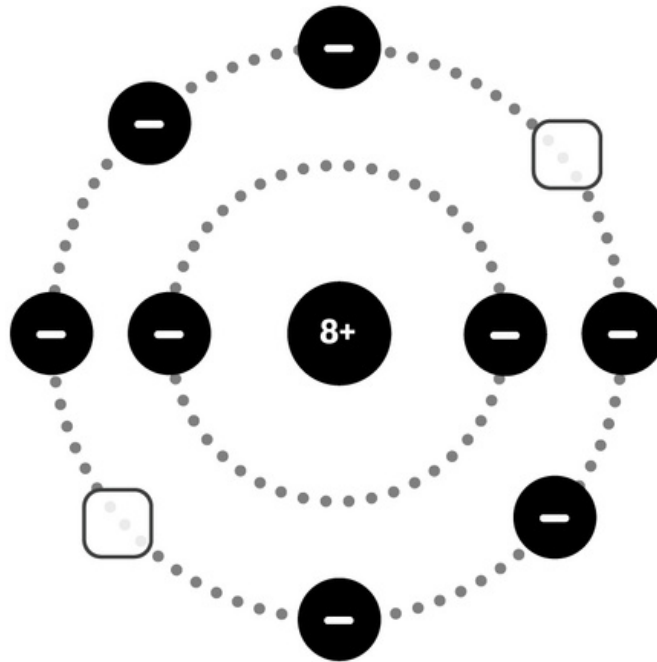


Chapter 2, Fig. 6: Carbon atom

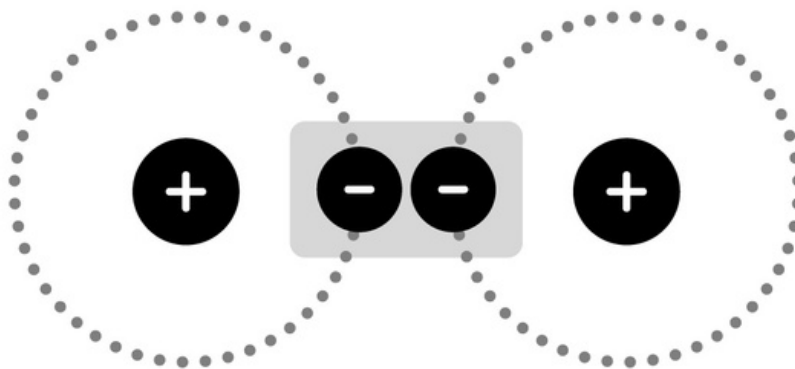


Chapter 2: A Crash Course in Chemistry

Chapter 2, Fig. 7: Oxygen atom

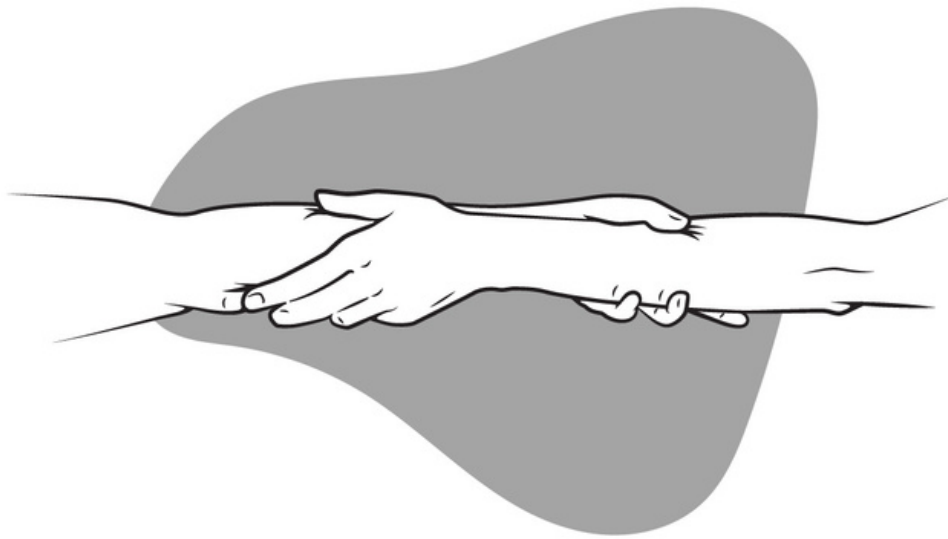


Chapter 2, Fig. 8: Hydrogen gas molecule

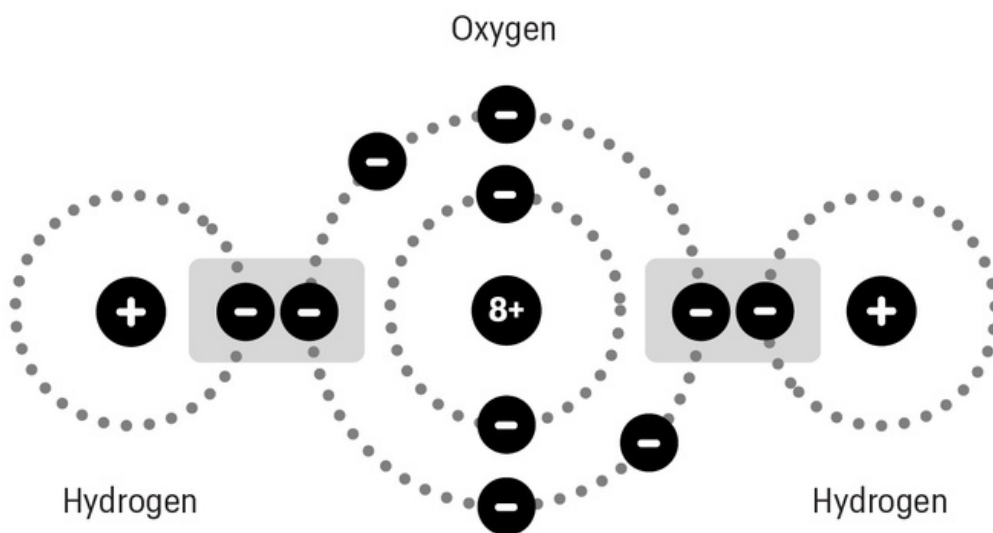


Chapter 2: A Crash Course in Chemistry

Chapter 2, Fig. 9: Grasping arms

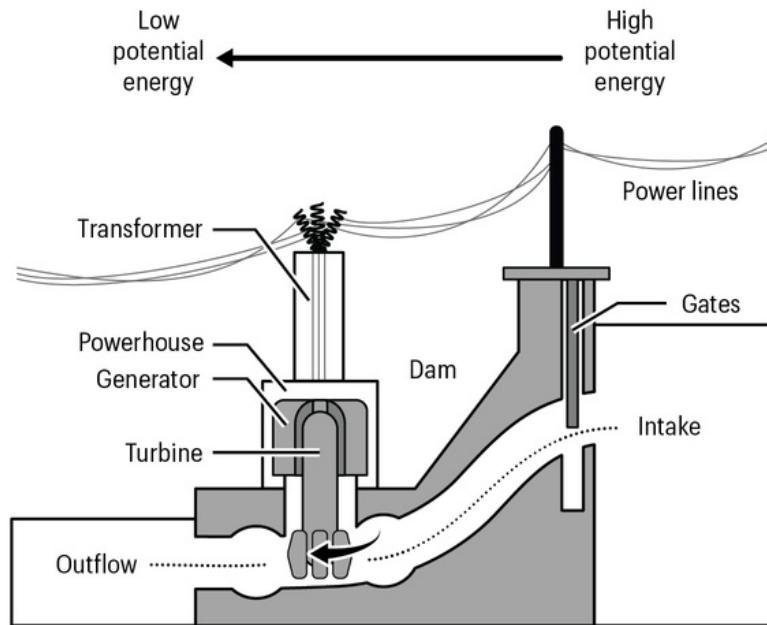


Chapter 2, Fig. 10: Water molecule

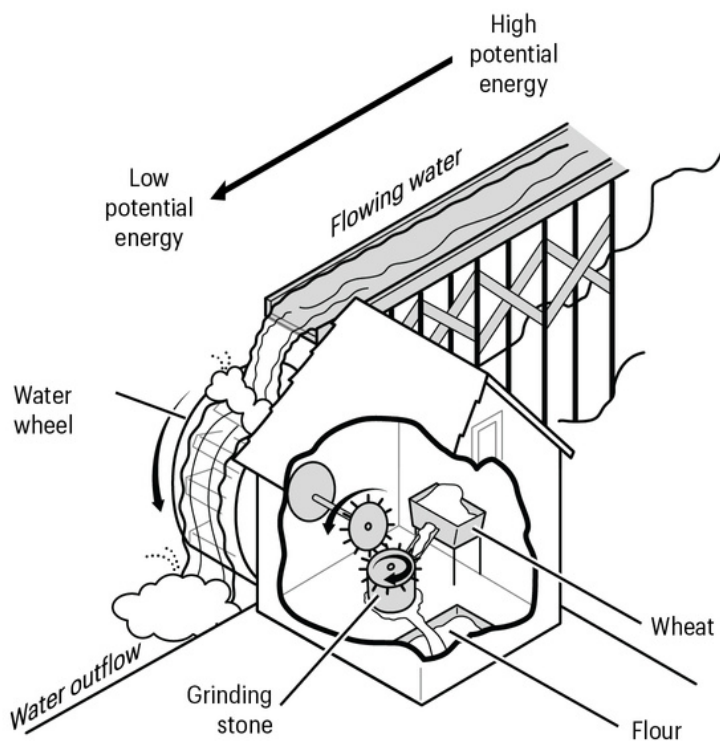


Chapter 3: Life 1.0

Chapter 3, Fig. 1: Hydroelectric power generation

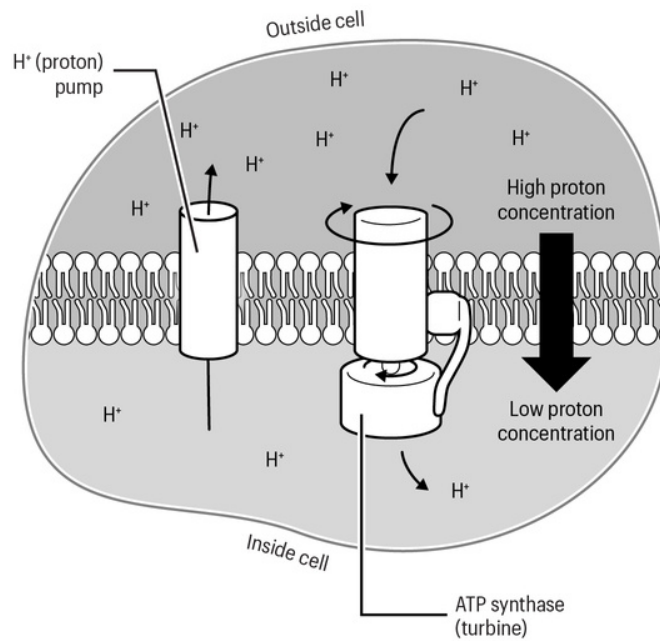


Chapter 3, Fig. 2: Water-powered mill

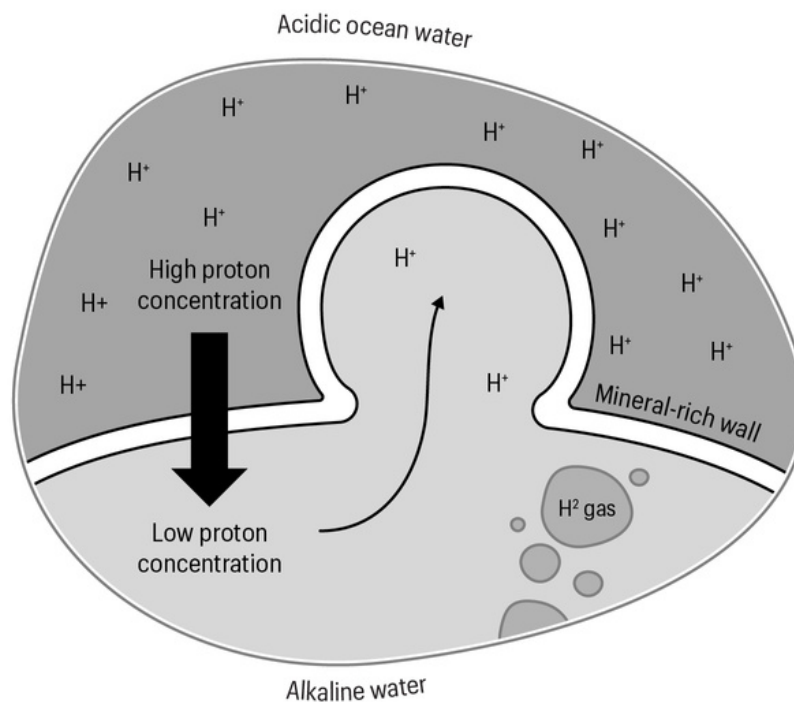


Chapter 3: Life 1.0

Chapter 3, Fig. 3: ATP-Synthase & Proton Gradient

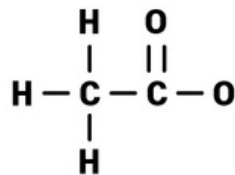


Chapter 3, Fig. 4: Inorganic pore



Chapter 3: Life 1.0

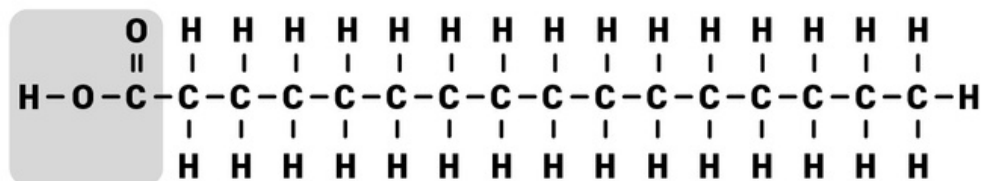
Chapter 3, Fig. 5: Acetyl-CoA



Acetyl-CoA

Chapter 3, Fig. 6: Palmitic Acid

Hydrophilic

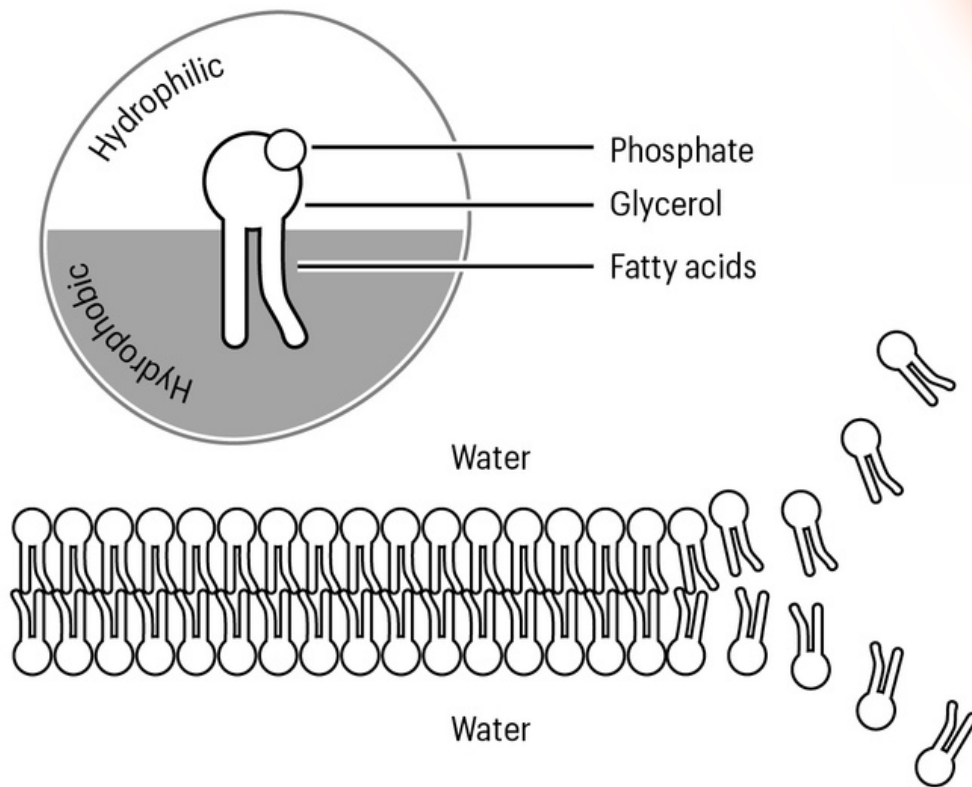


Carboxyl group
(carbon dioxide)

