



Aging and the Systems

B.M.C. Durfee High School

Objectives

- Explain the difference between Normal Aging and Pathological Aging
- Explain how pathological aging can effect the body



Normal Vs. Pathological Aging



- **Normal Aging:** Changes that can be expected in everyone as we age
- **Normal aging** is a result of natural maturational processes whereas **pathological aging** is due to non-normative factors such as disease or trauma to the brain
- **Dysfunctions and Diseases:** not everyone gets them, but as we age there is an increased risk of them

An hourglass with a blue top and bottom. Inside, a DNA double helix and a pink cell are visible in the upper bulb, while a single DNA strand and a blue cell are in the lower bulb, illustrating the passage of time and biological processes.

Aging in the Skeletal System

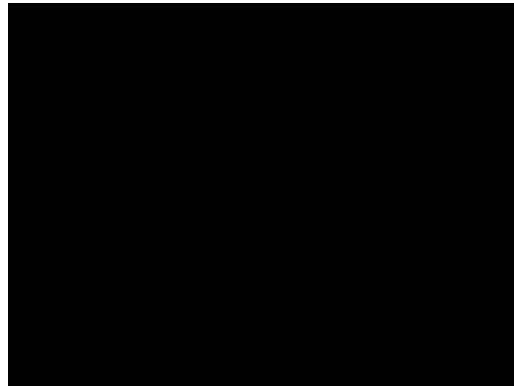
- **Normal Changes**
 - **Loss of calcium of bone; by age 70 lose 30% of bone is lost**
 - **Loss of cartilage: bones rub against each other**

Aging in the Skeletal System...

- **Dysfunctions and Diseases:**
 - **Osteoarthritis**
 - **Rheumatoid arthritis**
 - **Gouty arthritis: crystals formed in soft tissues**
 - **Osteoporosis**
 - **Bone Tumors**



Understanding Arthritis Video



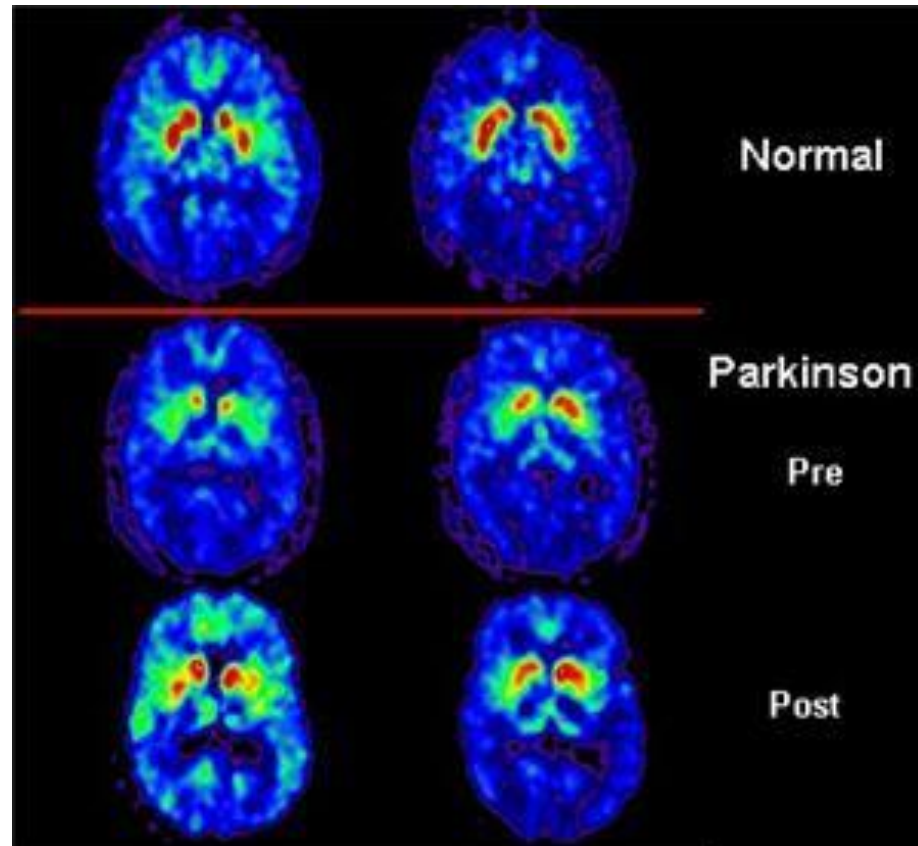
Aging in the Muscular System

- **Normal Changes**
 - Reduction in strength and endurance
 - Loss in muscle mass: muscle is post-mitotic
 - Diverticula (weakened of muscles, pouches)
 - More fat in heart muscle



Aging in the Muscular System...