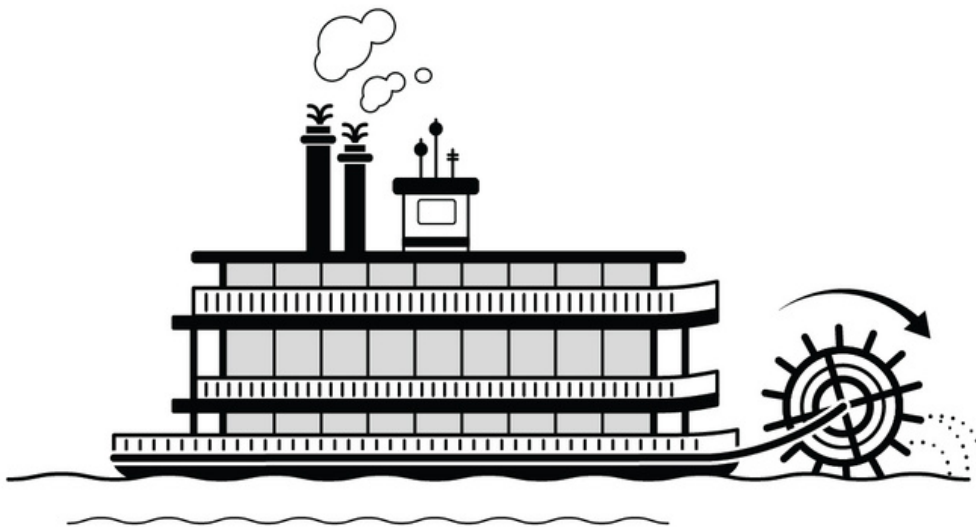
Palmitic Acid

Chapter 3: Life 1.0

Chapter 3, Fig. 7: Phospholipid Self Assembly

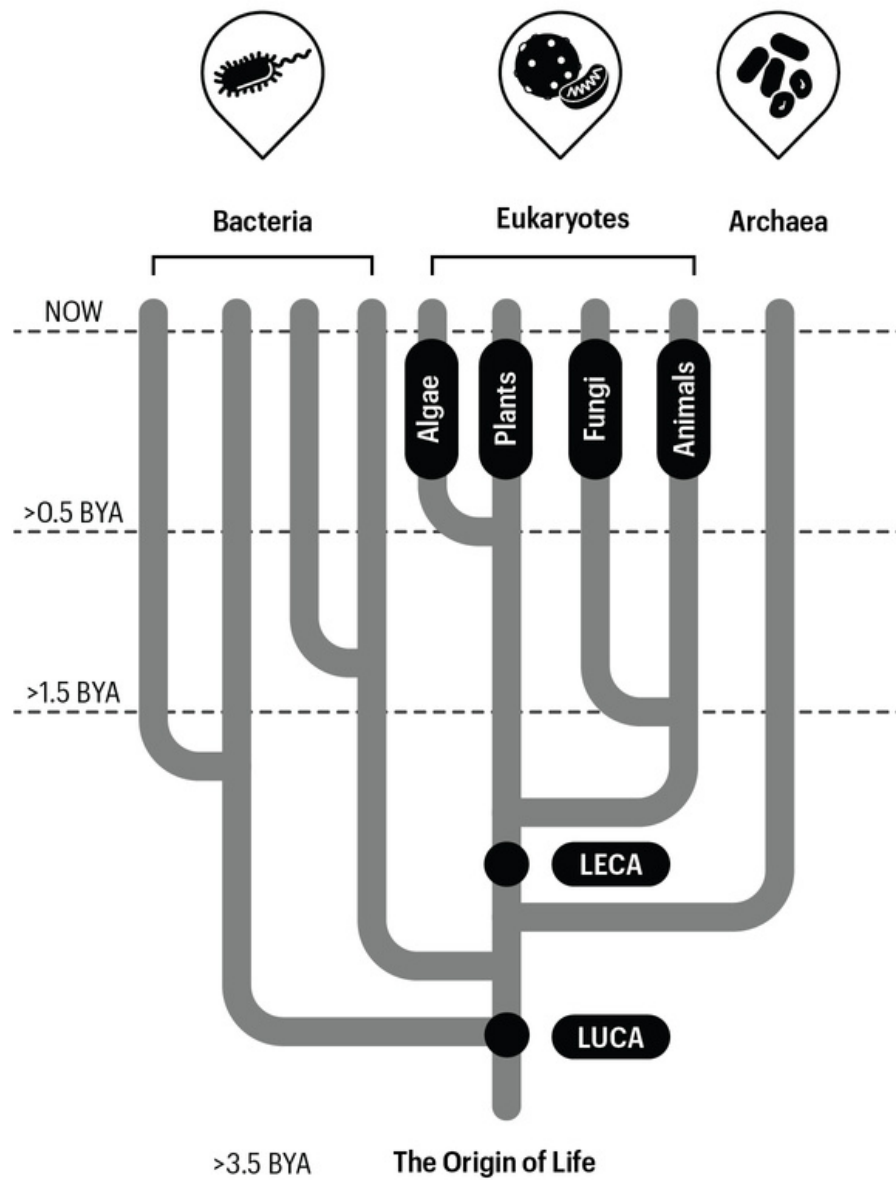


Chapter 3, Fig. 8: Steamboat



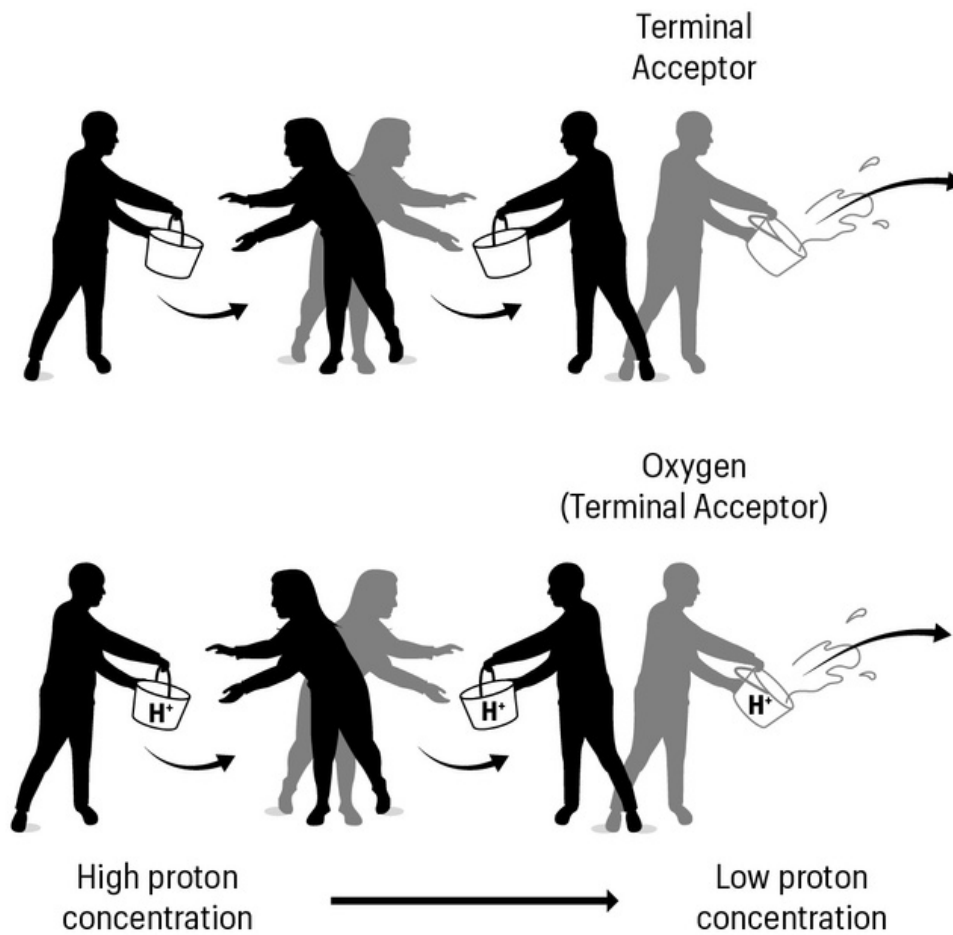
Chapter 3: Life 1.0

Chapter 3, Fig. 10: LUCA



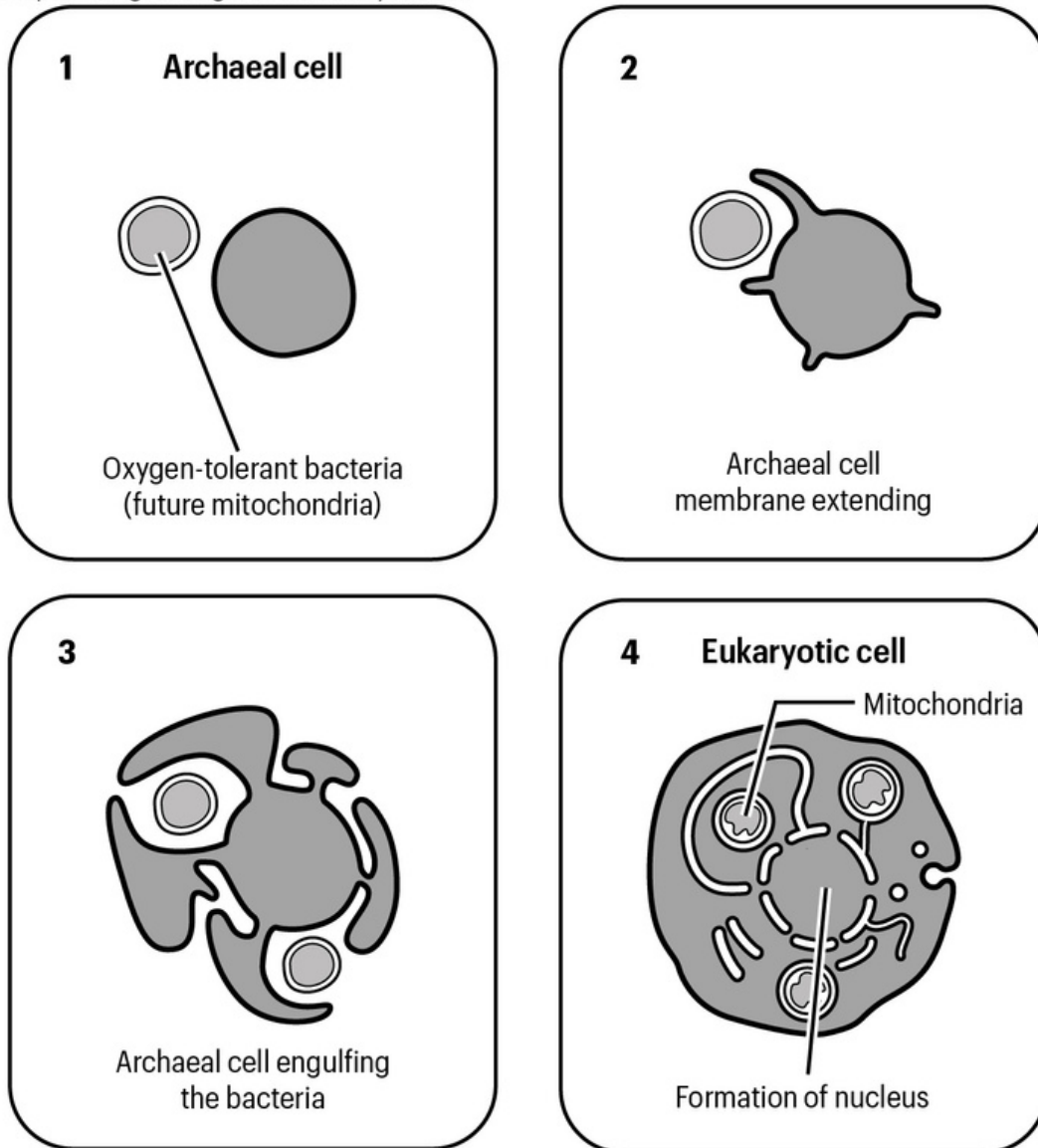
Chapter 4: Life 2.0

Chapter 4, Fig. 2: Molecular Bucket Brigade



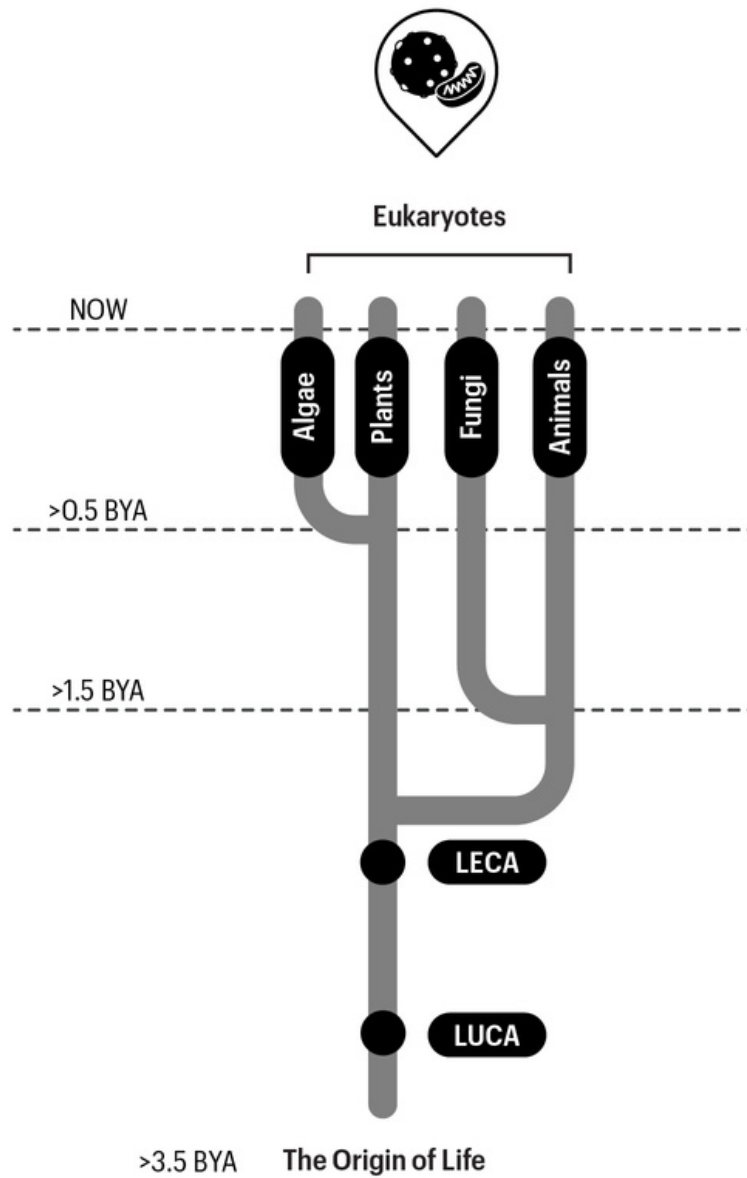
Chapter 4: Life 2.0

Chapter 4, Fig. 3: Origin of the eukaryotic cell



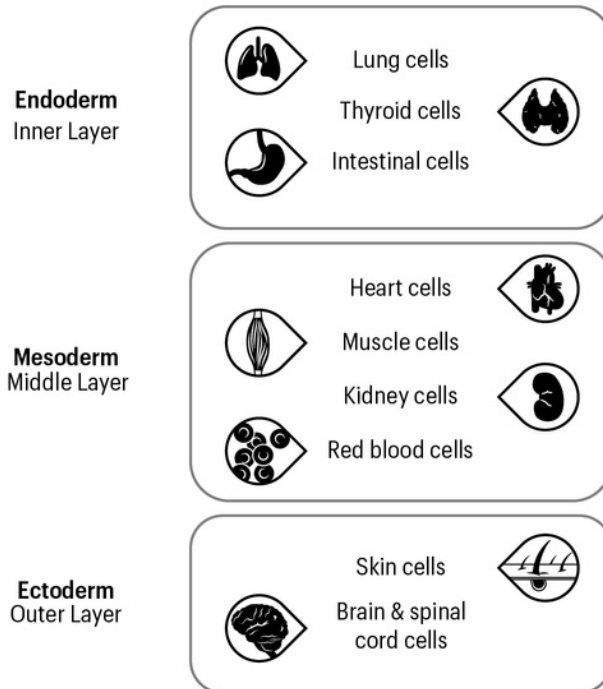
Chapter 4: Life 2.0

Chapter 4, Fig 4: LECA/Eukaryotes

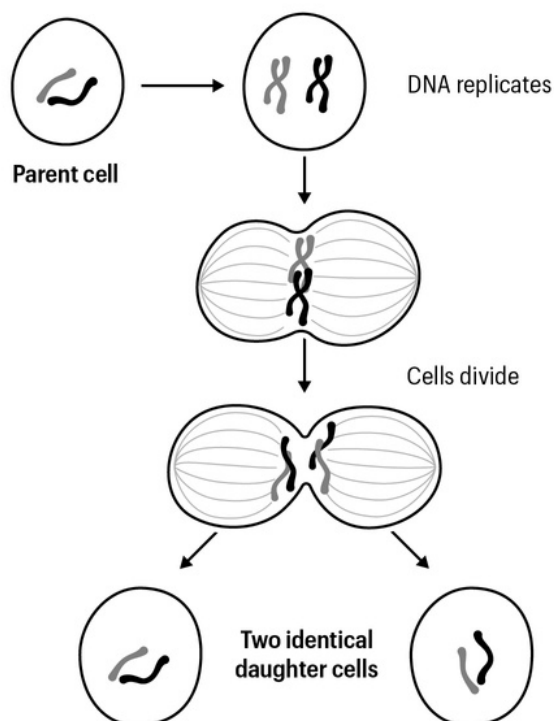


Chapter 5: Life 3.0

Chapter 5, Fig. 1: Germ layers

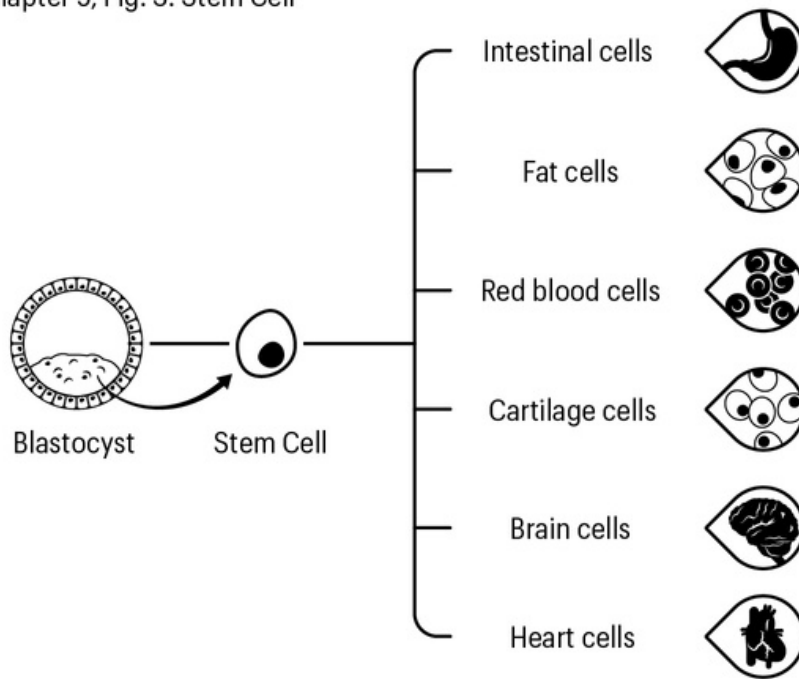


Chapter 5, Fig. 2: Mitosis

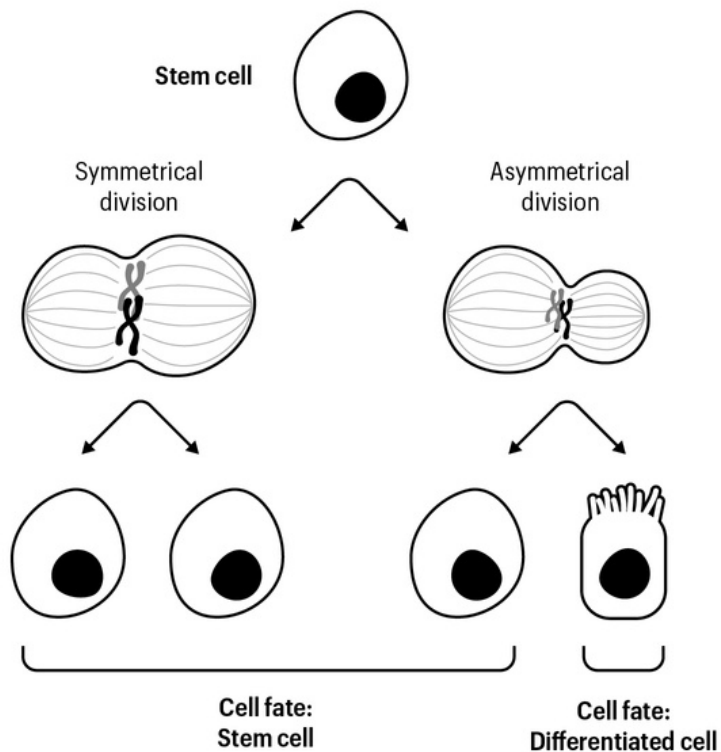


Chapter 5: Life 3.0

Chapter 5, Fig. 3: Stem Cell

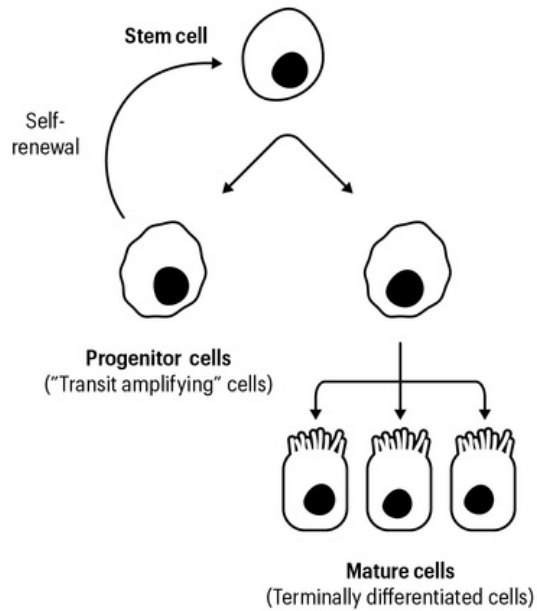


Chapter 5, Fig. 4: Stem Cell Dividing

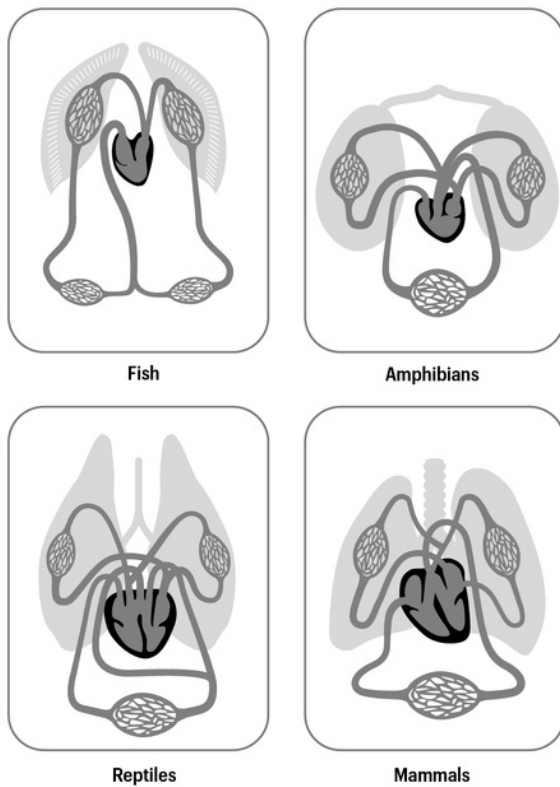


Chapter 5: Life 3.0

Chapter 5, Fig. 5: Stem Cell to Mature Cell

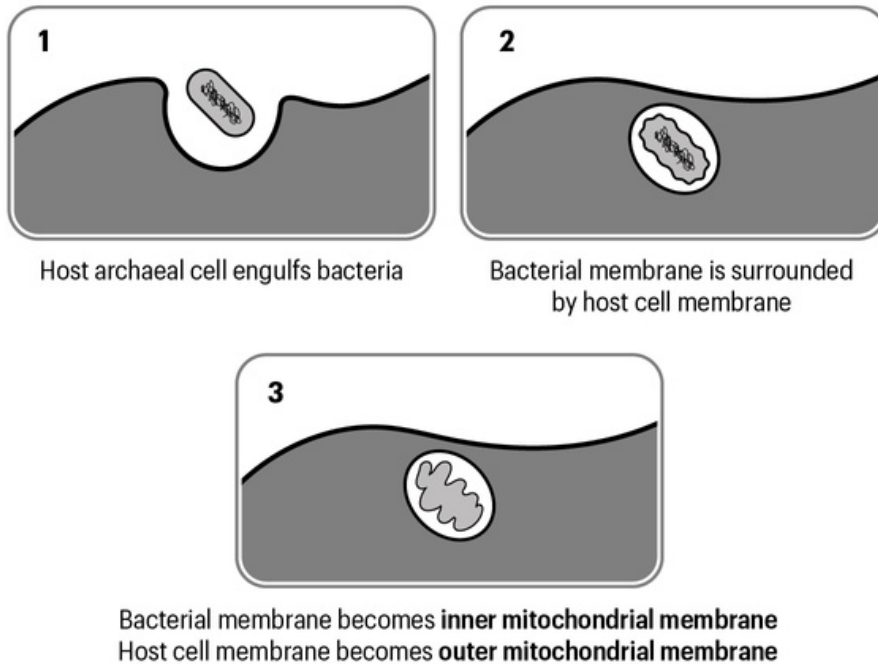


Chapter 5, Fig. 6: Pulmonary Diagrams x4

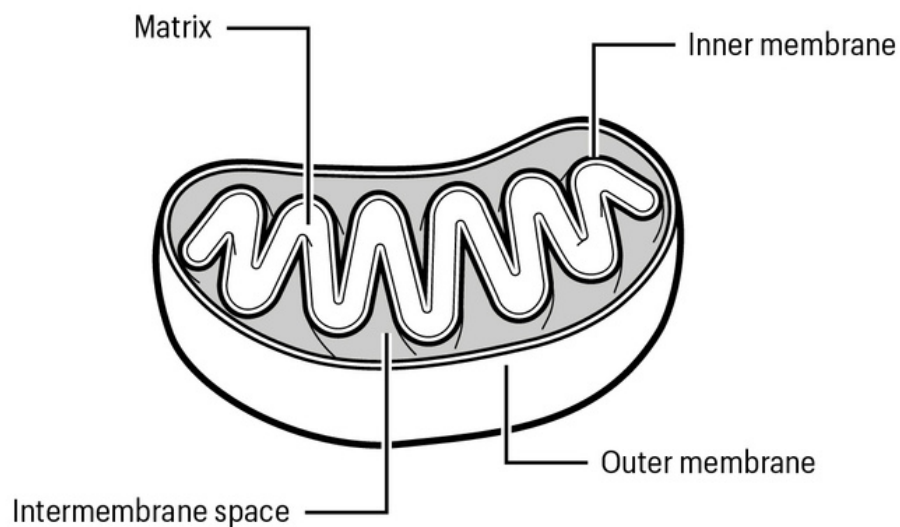


Chapter 6: The Dark Side of Progress

Chapter 6, Fig. 1: Mitochondria Origin

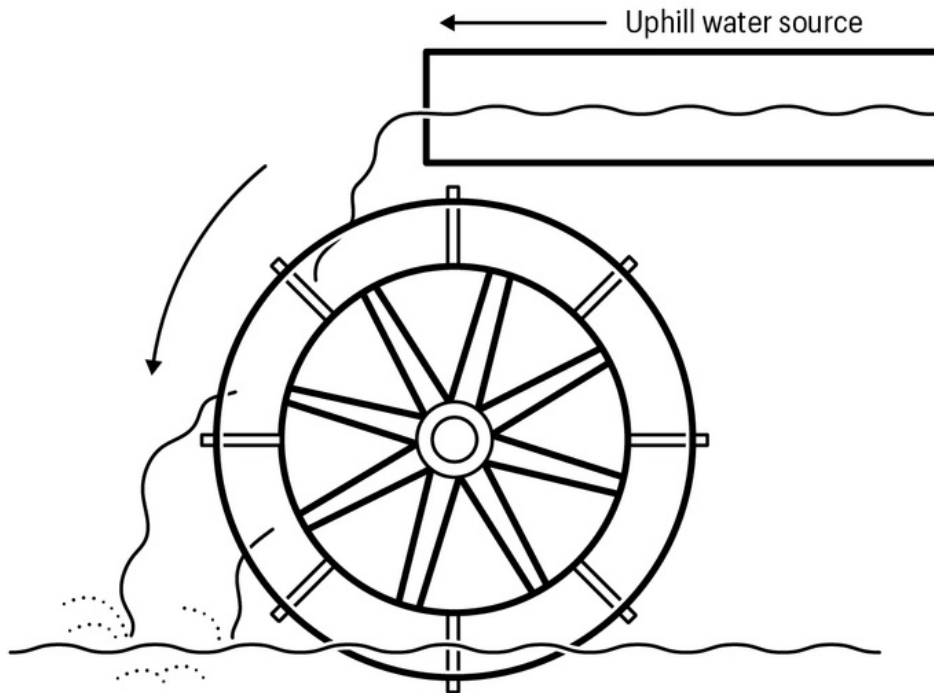


Chapter 6, Fig. 2: Mitochondria Anatomy

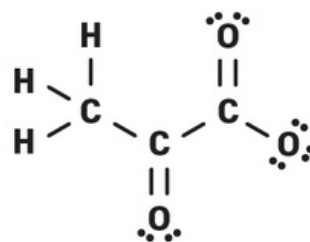


Chapter 6: The Dark Side of Progress

Chapter 6, Fig. 3: Water wheel kinetic energy



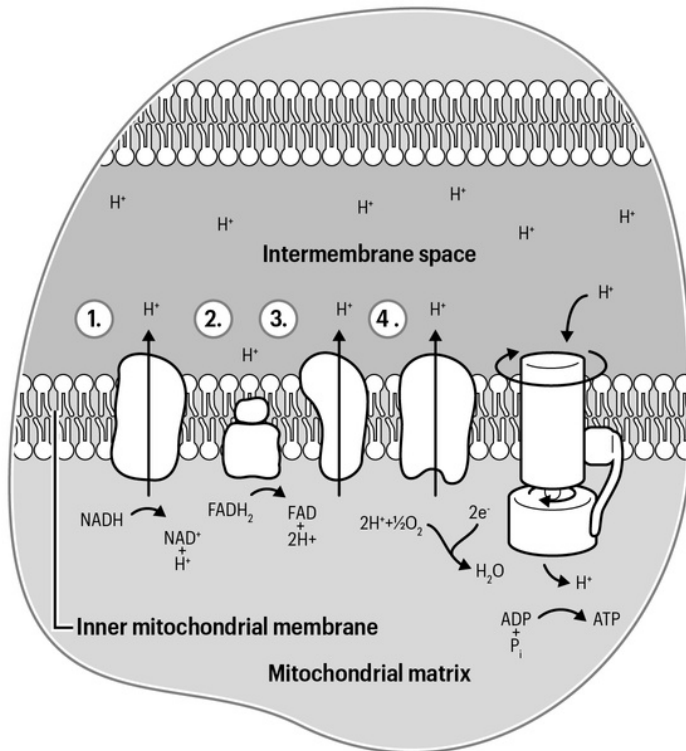
Chapter 6, Fig. 4: Pyruvate



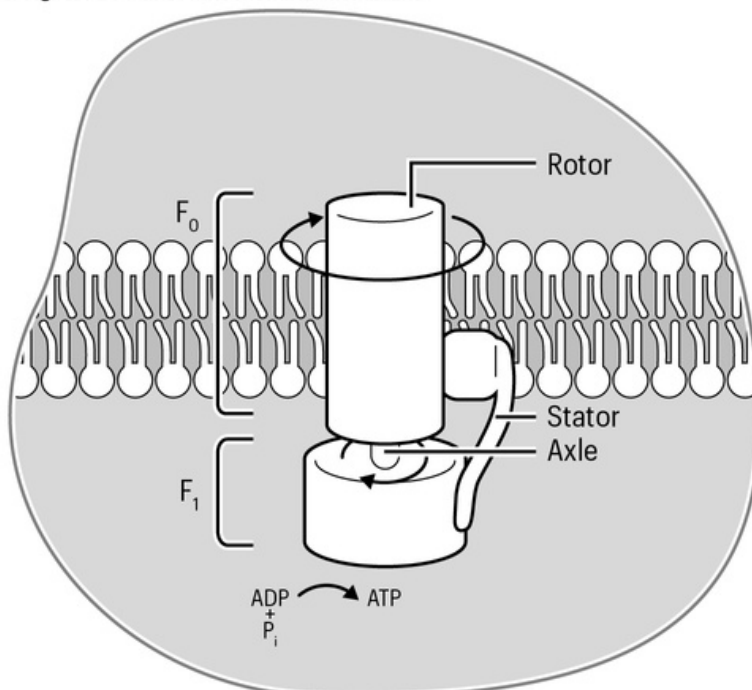
Pyruvate

Chapter 6: The Dark Side of Progress

Chapter 6, Fig. 5: Electron Transport Chain

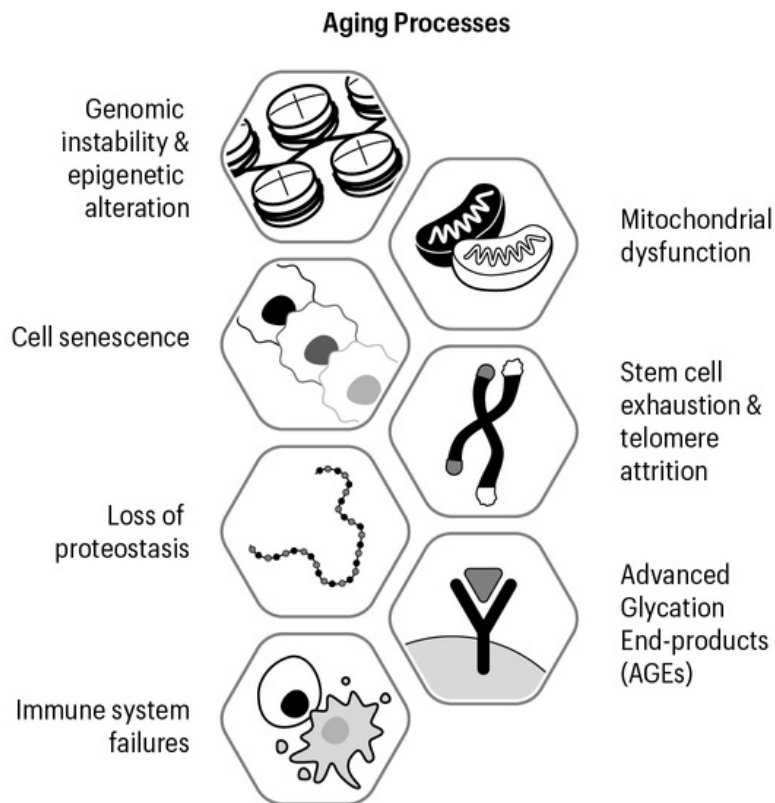


Chapter 6, Fig. 6: F₀F₁ Inner mitochondrial membrane

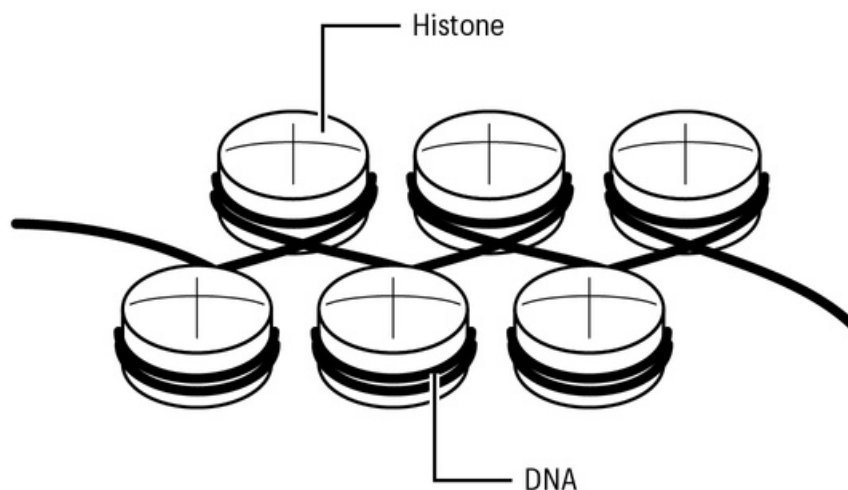


Chapter 7: Why Do We Age and Die?

Chapter 7, Fig. 1: Aging Process Chart

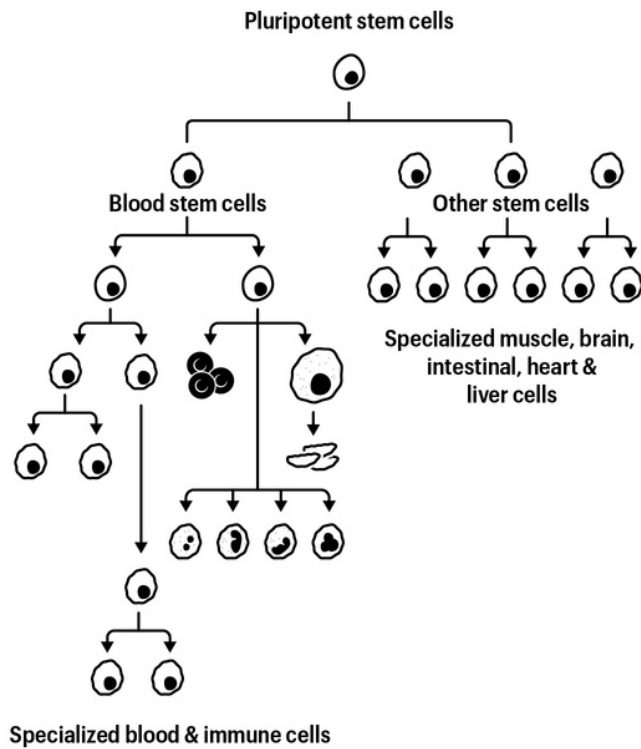


Chapter 7 , Fig. 2: DNA looped around histones

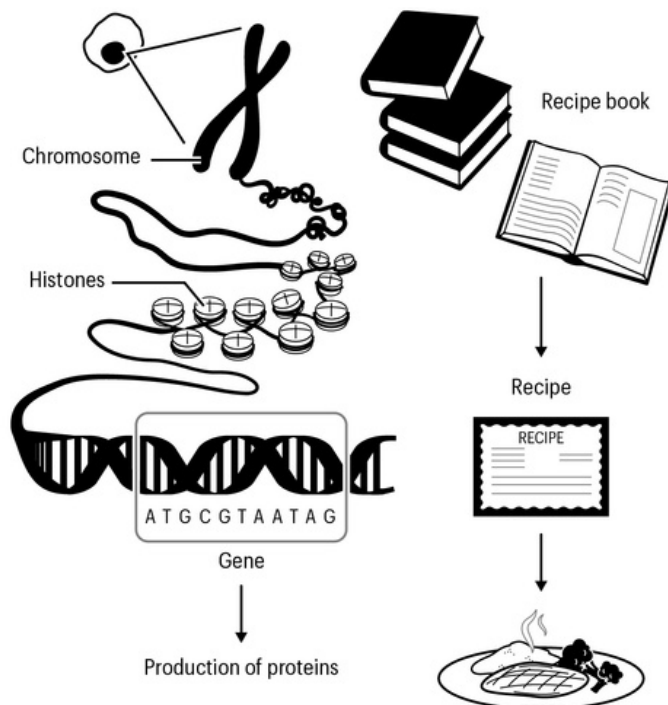


Chapter 7: Why Do We Age and Die?

Chapter 7, Fig. 3: Adult Blood Stem Cells/Other stem cells

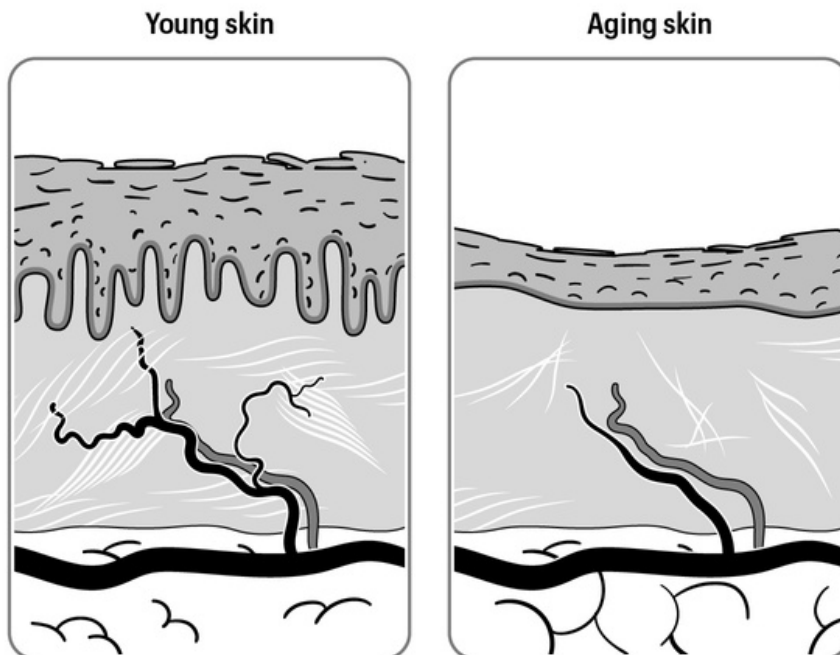


Chapter 8, Fig. 4: Big picture genetic overview

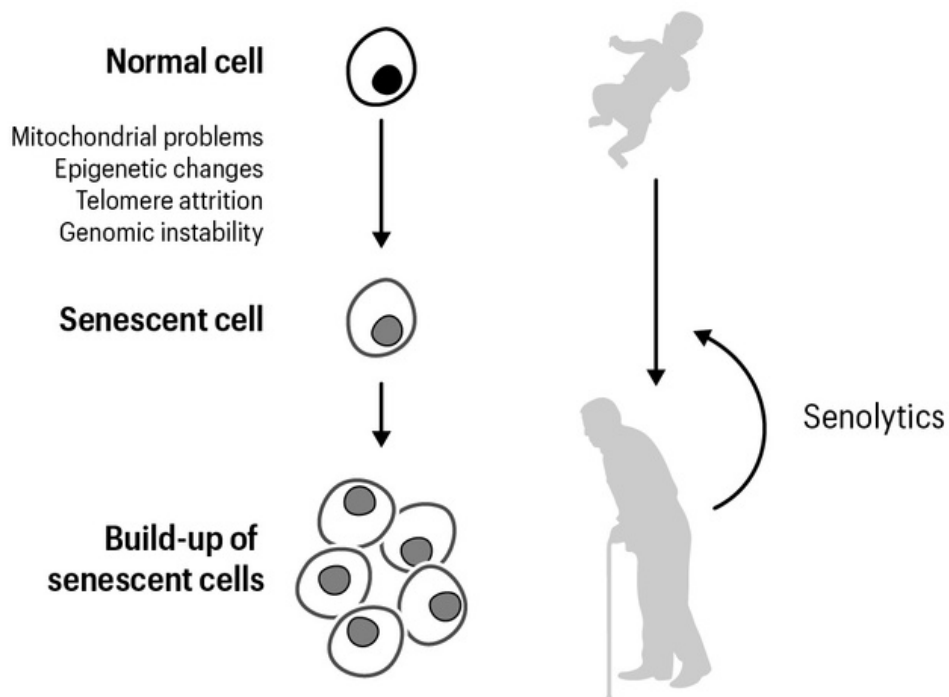


Chapter 7: Why Do We Age and Die?

Chapter 8, Fig. 5: Cellular structure of old and young tissue

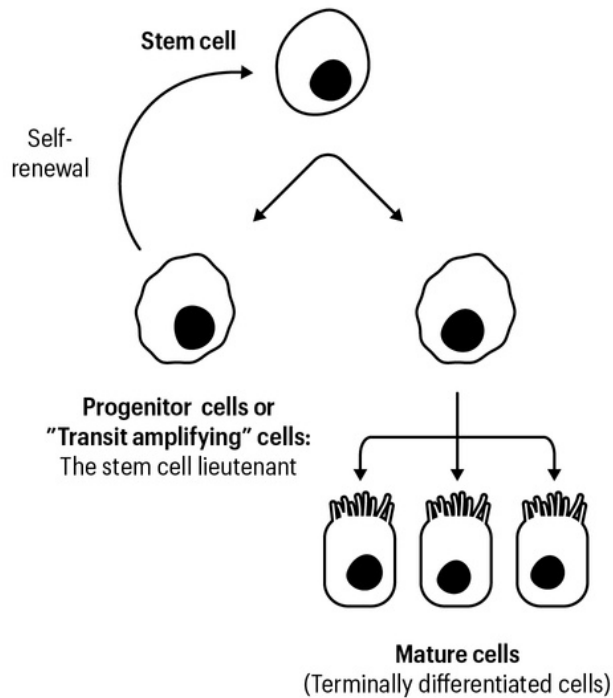


Chapter 7, Fig. 6: Senescent cell: age-associated disease

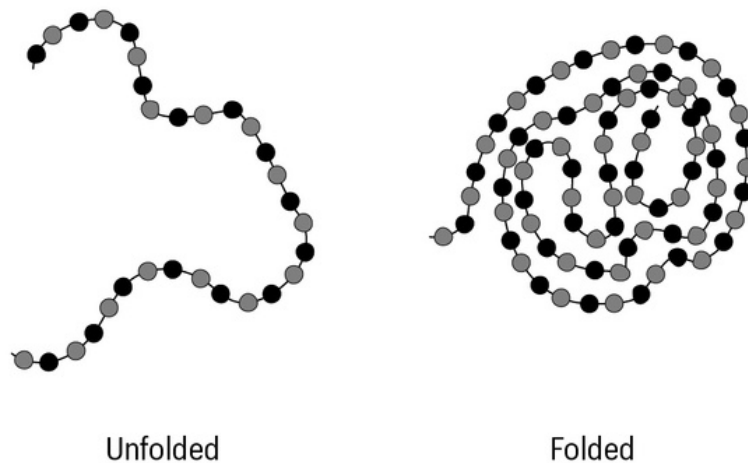


Chapter 7: Why Do We Age and Die?

Chapter 7, Fig. 7: Stem Cell to Mature Cell

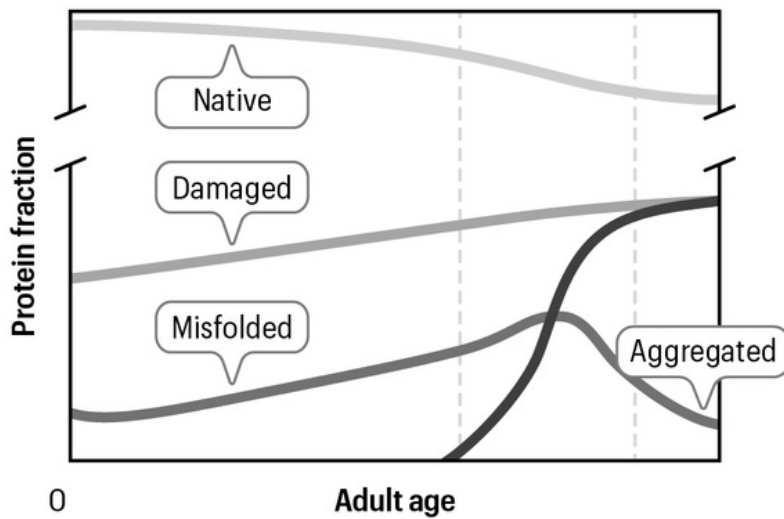


Chapter 7, Fig. 8: Folded and unfolded amino acids

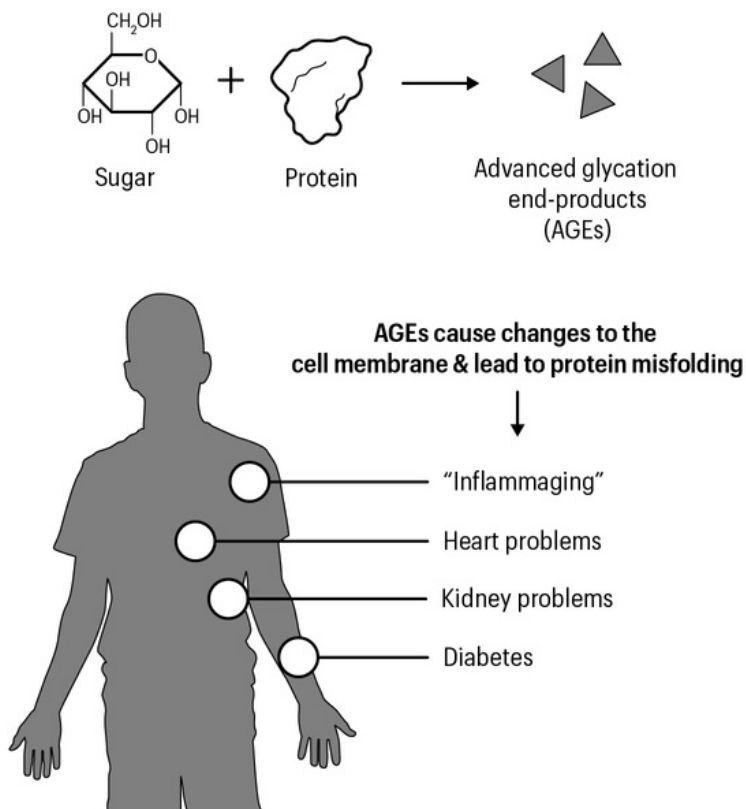


Chapter 7: Why Do We Age and Die?

Chapter 7, Fig. 9: Adult age/protein fraction

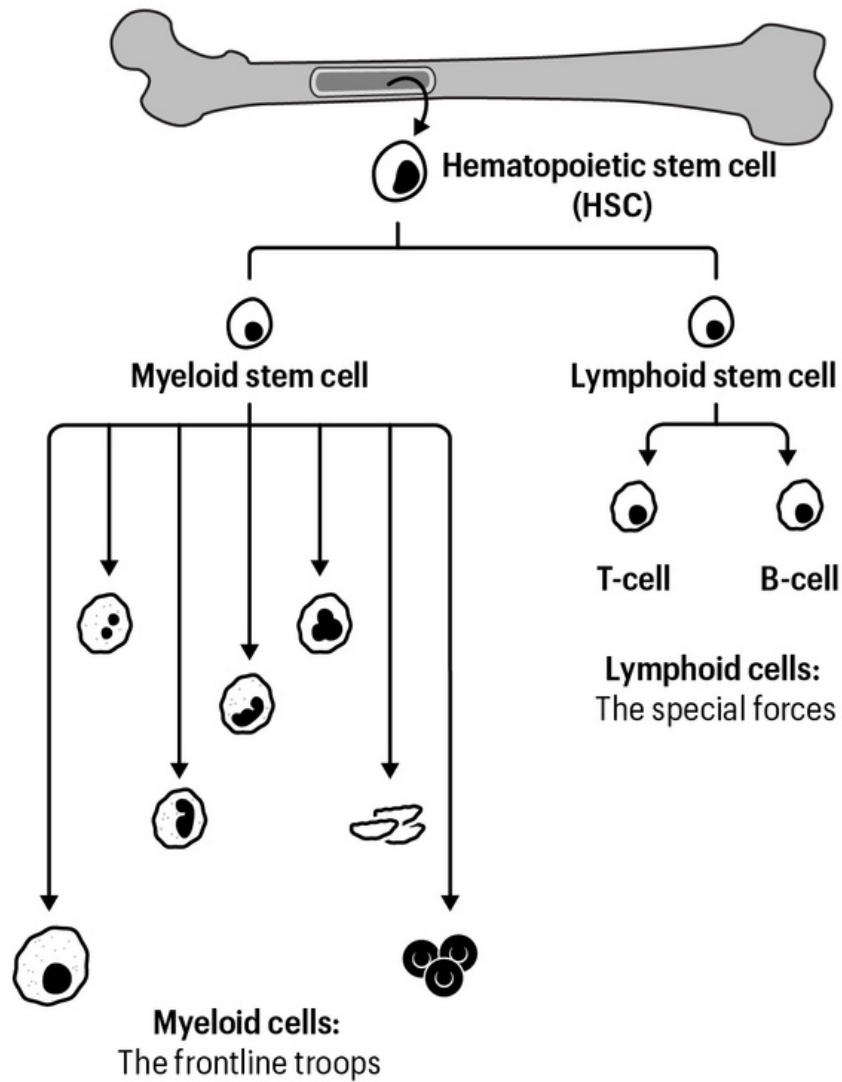


Chapter 7, Fig. 10: AGE's impact on body



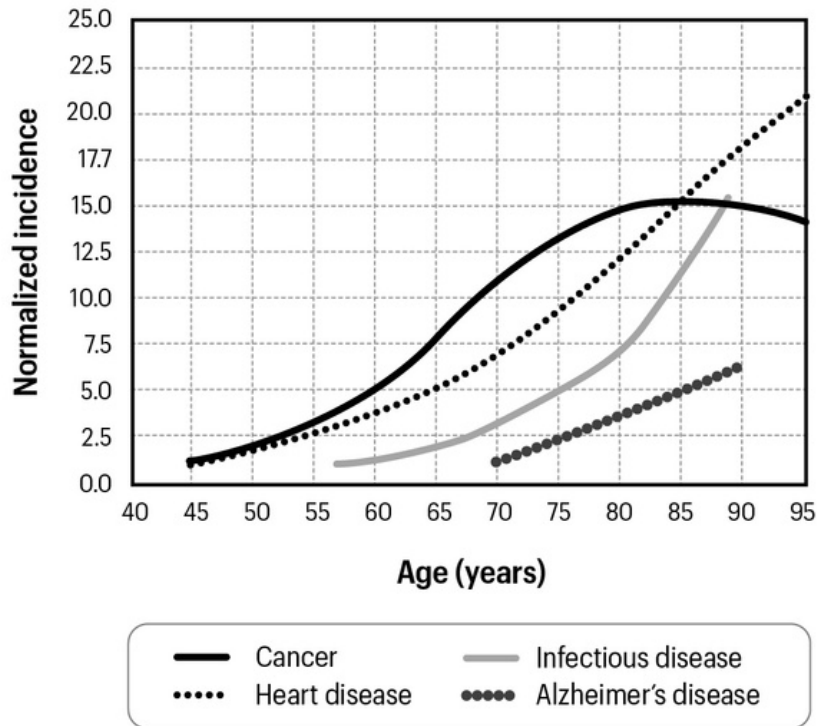
Chapter 7: Why Do We Age and Die?