- **Dysfunctions and Diseases:**
 - **Parkinsons**



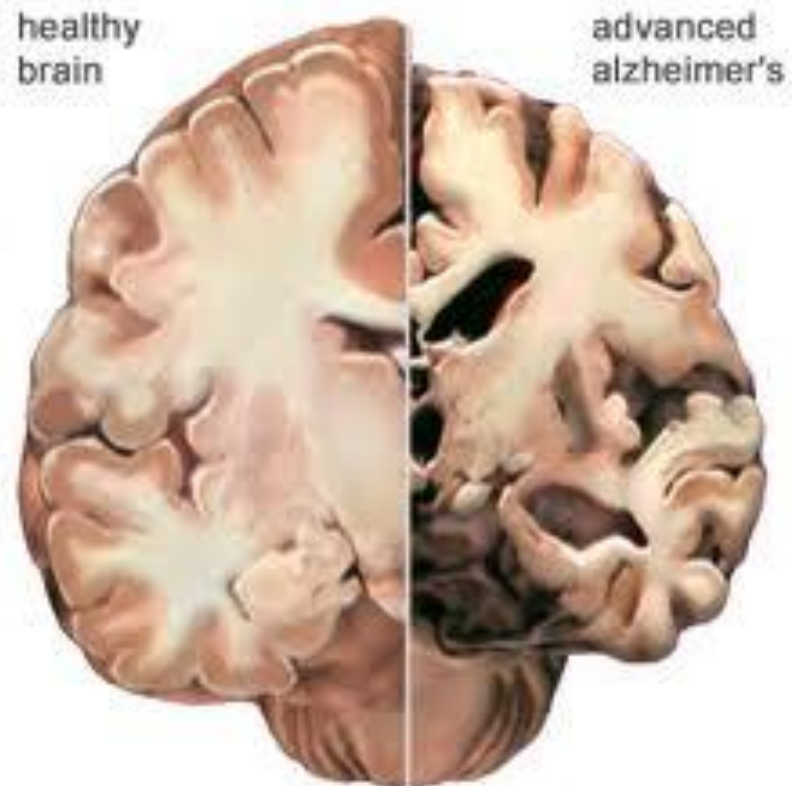
Aging in Nervous System

- **Normal Changes**
 - Lose nerve cells and they are not replaced: post mitotic
 - Reduction in brain mass
 - More plaques on cells of neurons



Aging in Nervous System...

- **Dysfunctions and Diseases**
 - Parkinsons
 - Alzheimer's Disease
 - Dementia



Aging in the Circulatory System...

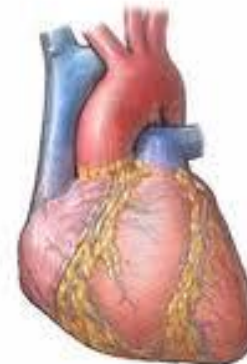
- **Normal Changes**
 - Heart may get smaller (due to muscle reduction)
 - Reduction in muscle cells
 - Thicker lining of the heart
 - Calcified valves
 - Blood pressure changes



Aging in the Circulatory System...

- **Dysfunctions and Diseases**
 - Heart Disease (not enough blood flow)
 - Heart Attacks
 - Congestive Heart failure (can't pump enough blood around the body)
 - Arteriosclerosis (hardening of blood vessels)
 - High Blood Pressure