Chapter 7, Fig. 11: Bone Marrow HSC

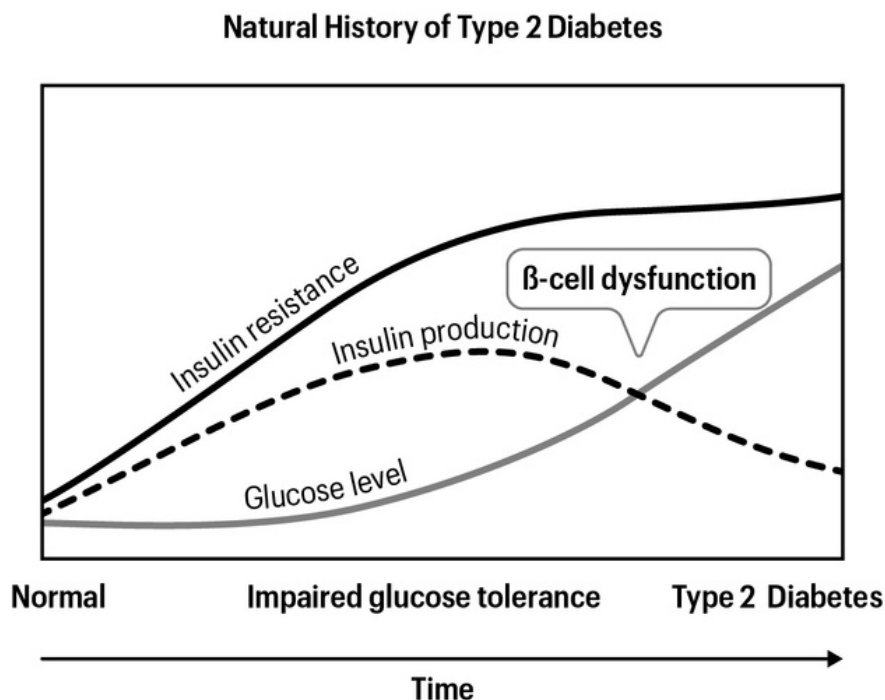


Chapter 8: Diseases of Aging

Chapter 8, Fig. 1: AAAS Chart

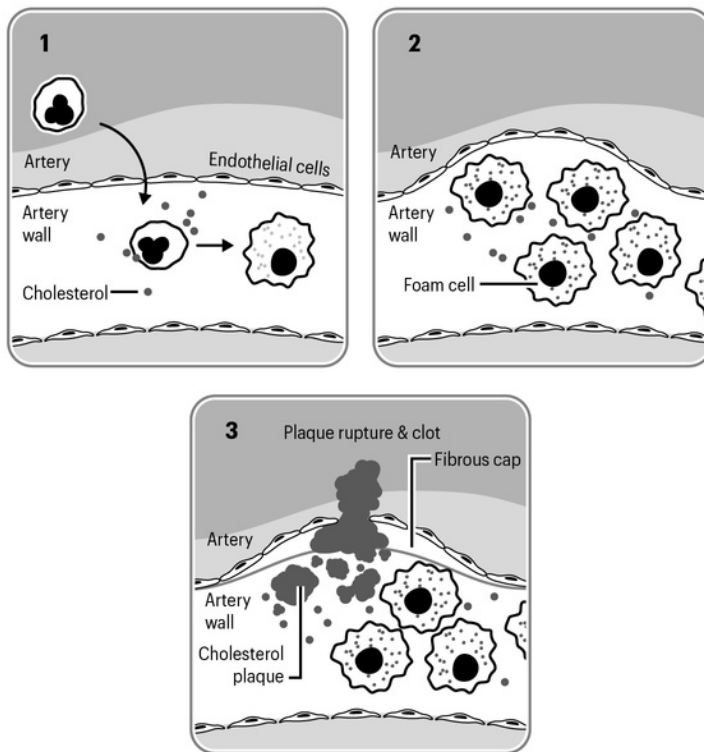


Chapter 8, Fig. 2: Natural History of Type 2 Diabetes

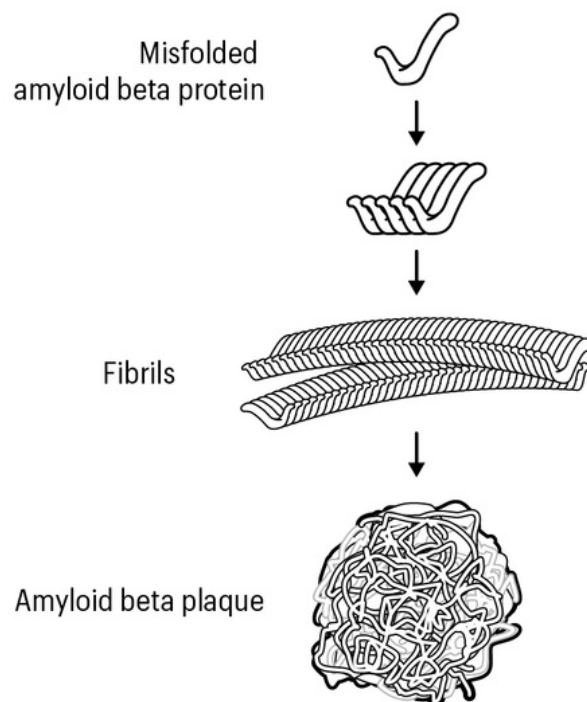


Chapter 8: Diseases of Aging

Chapter 8, Fig. 3: Vascular muscle cells

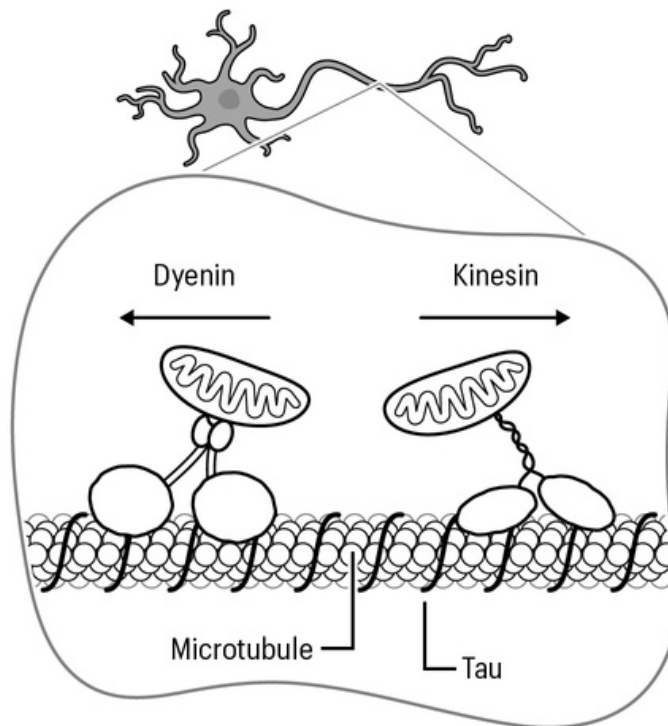


Chapter 8, Fig. 4: Amyloid beta plaque formation

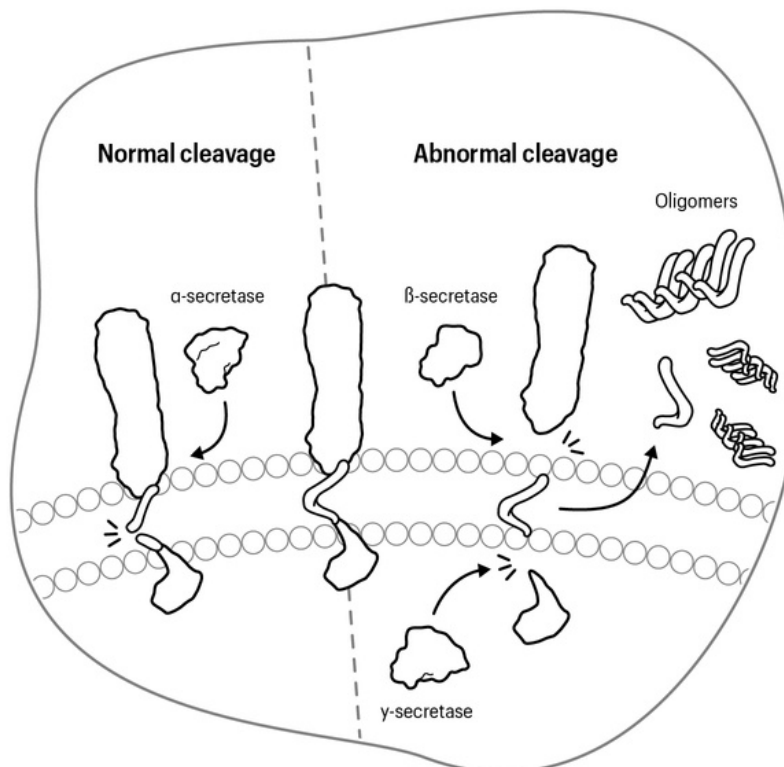


Chapter 8: Diseases of Aging

Chapter 8, Fig. 4: Tau

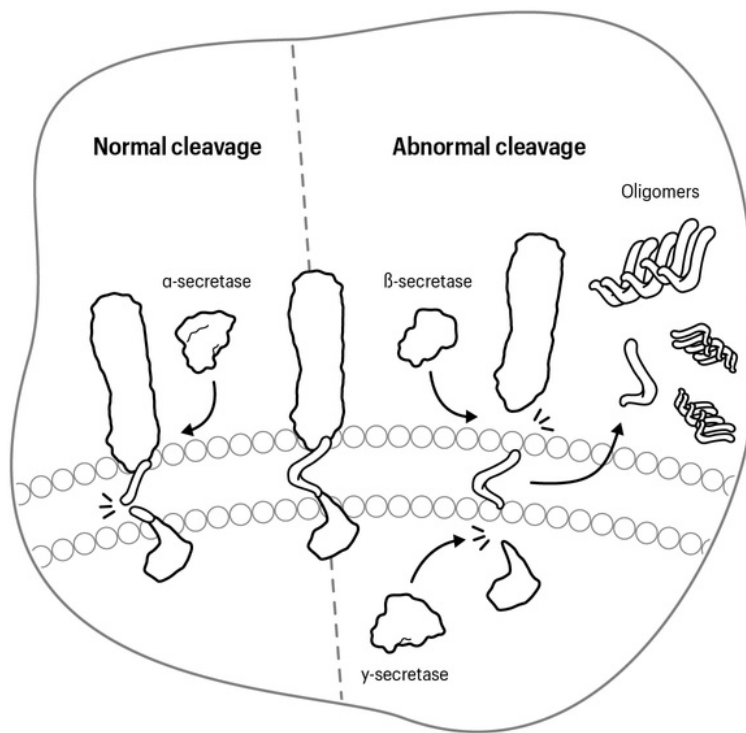


Chapter 8, Fig. 4-PSEN1 PSEN2

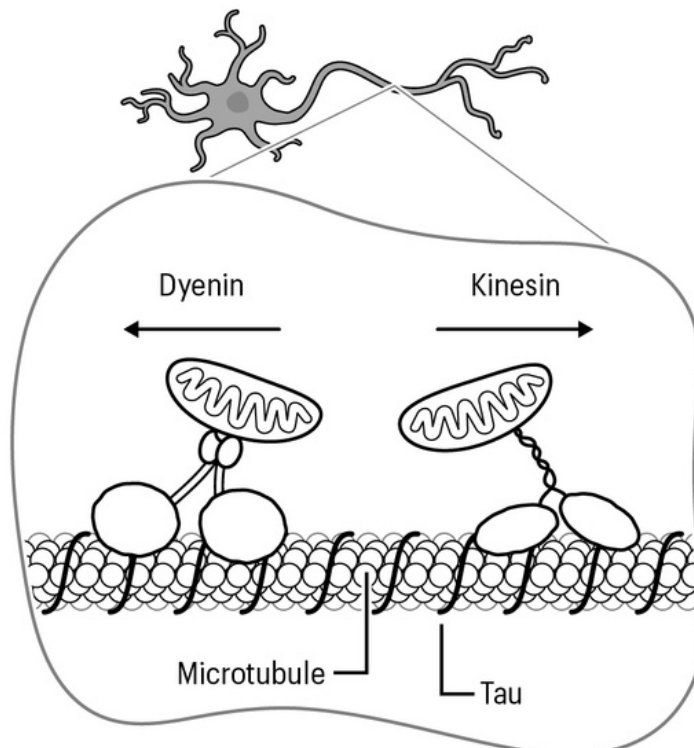


Chapter 8: Diseases of Aging

Chapter 8, Fig. 4-PSEN1 PSEN2

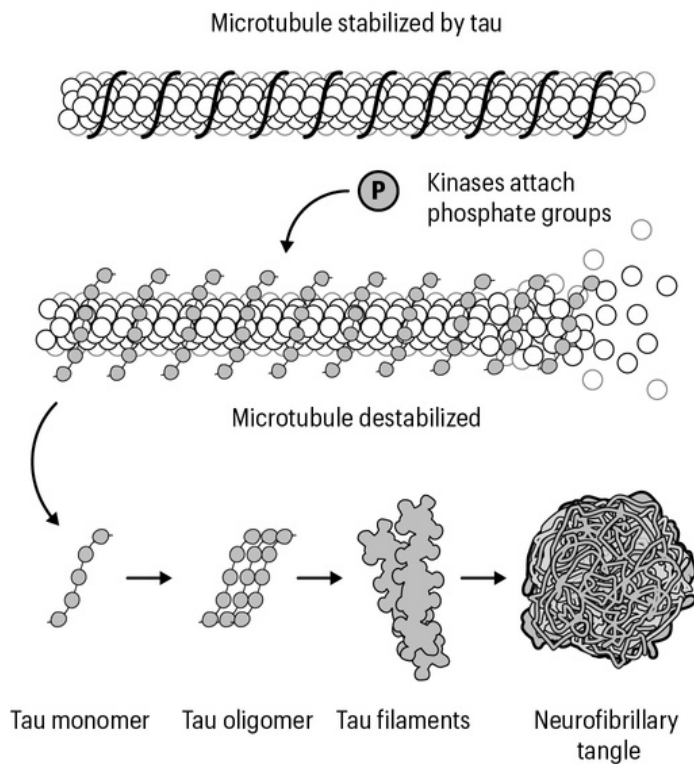


Chapter 8, Fig. 4: Tau

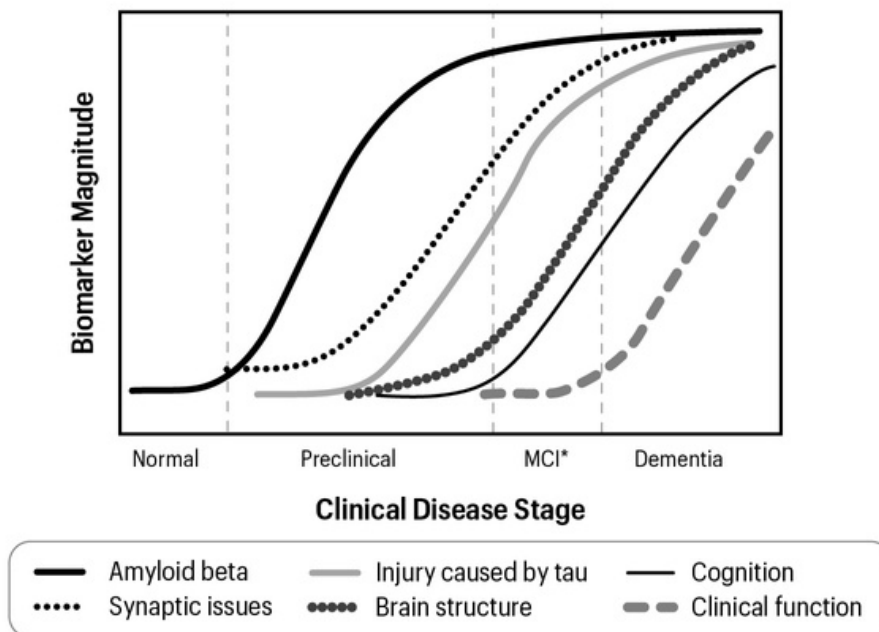


Chapter 8: Diseases of Aging

Chapter 8, Fig. 7: Alzheimer's sequence



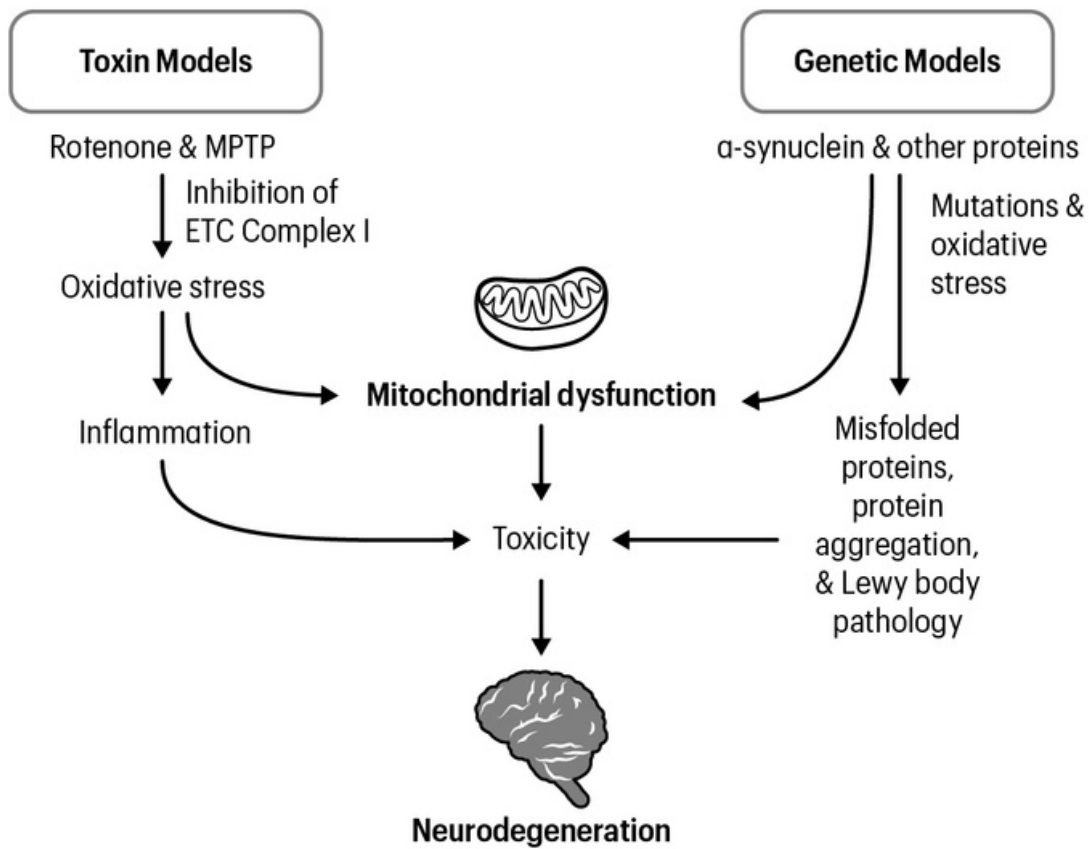
Chapter 8, Fig. 8: Alzheimer's disease stage



*Mild cognitive impairment

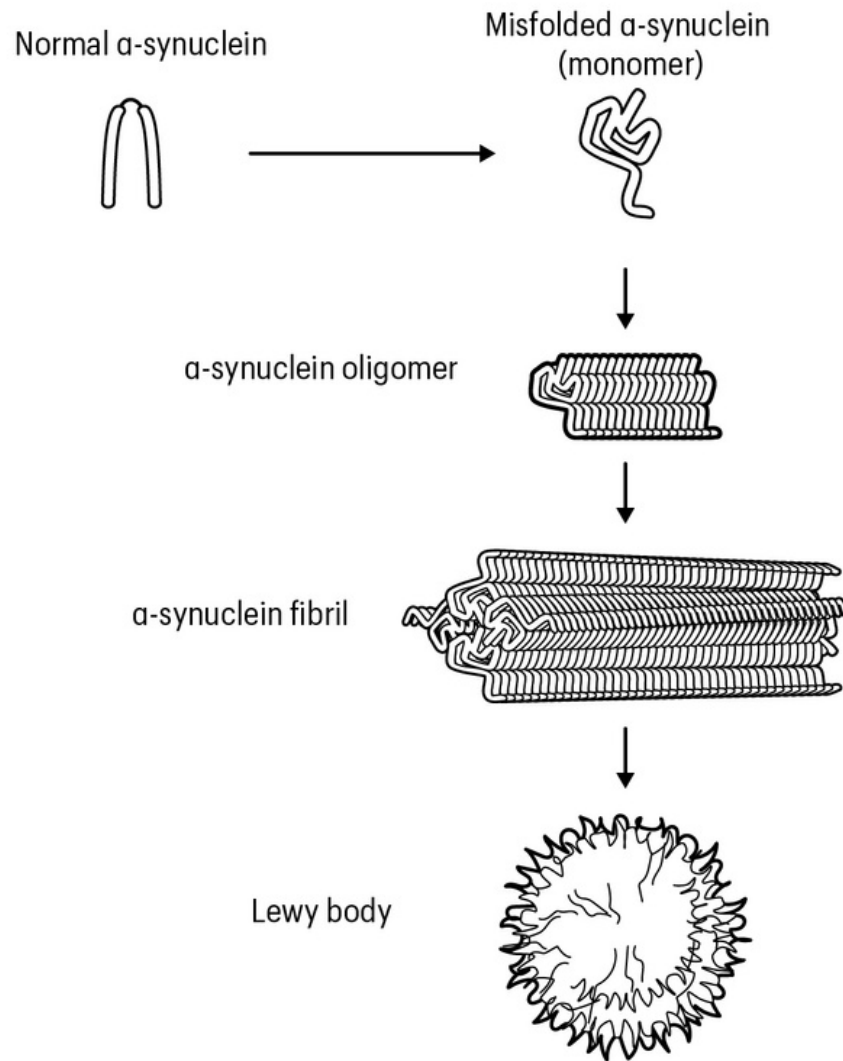
Chapter 8: Diseases of Aging

Chapter 8, Fig. 9: Toxin vs genetic models



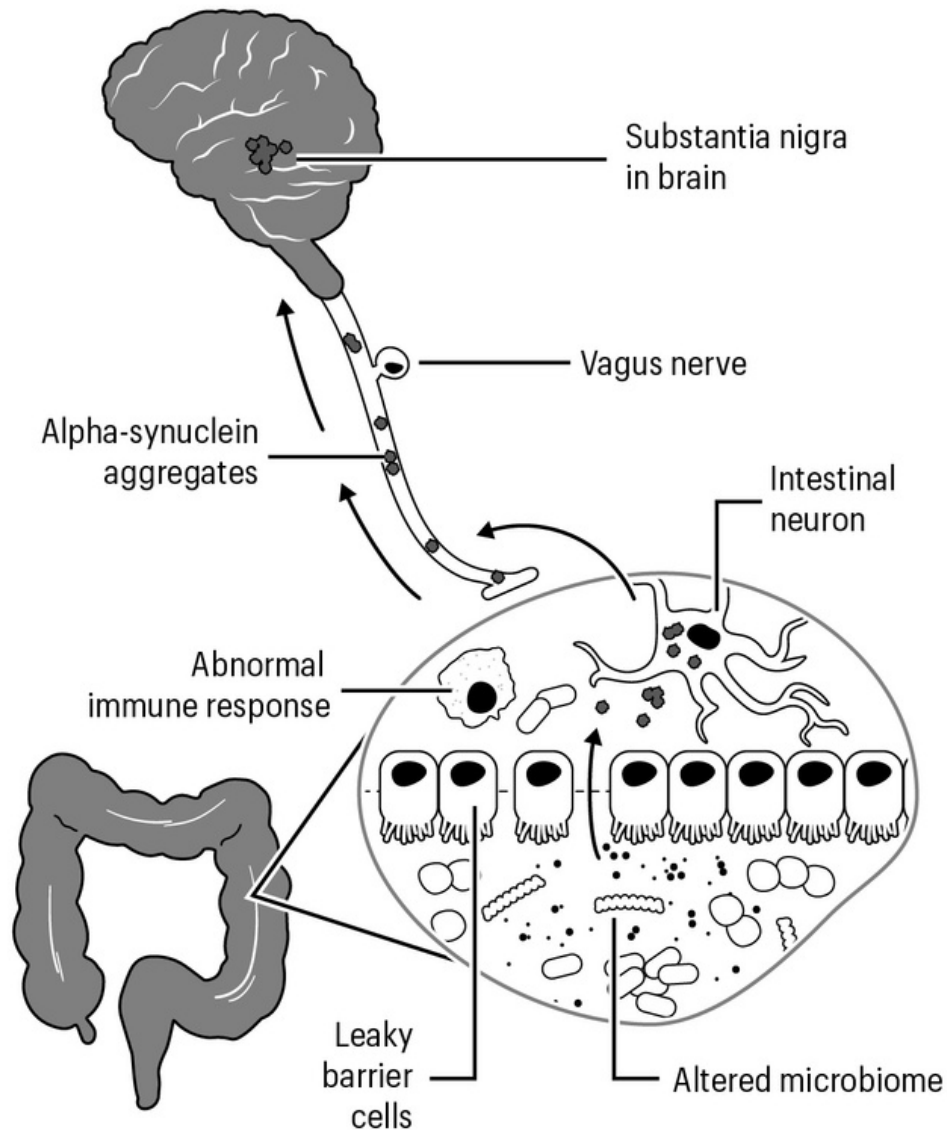
Chapter 8: Diseases of Aging

Chapter 8, Fig. 10: alpha synuclein



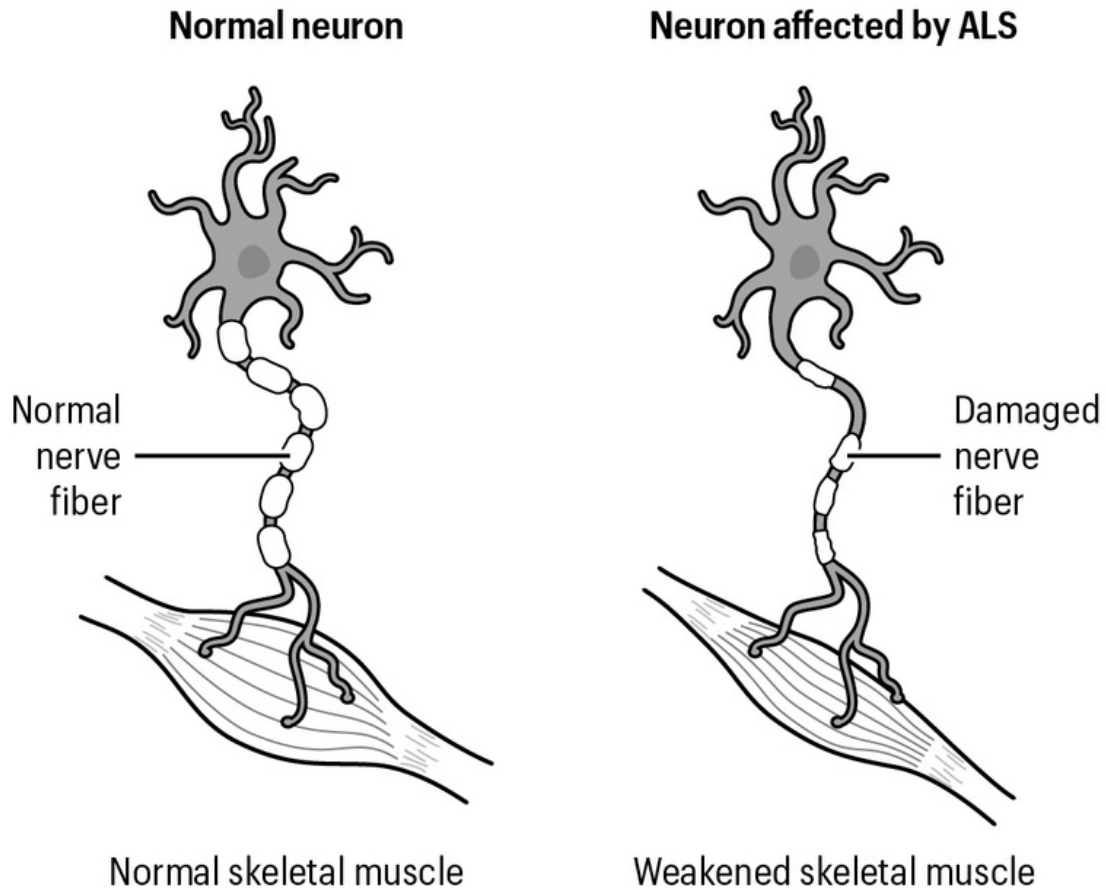
Chapter 8: Diseases of Aging

Chapter 8, Fig. 11: Disrupted immune response



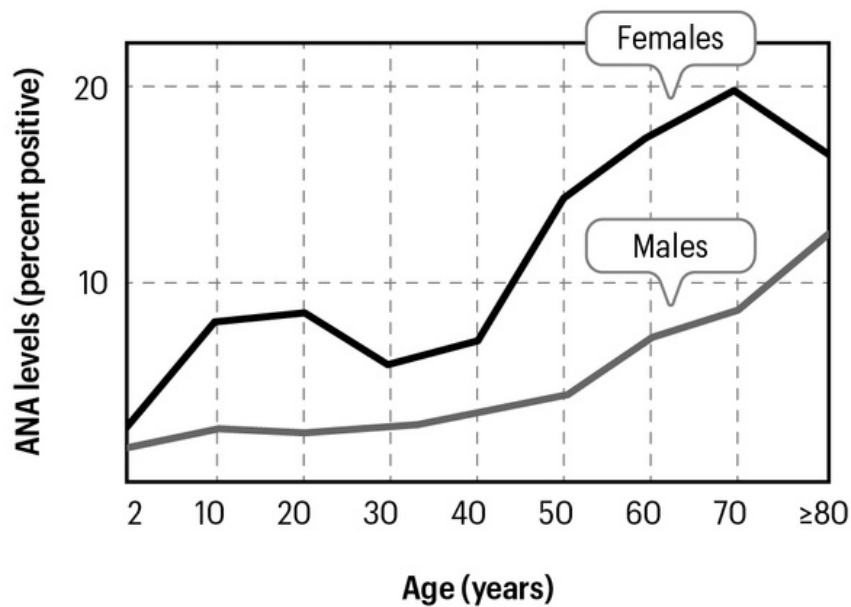
Chapter 8: Diseases of Aging

Chapter 8, Fig. 12: ALS

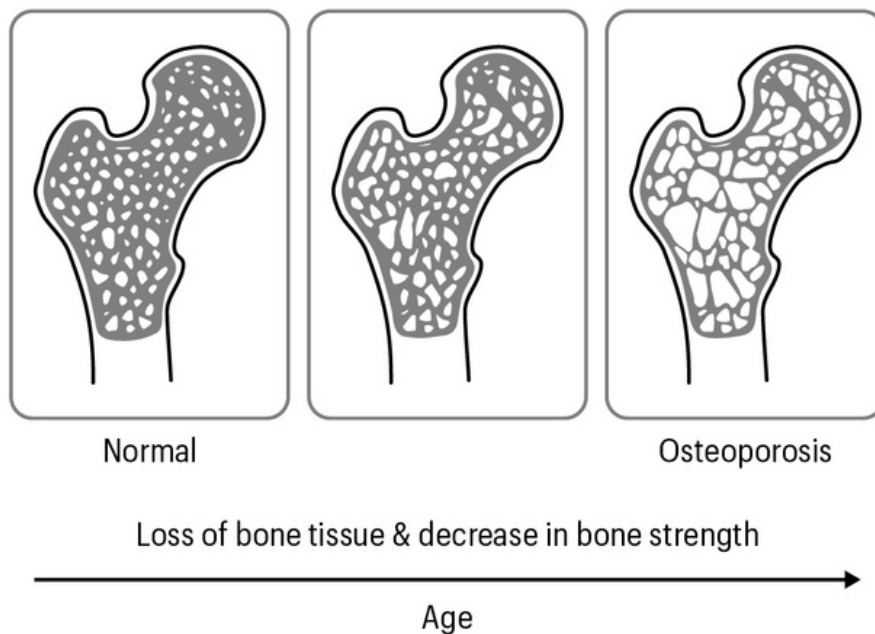


Chapter 8: Diseases of Aging

Chapter 8, Fig. 13: Age graph, Antinuclear antibodies

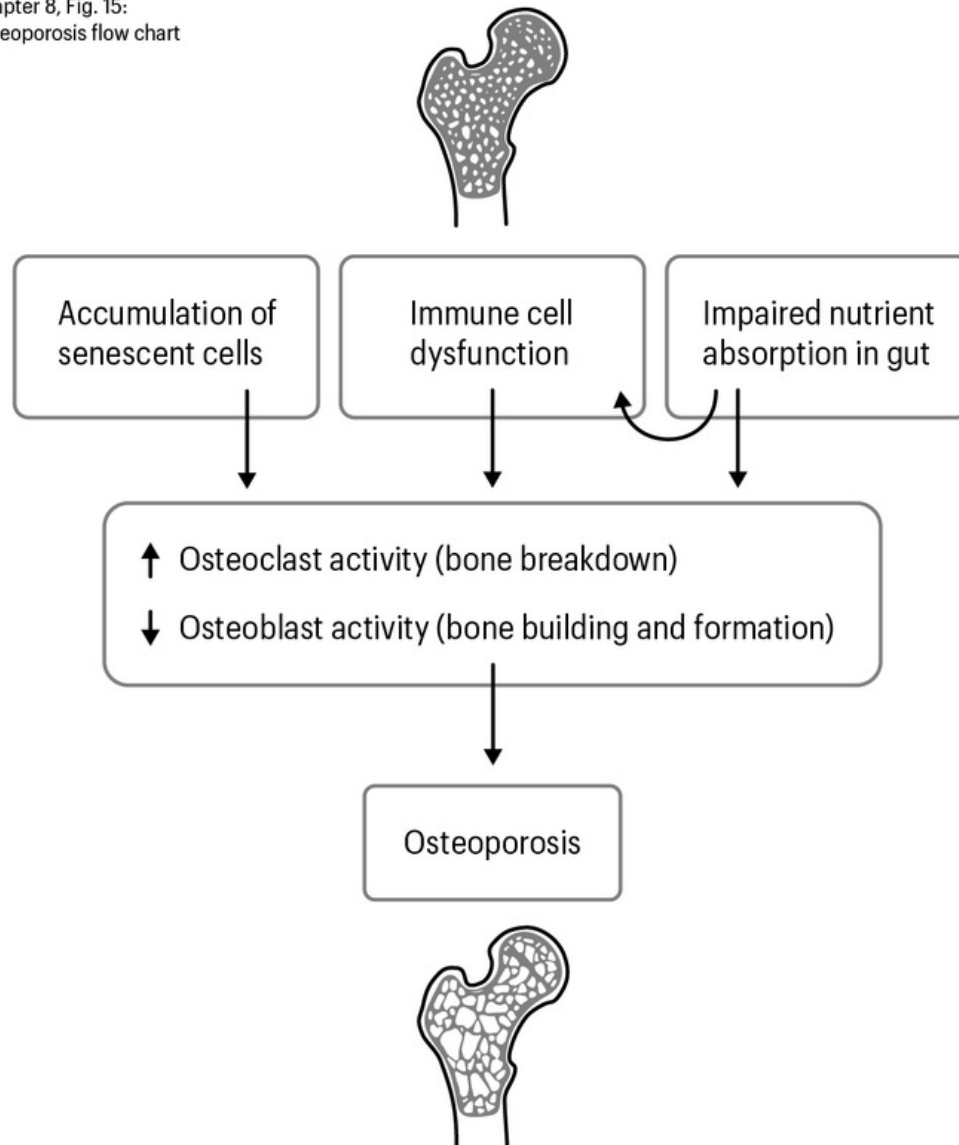


Chapter 8, Fig. 14: Osteoporosis



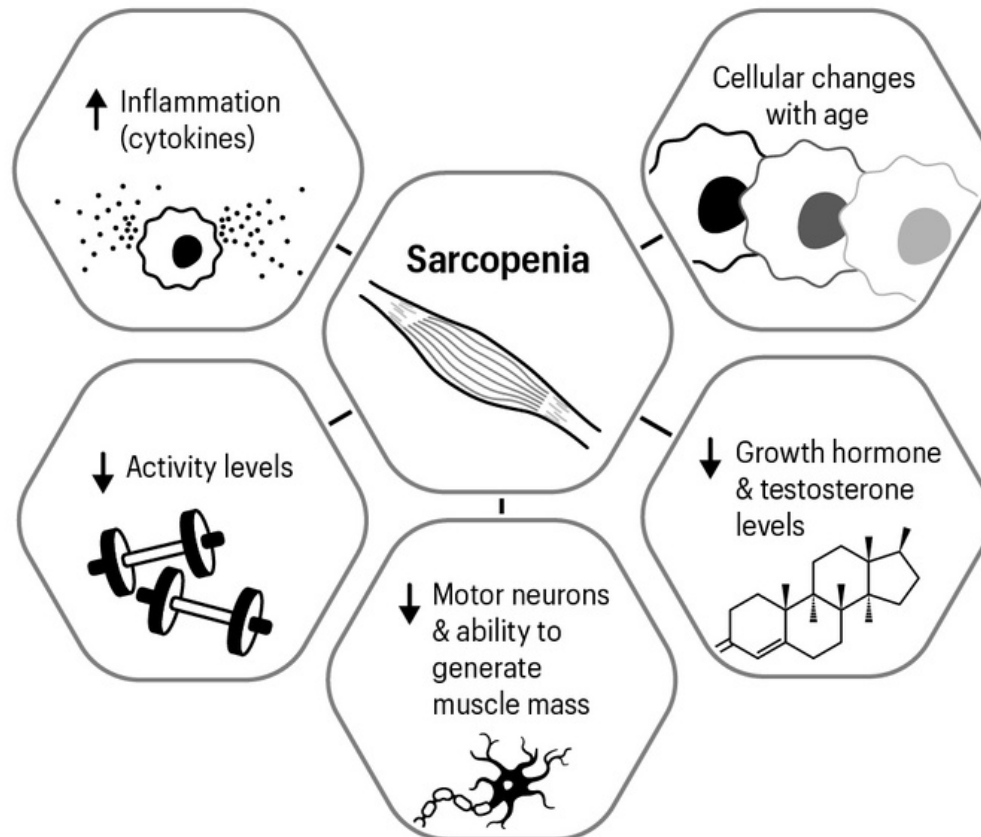
Chapter 8: Diseases of Aging

Chapter 8, Fig. 15:
Osteoporosis flow chart



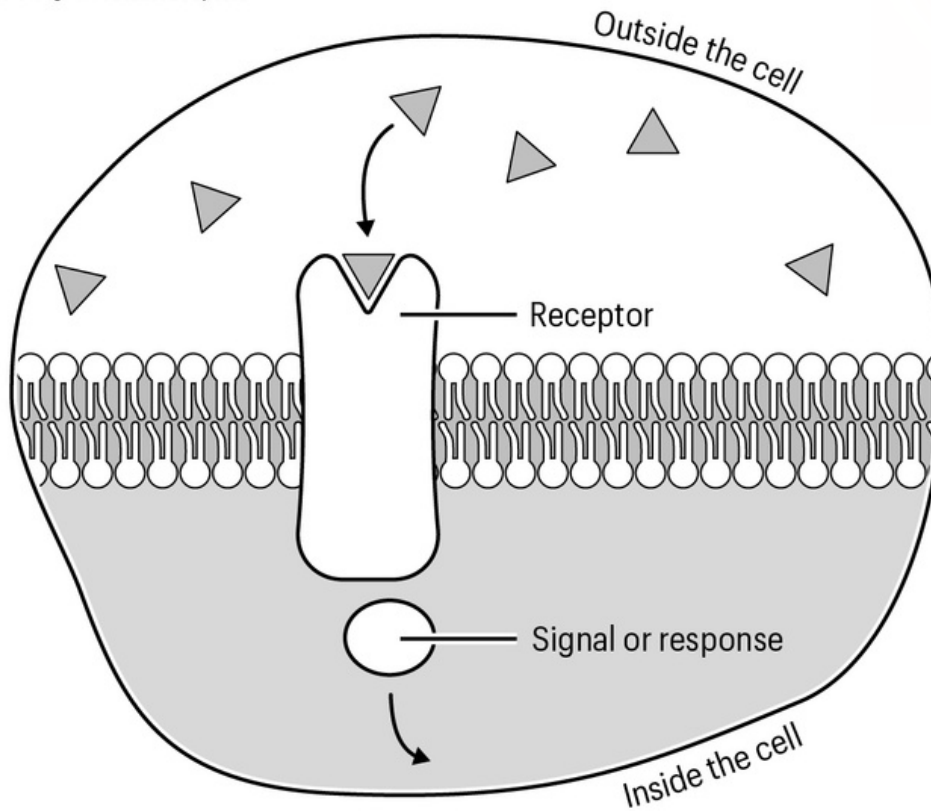
Chapter 8: Diseases of Aging

Chapter 8, Fig. 16: Sarcopenia chart



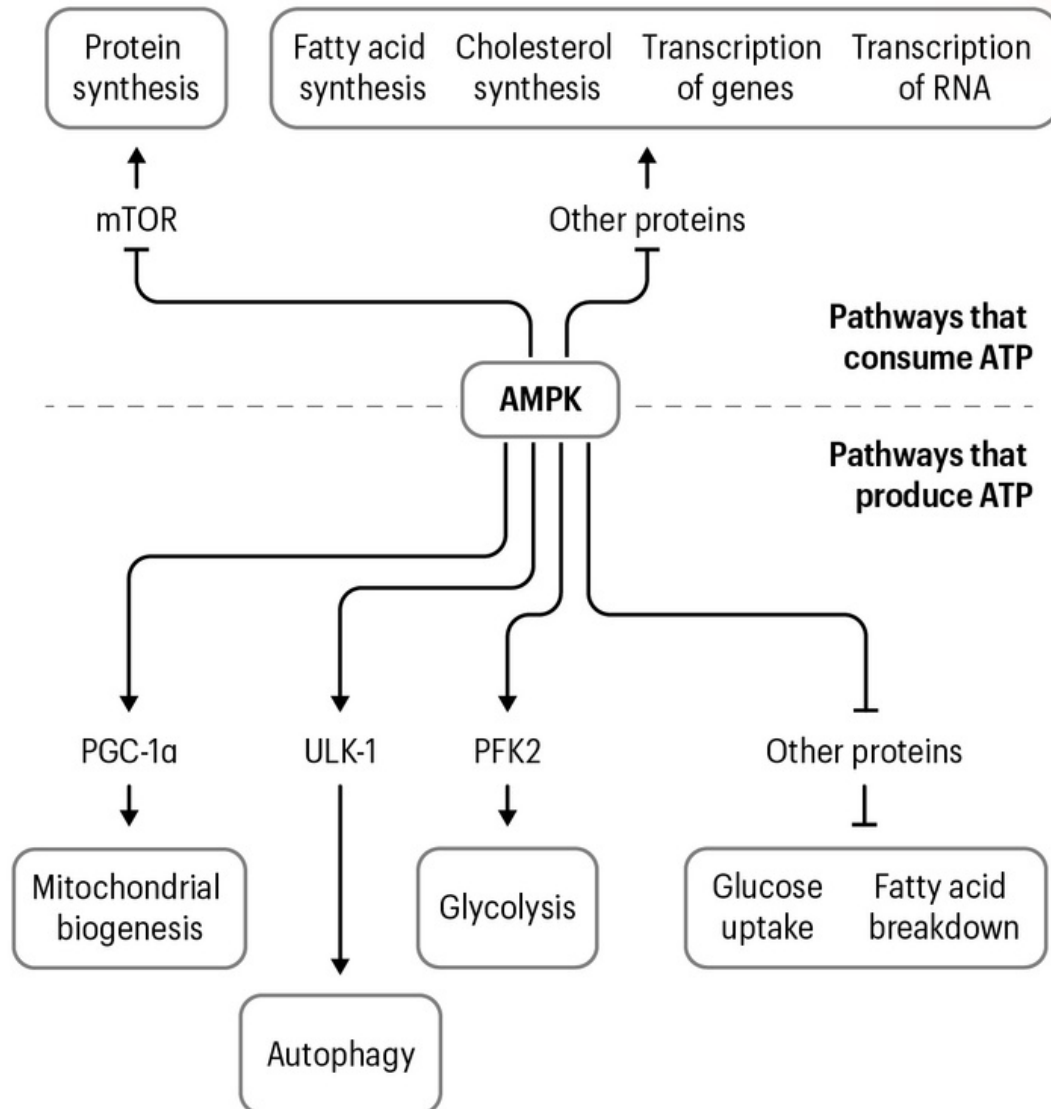
Chapter 9: Cell Signaling

Chapter 9, Fig. 1: Protein receptors



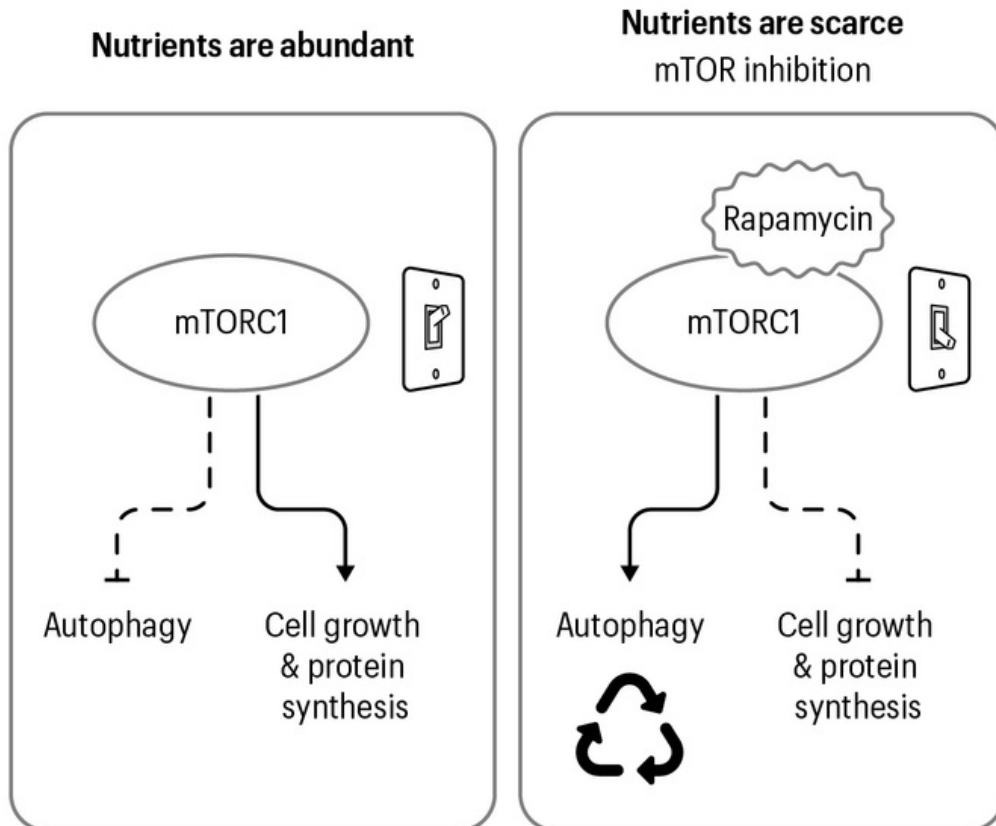
Chapter 9: Cell Signaling

Chapter 9, Fig. 2: AMPK



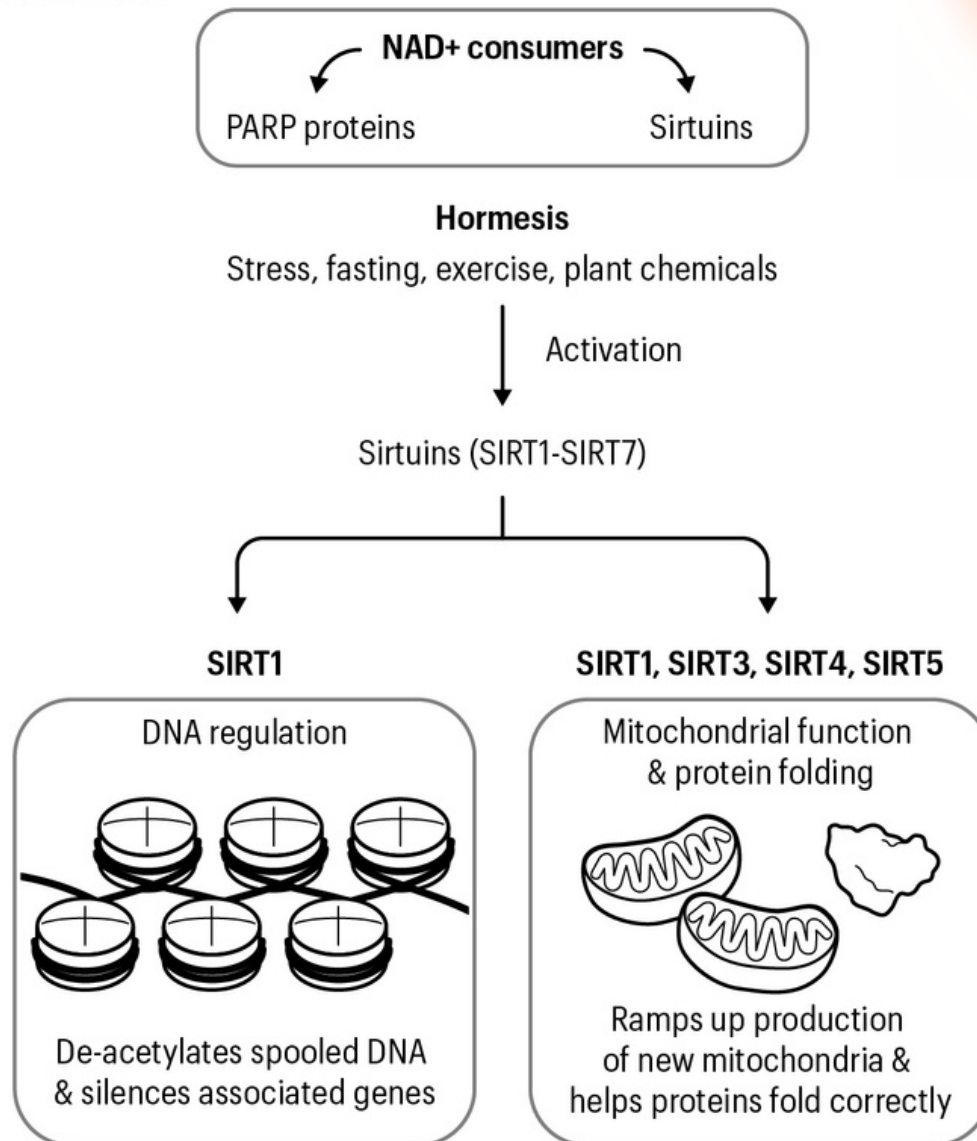
Chapter 9: Cell Signaling

Chapter 9, Fig. 3: Autophagy



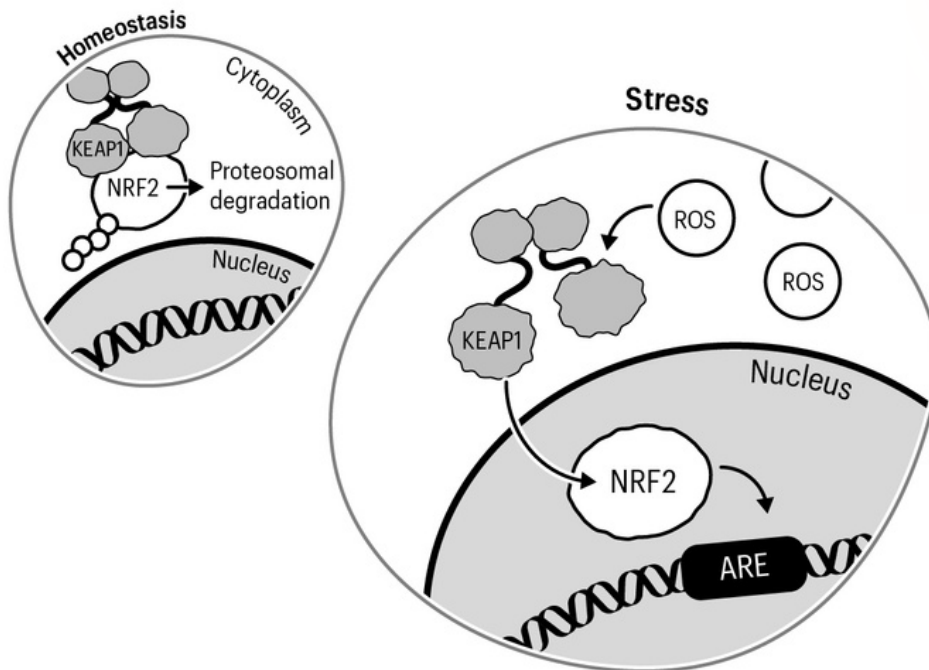
Chapter 9: Cell Signaling

Chapter 9, Fig. 4: Sirtuins & stress

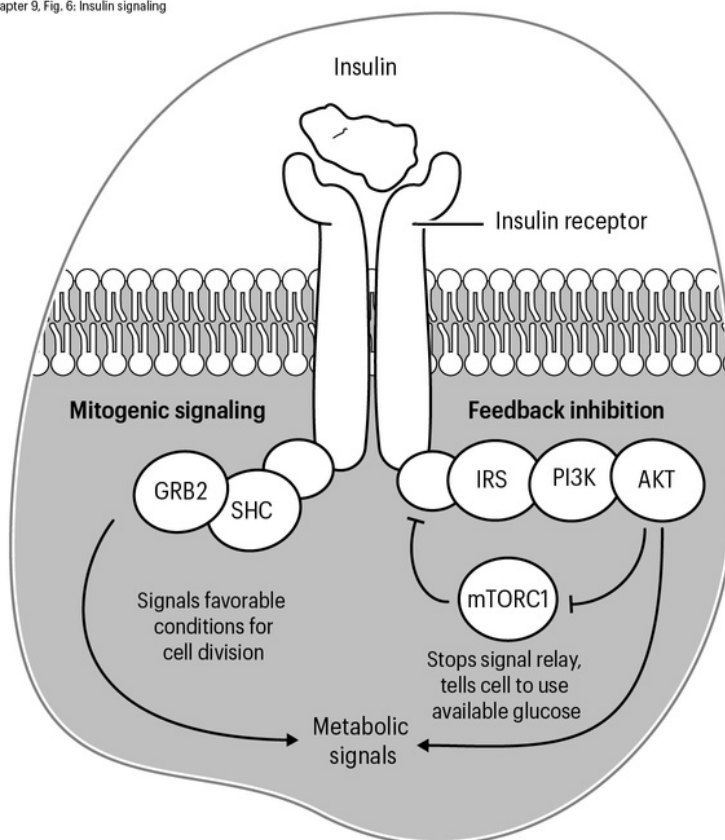


Chapter 9: Cell Signaling

Chapter 9, Fig. 5: NRF2

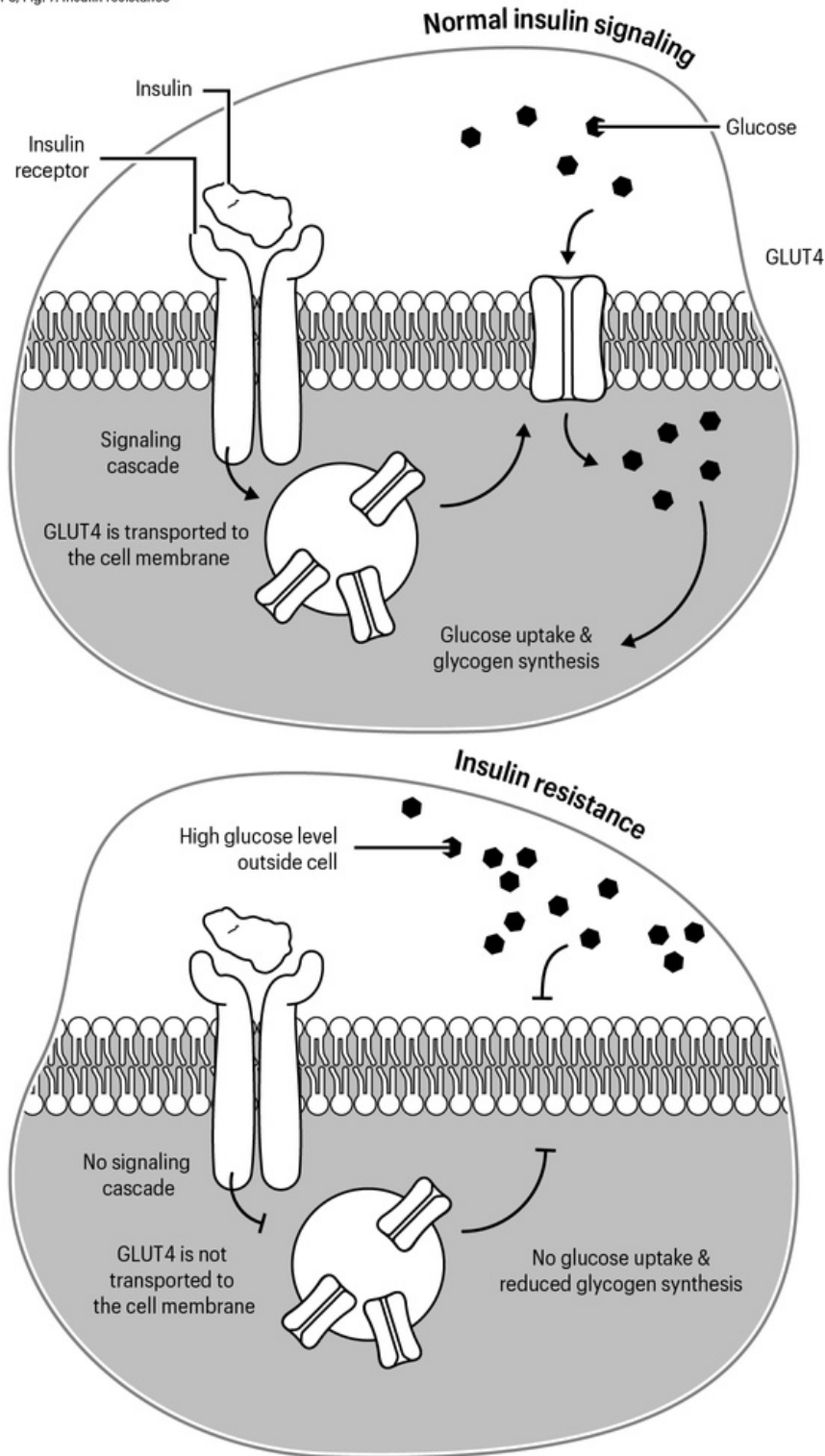