Normal heart



Enlarged heart due to cardiomyopathy



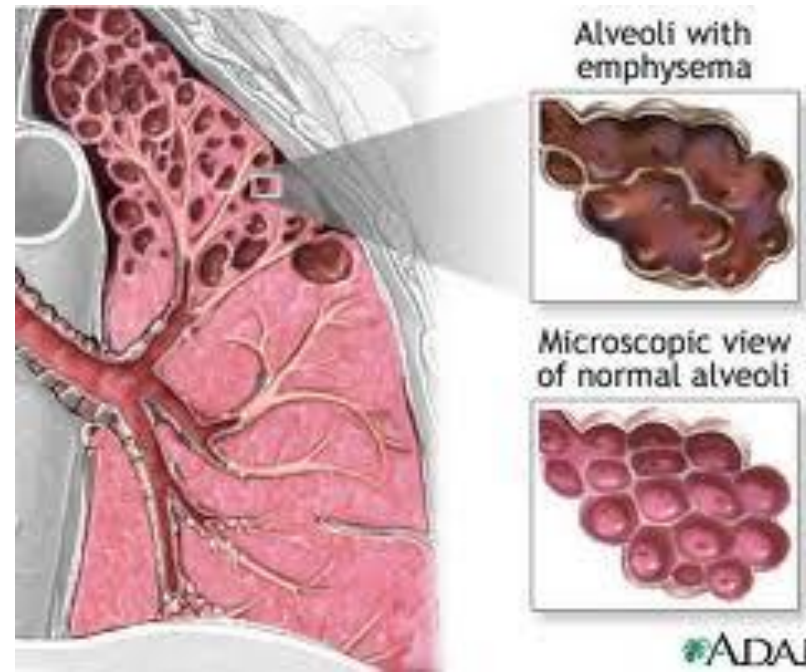
Aging in the Respiratory System

- **Normal Changes**
 - **Calcified cartilage in trachea and bronchi: rigid with aging**
 - **Bronchioles muscle gets harder with connective tissue: harder to breathe**
 - **Alveoli: walls between them wear down**
 - **Lungs are less elastic**
 - **Harder to get air into lungs**



Aging in the Respiratory System...

- **Dysfunctions and Dysfunctions**
 - **Emphysema:** air accumulates in the lungs and places load on heart
 - **Bronchitis:** inflammation of bronchial tree from inhaling irritants
 - **Pneumonia**
 - **Tuberculosis**



Aging in the Digestive System

- **Normal Changes**
 - **Loss of teeth, jaws atrophy**
 - **Reduced salivary glands**
 - **Diminished sense of taste**
 - **Difficulty swallowing**
 - **Stomach lining thins**
 - **Diverticulosis**



Aging in the Digestive System...

- **Dysfunctions and Diseases**
 - **Hiatal hernia**
 - **Cancer**
 - **Diverticulitis**
 - **Constipation**
 - **Fecal Incontinence**
 - **Hemorrhoids**



Aging in the Skin

- **Normal Changes:**
 - **Epidermis (outer skin) gets thinner**
 - **Skin becomes less elastic (more wrinkles)**
 - **Reduce oil and sweat glands: drier skin**
 - **Less blood flow: colder**
 - **Less hair on head and more in ears, nose, etc.**
 - **Loss of some fat: pressure sores**



Aging in the Skin...

- **Dysfunctions and Diseases**
 - **Acrochordon: skin tags**
 - **Cracks in the skin that leak fluids**
 - **Skin Cancer**



Small, smooth, shiny, pale, or waxy lump



Firm, red lump



A lump that bleeds or develops a crust

Photos courtesy of NCI's Dermatology Branch

Aging in the Senses - Eyes

- **Normal Changes**
 - Lose eye sight
 - Bags around eyes
 - Feel sand in eyes
 - Hardened iris and faded color
 - Yellow lens



Aging in the Senses – Eyes...