Chapter 9, Fig. 6: Insulin signaling



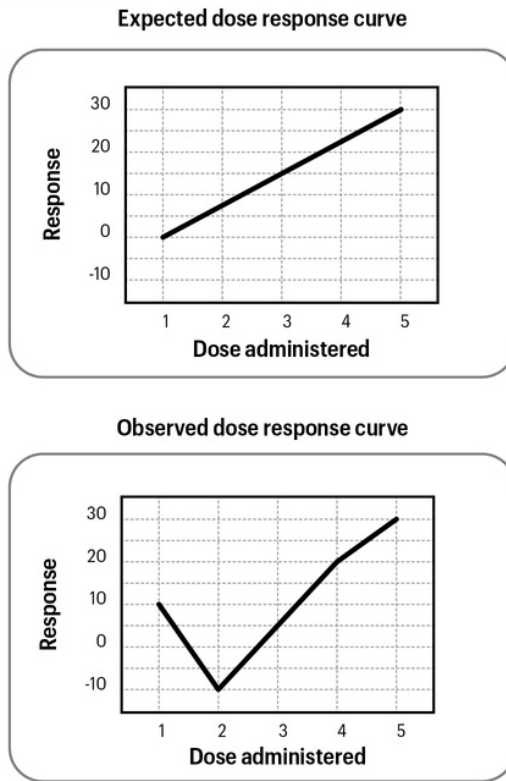
Chapter 9: Cell Signaling

Chapter 9, Fig. 7: Insulin resistance

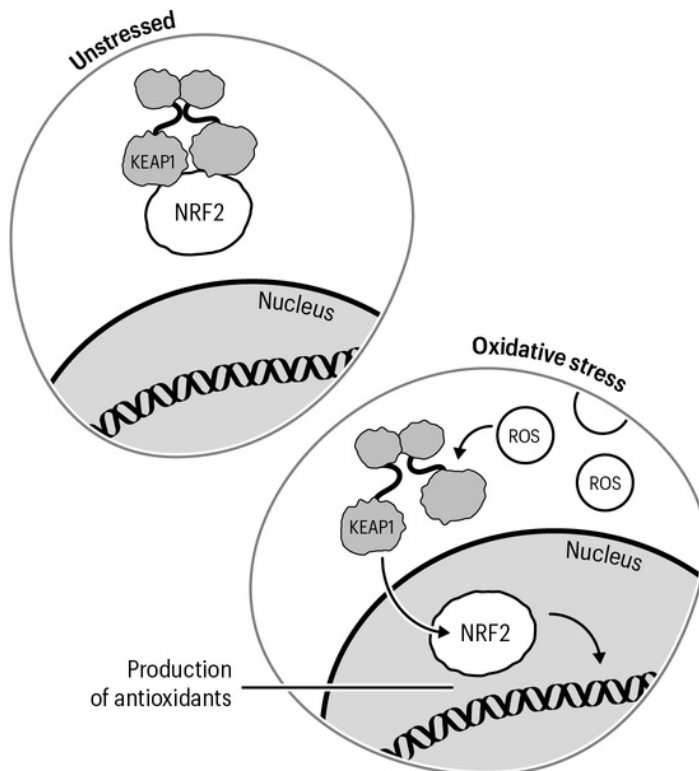


Chapter 10: A Secret Program

Chapter 10, Fig. 1: Hormesis/dose response curves

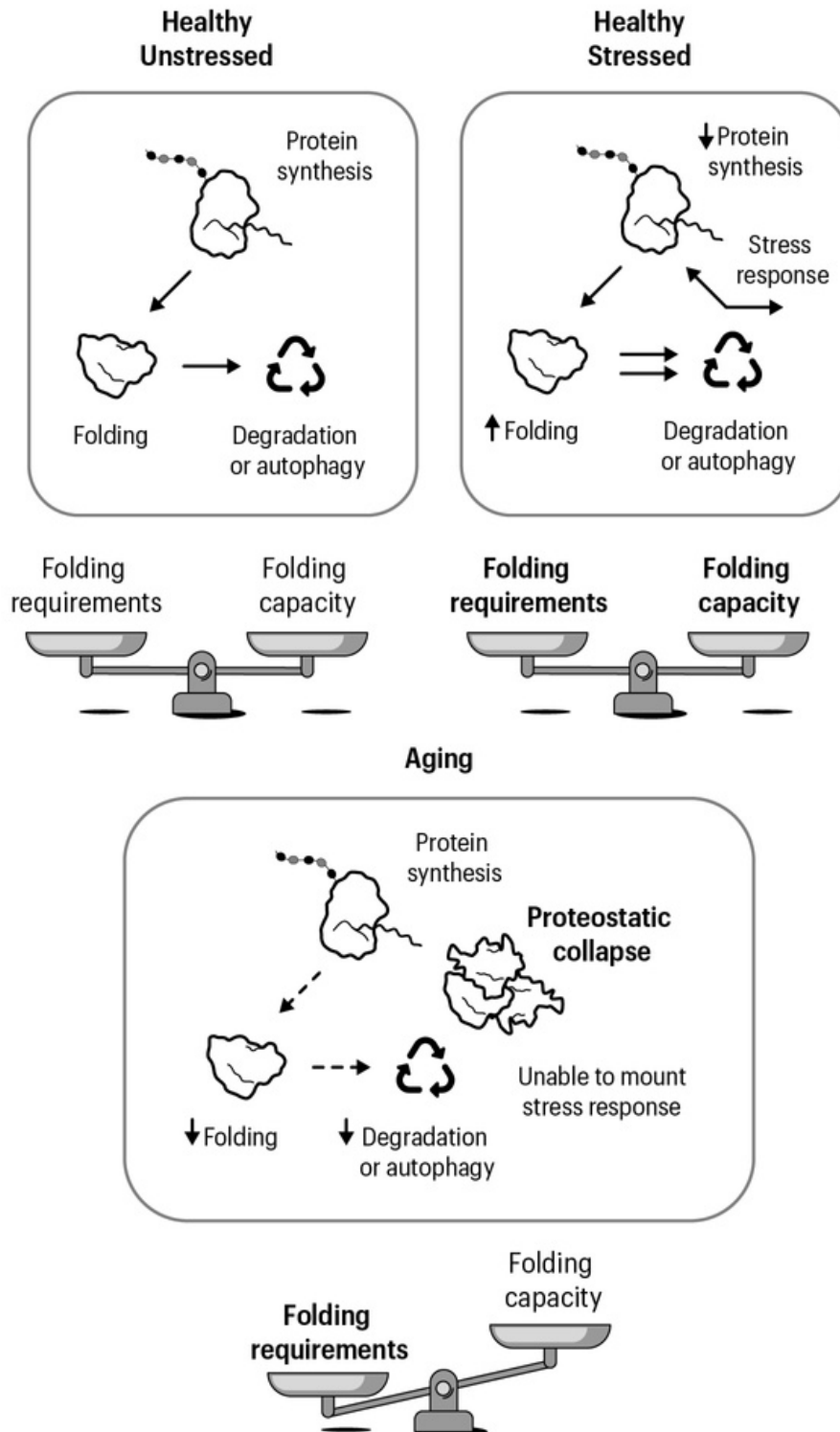


Chapter 10, Fig. 2: Oxidative Stress



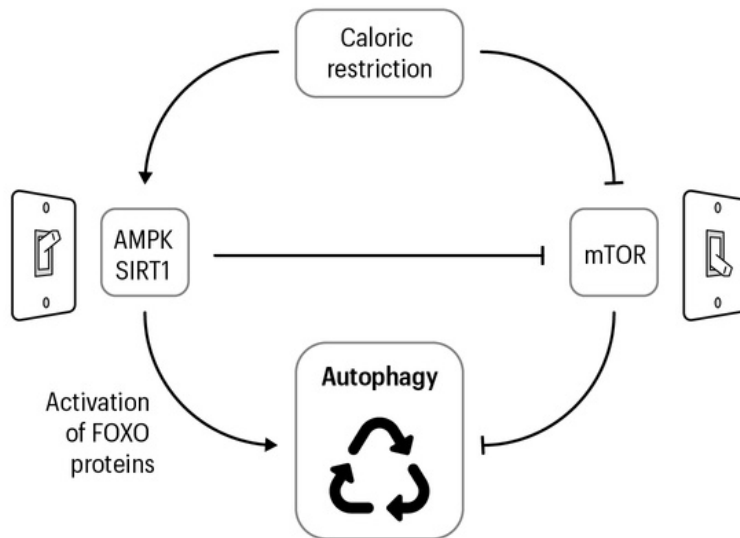
Chapter 10: A Secret Program

Chapter 10, Fig. 3: Misfolded proteins with age

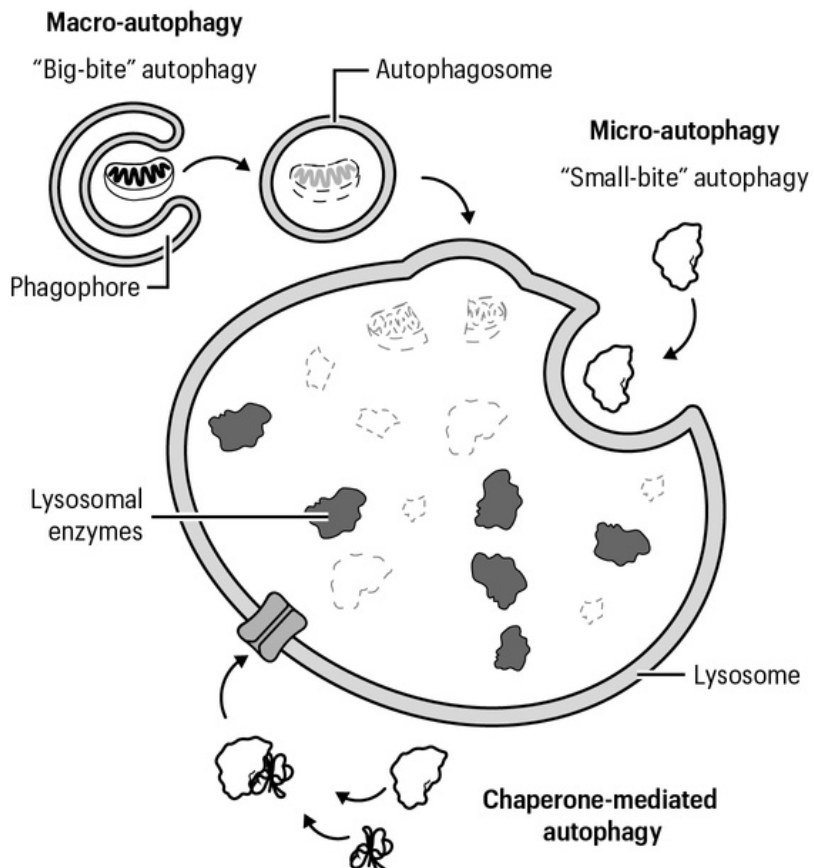


Chapter 11: Autophagy

Chapter 11, Fig. 1: Caloric restriction

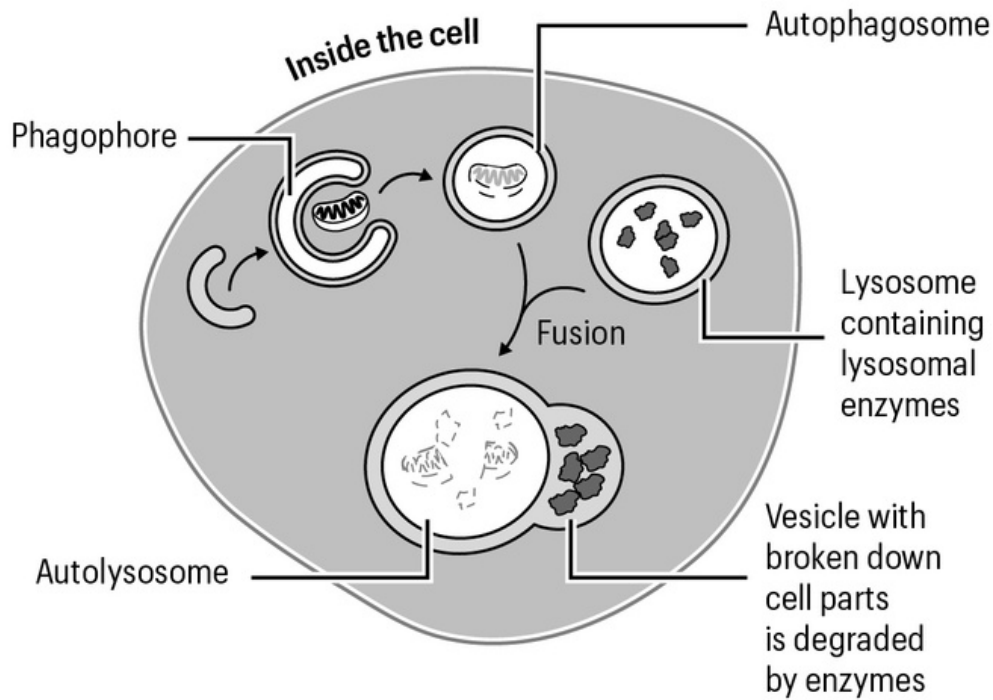


Chapter 11, Fig. 2: Macro- and micro-autophagy



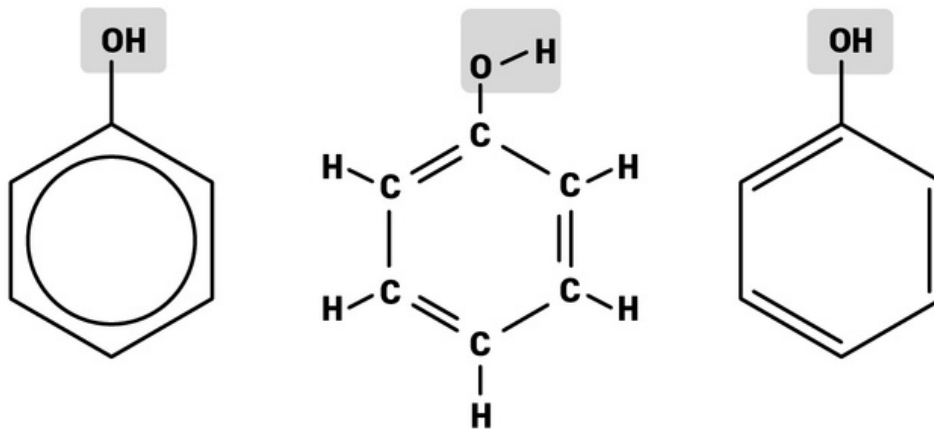
Chapter 11: Autophagy

Chapter 11, Fig. 3: Lysosomes

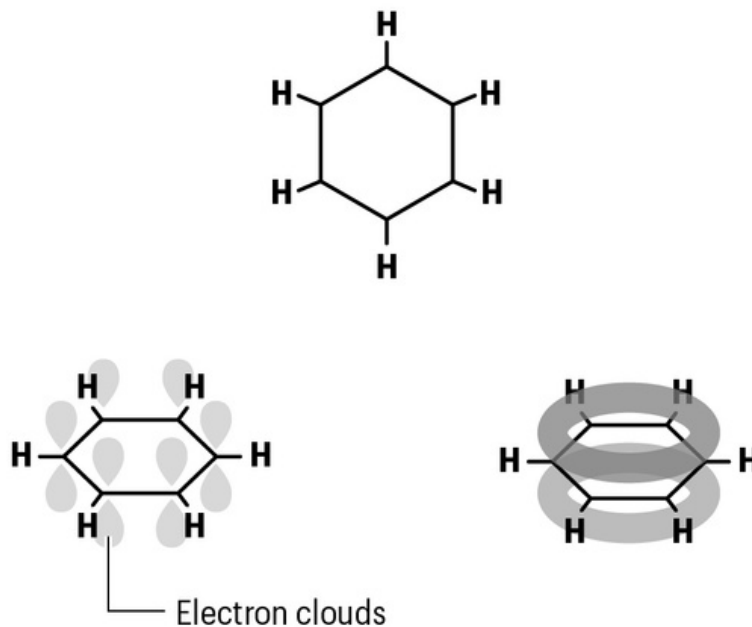


Chapter 12: Plants and Phytochemicals

Chapter 12, Fig 1: Phenols

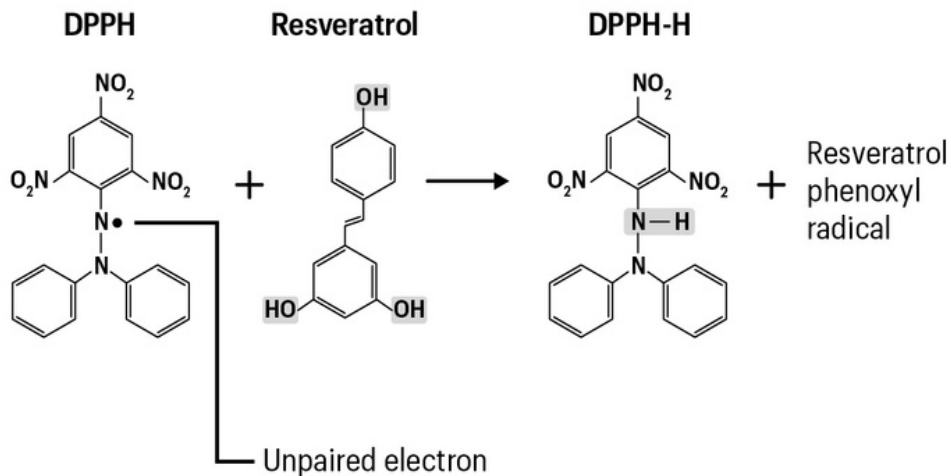


Chapter 12, Fig 2: Six carbon ring

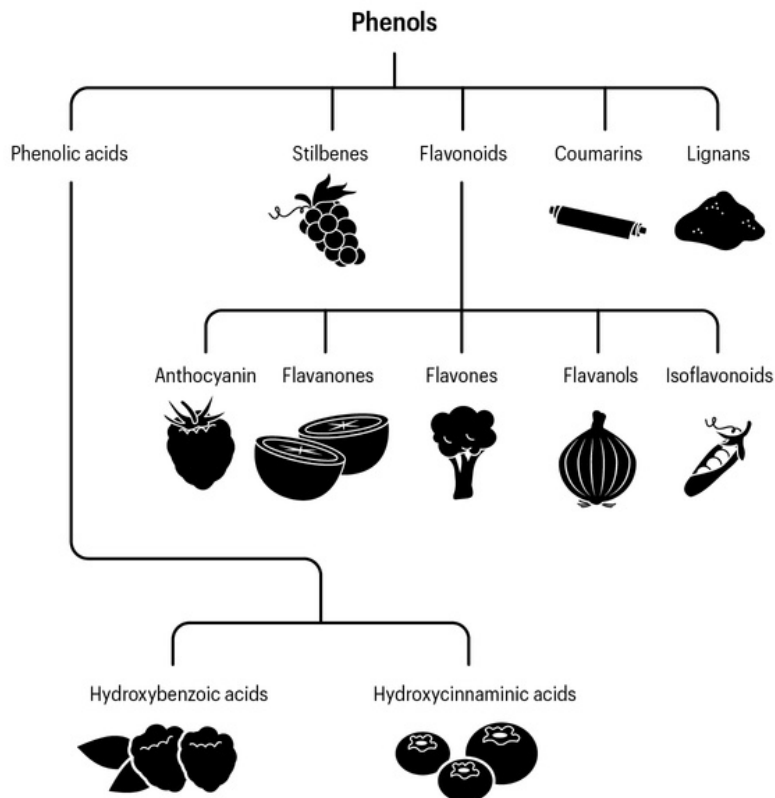


Chapter 12: Plants and Phytochemicals

Chapter 12, Fig 3: Phenol groups x 5

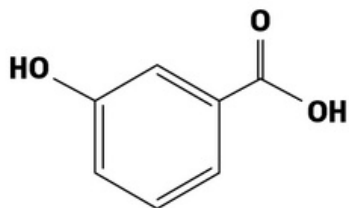


Chapter 12, Fig 4: Phenol chart, foods

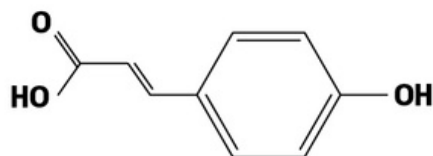


Chapter 12: Plants and Phytochemicals

Chapter 12, Fig 5: hydroxybenzoic and hydroxycinnaminic acid



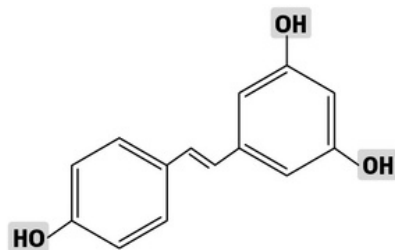
Hydroxybenzoic acid



Hydroxycinnaminic acid



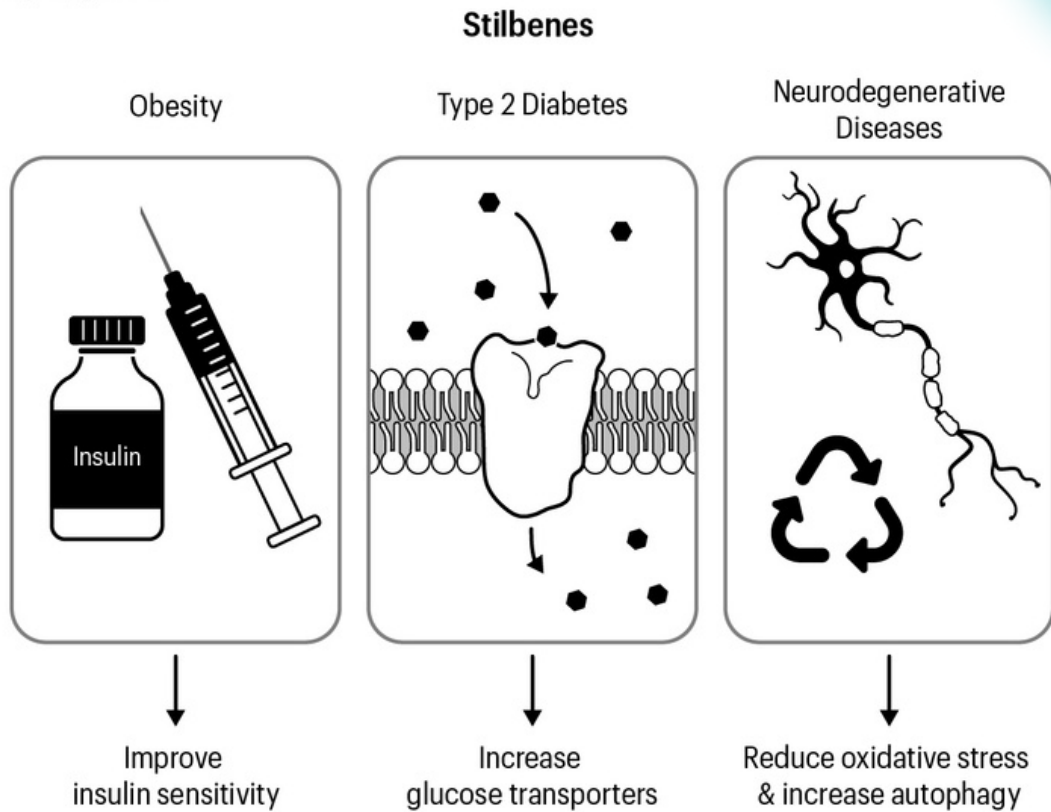
Chapter 12, Fig 6 : Resveratrol



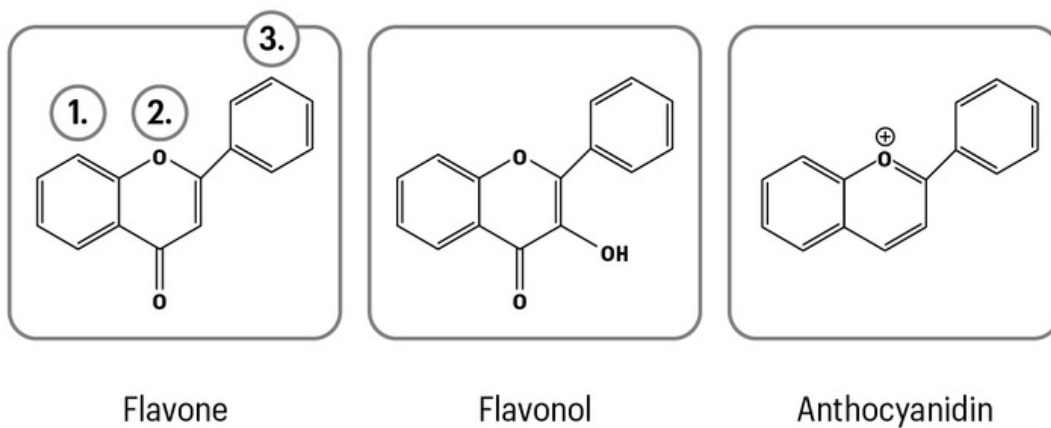
Resveratrol

Chapter 12: Plants and Phytochemicals

Chapter 12, Fig 7 : Stilbenes



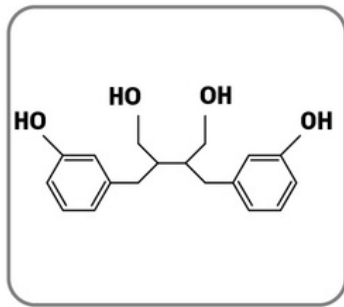
Chapter 12, Fig 8: Flavanoids



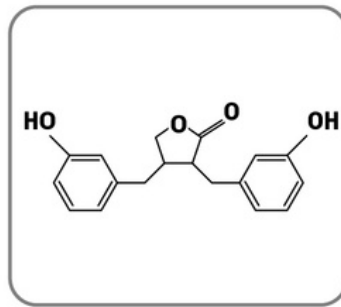
Chapter 12:

Plants and Phytochemicals

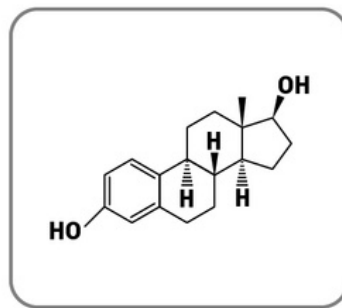
Chapter 12, Fig 9: Lignans



Enterodiol

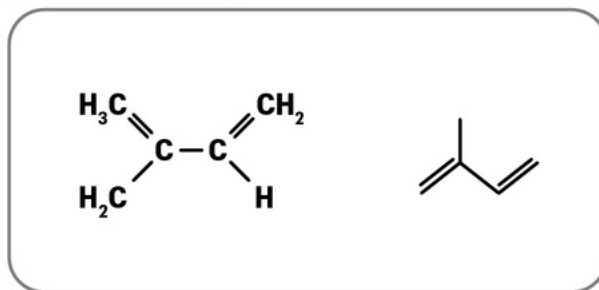


Enterolactone

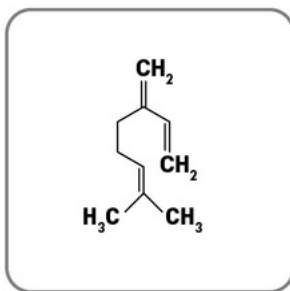


Estradiol

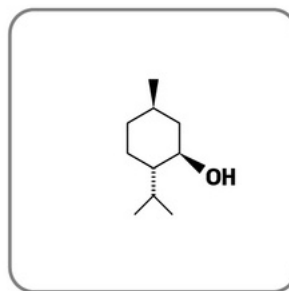
Chapter 12, Fig. 10A: Terpenoids



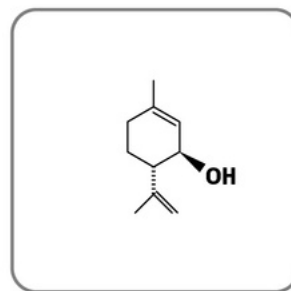
Isoprene



Myrcene



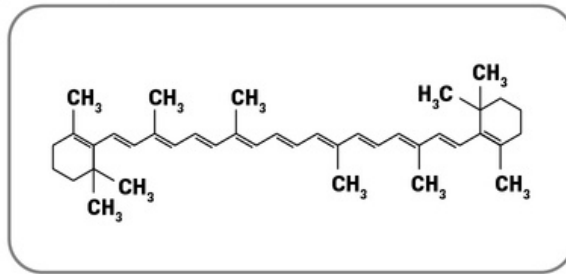
Menthol



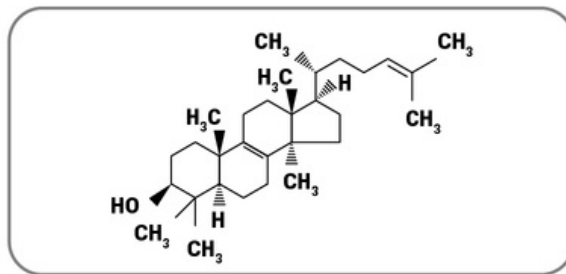
Limonene

Chapter 12: Plants and Phytochemicals

Chapter 12, Fig. 10B: Terpenoids



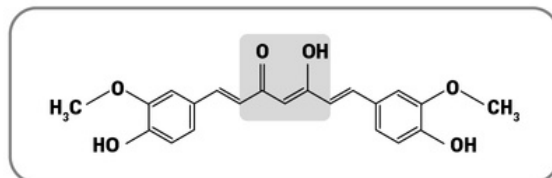
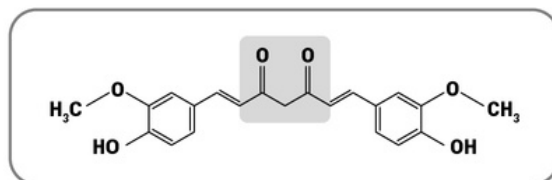
β -Carotene



Lanosterol

Chapter 12, Fig. 11: Keto & enol forms of curcuminoids

Keto Form



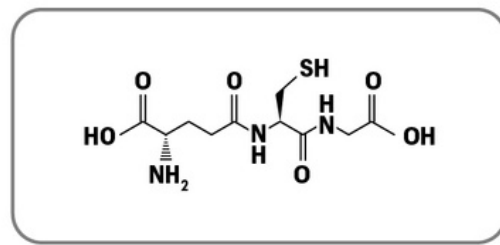
Enol Form



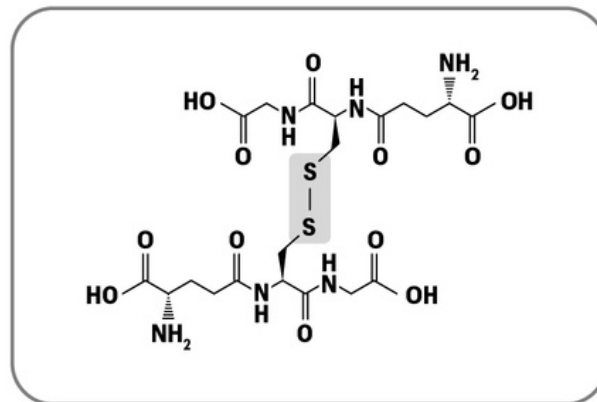
Curcuminoids

Chapter 12: Plants and Phytochemicals

Chapter 12, Fig. 12: Thiols

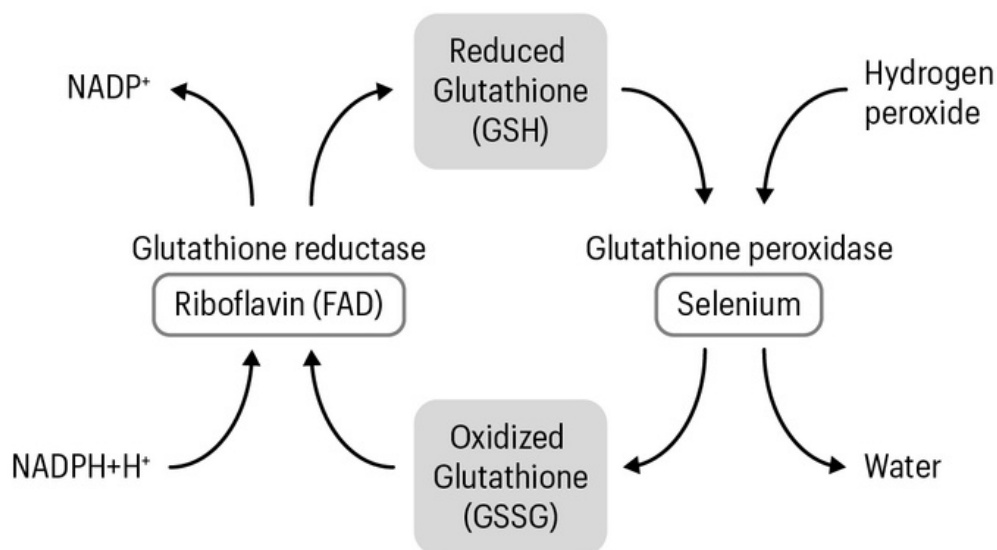


Glutathione



Glutathione in oxidizing conditions

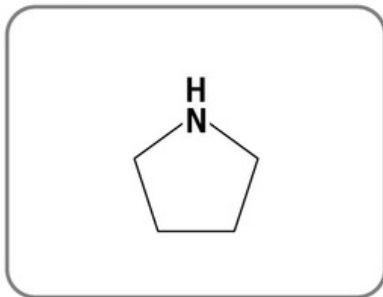
Chapter 12, Fig. 13: Glutathione chart



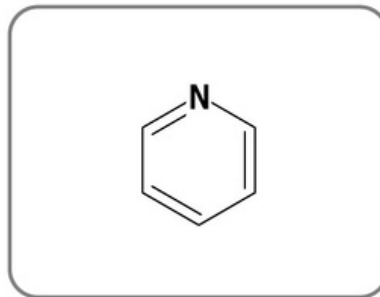
Chapter 12:

Plants and Phytochemicals

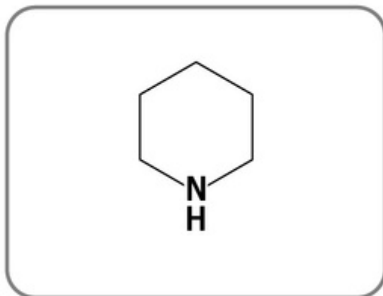
Chapter 12, Fig. 14: Alkaloids x 6



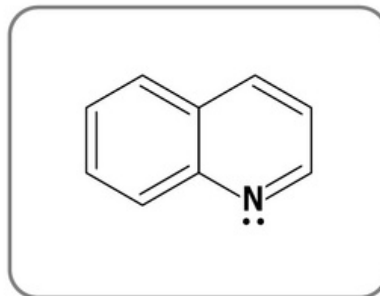
Pyrrolidine



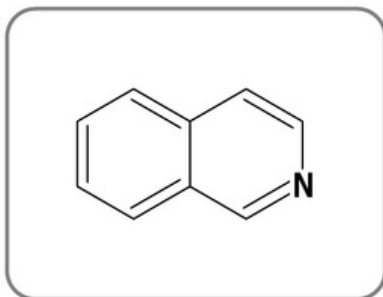
Pyridine



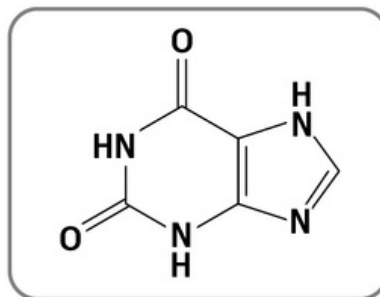
Piperidine



Quinoline



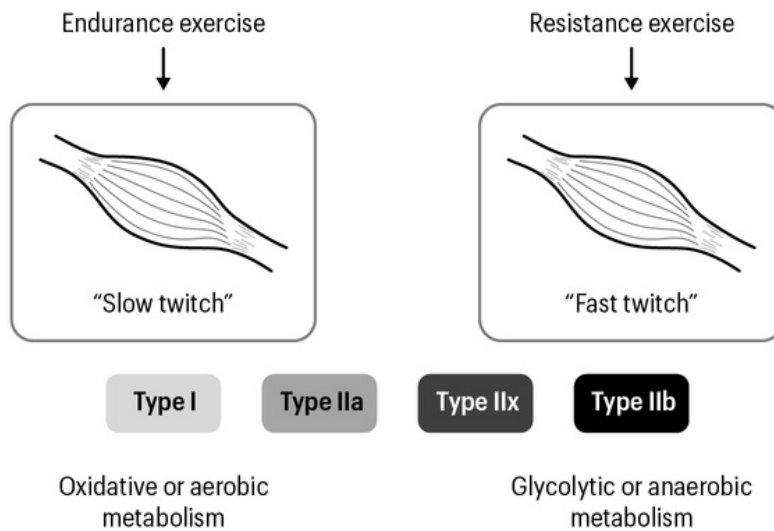
Isoquinoline



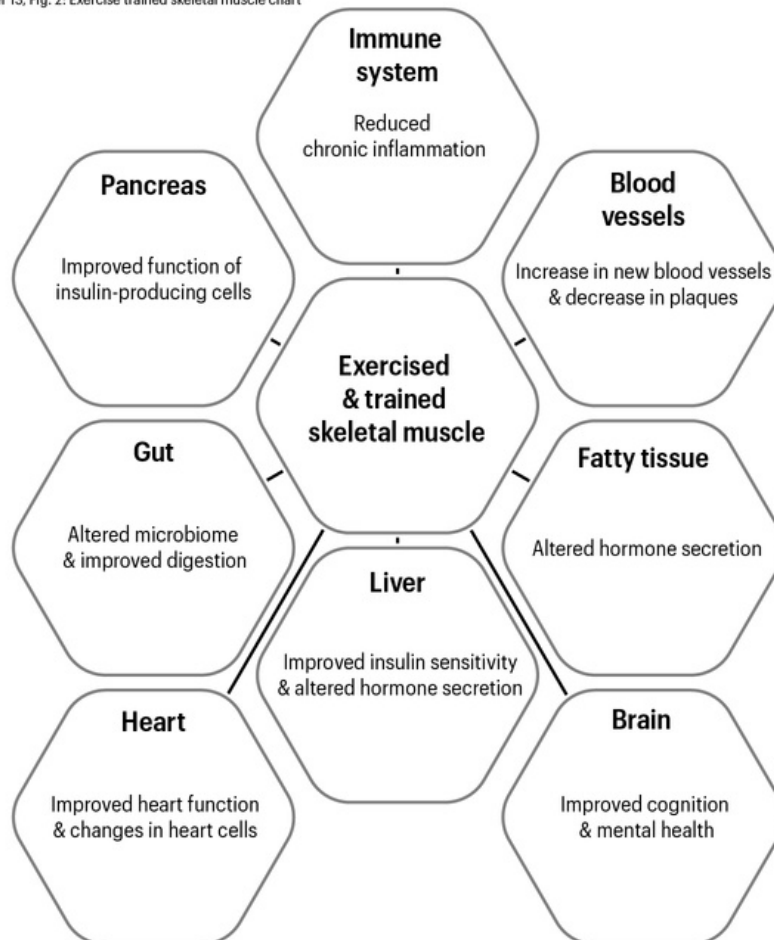
Xanthine

Chapter 13: Exercise

Chapter 13, Fig. 1: Muscle fiber types

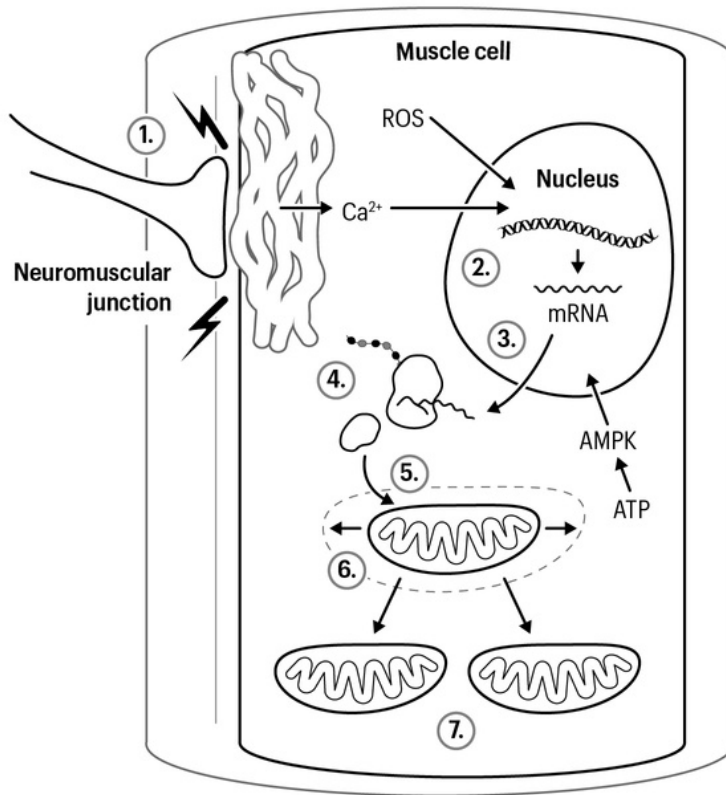


Chapter 13, Fig. 2: Exercise trained skeletal muscle chart

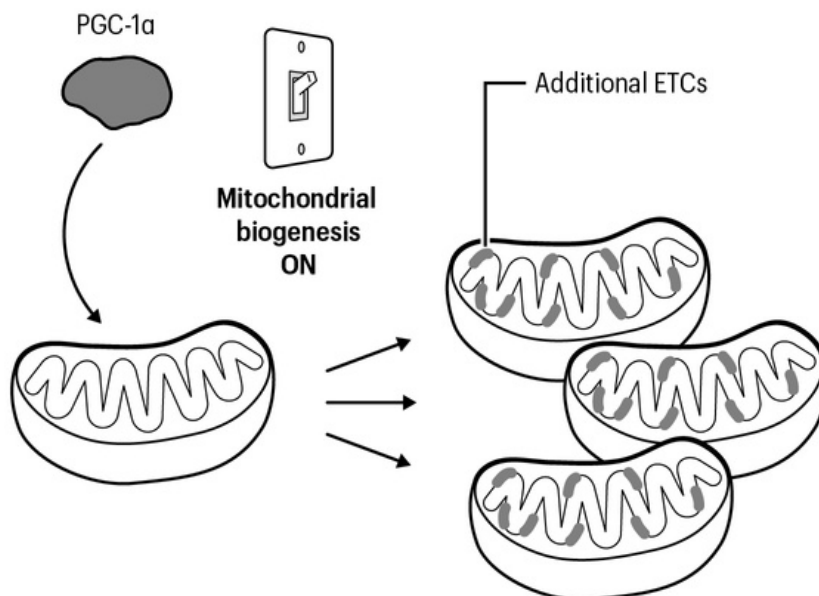


Chapter 13: Exercise

Chapter 13, Fig. 3: Nucleus/NMJ/Mitochondria

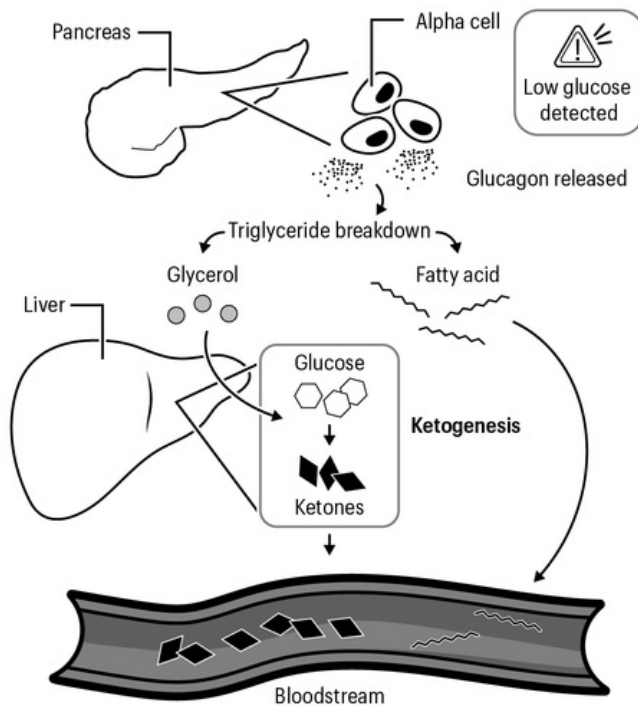


Chapter 13, Fig. 4: PGC1 alpha

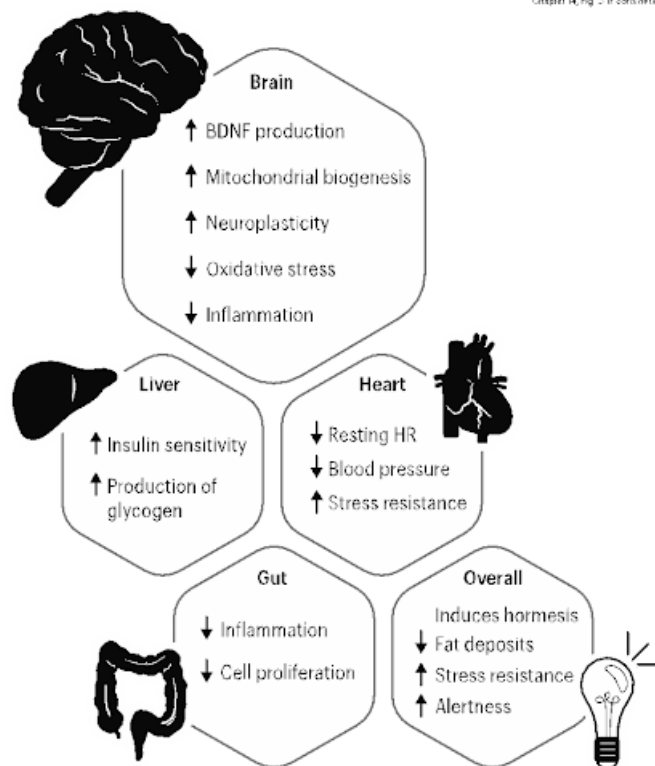


Chapter 14: Intermittent Fasting

Chapter 14, Fig. 1: Ketones in system

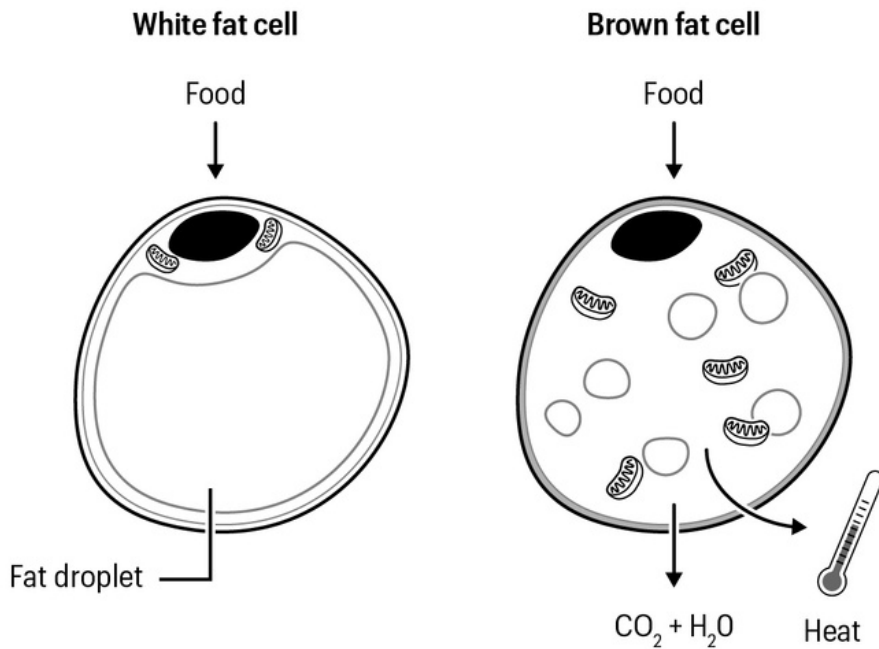


Chapter 14, Fig. 2: IF considerations

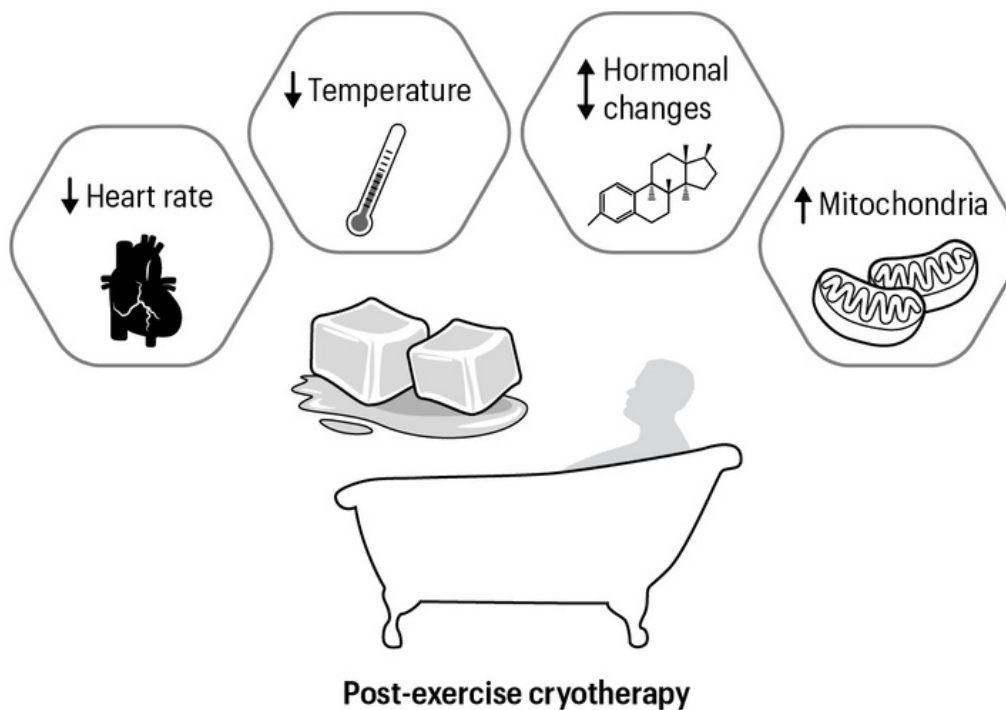


Chapter 15: Other Stressors

Chapter 15, Fig. 1: Adipocytes

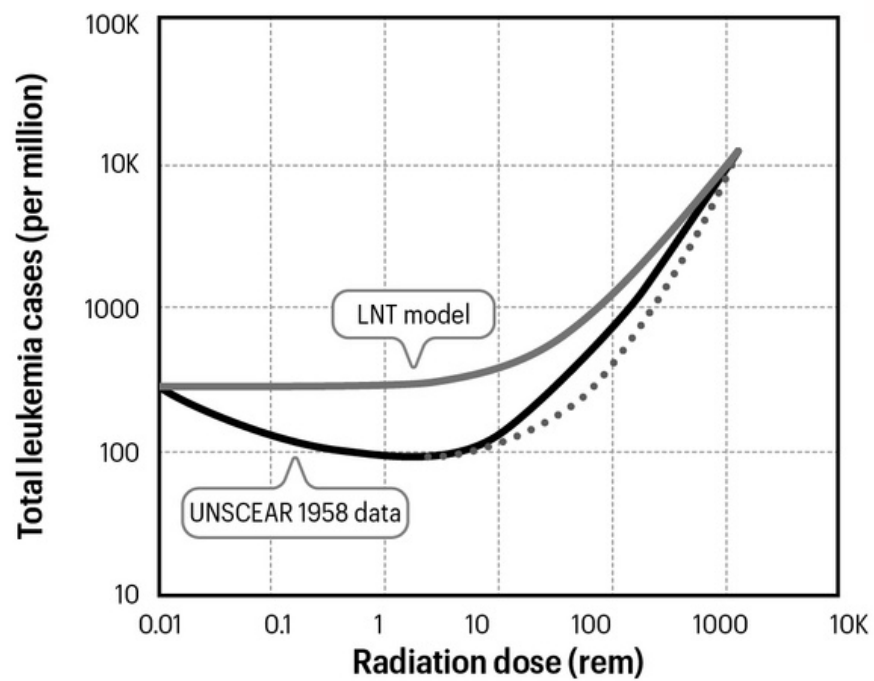


Chapter 15, Fig. 2: Cryotherapy



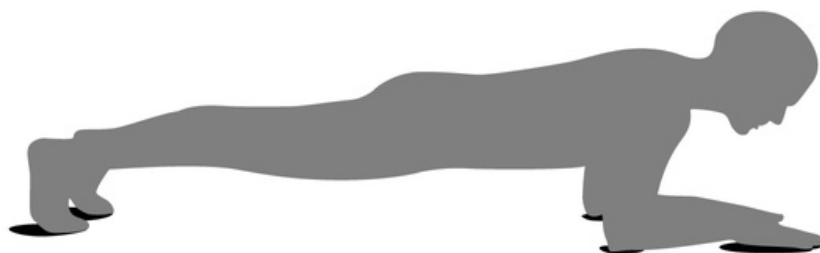
Chapter 15: Other Stressors

Chapter 15, Fig. 3: Leukemia graph

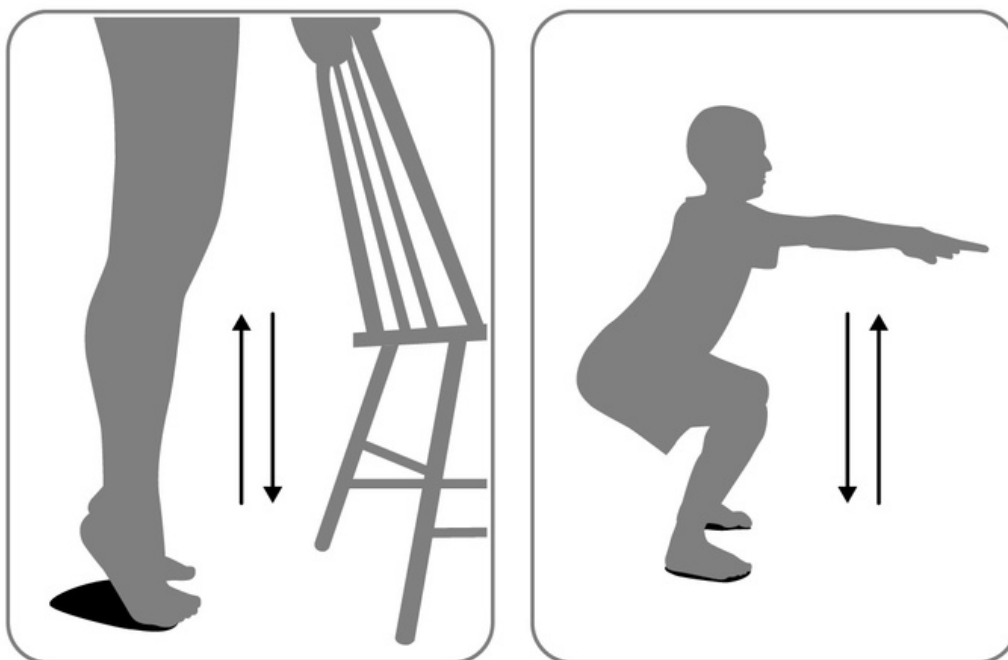


Chapter 16: Recommendations for a Long, Healthy Life

Chapter 16, Fig. 1: Plank

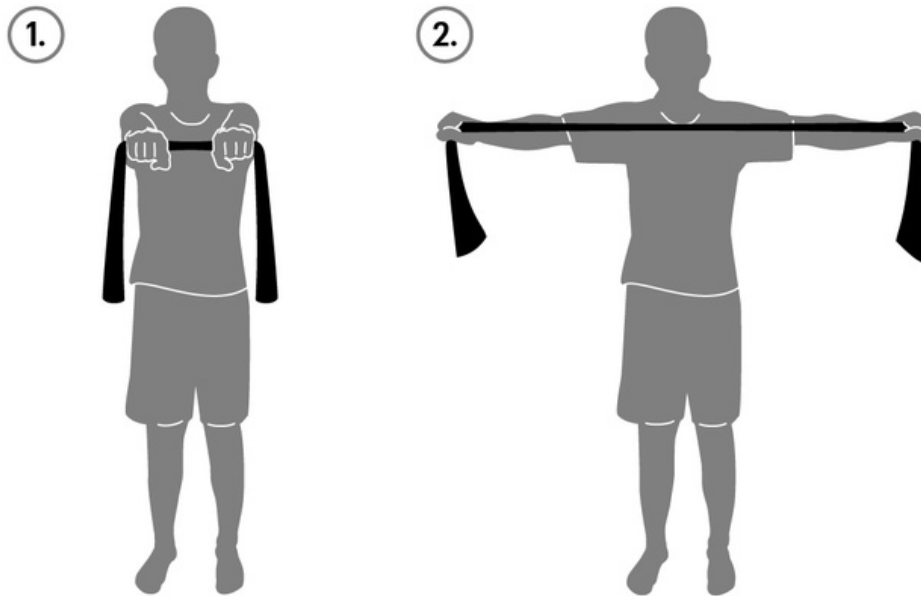


Chapter 16, Fig. 2: Foot exercises and squats



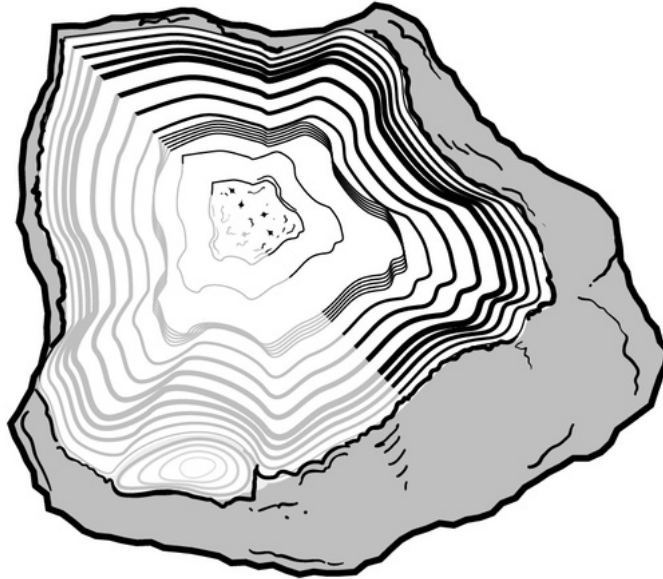
Chapter 16: Recommendations for a Long, Healthy Life

Chapter 16, Fig. 3: chest exercise



Chapter 17: What is Life?

Chapter 17, Fig. 1: Mineral surface



Chapter 17, Fig. 2: Mice

Normal aging mouse



Signs of aging:

- Kidney problems
- Heart problems
- Cataracts in eyes
- Curvature of spine
- Fat loss
- Reduced mobility
- Cancer

Mouse treated with senolytics



**Significant extension
of healthiness & increase
in median lifespan**