- **Dysfunctions and Diseases**

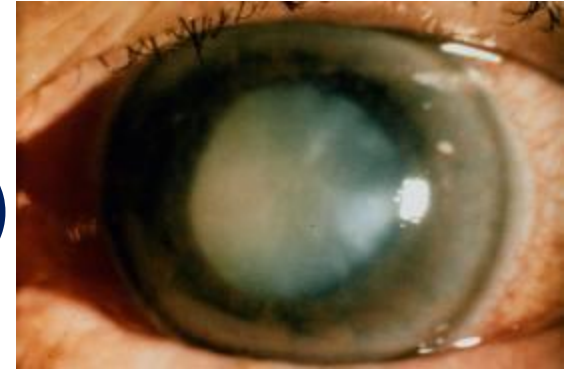
- **Blindness**

- **Glaucoma (pressure in eye)**

- **Cataracts: cloudy lens**

- **Macular Degeneration: can't discern details**

- **Detached retina**



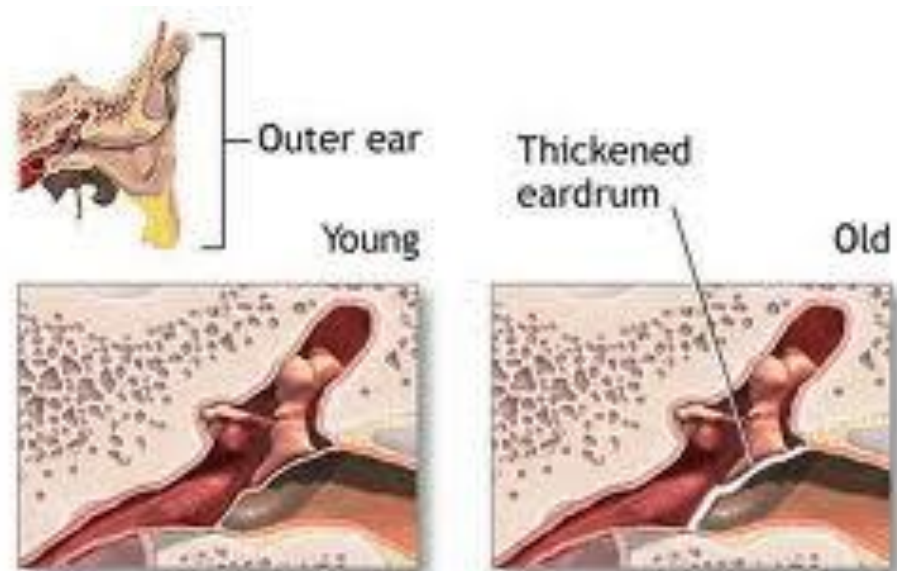
Aging in the Senses - Ears

- **Normal Changes**
 - Ear becomes longer and wider
 - More ear wax
 - More rigid fibers inside the ear (ear drum hardens)
 - Loss of hearing




Aging in the Senses – Ears...

- **Dysfunctions and Diseases**
 - **Presbycusis: loss of hearing with aging**
 - **ringing of ears**
 - **Deafness**
 - **Dizziness**



Aging in the Senses

Taste and Smell

- 
- **Normal Changes**
 - **Taste**
 - **Loss of taste**
 - **Reduced saliva**
 - **Smell**
 - **Reduction in sense of smell**
 - **This can effect taste**

Aging in the Immune System

- **Normal Changes**
 - **Reduced bone marrow**
 - **Small thymus**



Aging in the Immune System...

- **Dysfunctions and Diseases**
 - **Decrease in Immune Response**



Aging in the Urinary Systems

- Normal Changes
 - Bladder weakens



Aging in the Urinary Systems...

- **Dysfunctions and Diseases**
 - **Incontinence**



Aging in the Reproductive Systems

- **Normal Changes**
 - **Decrease in testes size**
 - **Reduced testosterone and sexual desires**
 - **Decline in sperm**
 - **Penis atrophy**
 - **Reduction in estrogen**
 - **Menopause**
 - **Drier vagina**



Aging in the Reproductive Systems

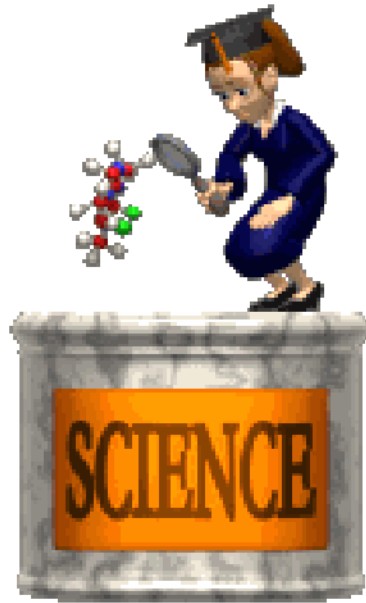
- **Dysfunctions and Diseases**
 - **Cancer**
 - **Thinner vaginal walls**
 - **Prolapsed Uterus**
 - **Impotence**
 - **Diminished Sexual Functioning**



Review

- Explain the difference between Normal Aging and Pathological Aging
- Explain how pathological aging can effect the body





Learn Long
Live Long