#### **Gastrointestinal Aging Changes:**

- Poor dentition
- ♣ 1 number of taste buds
- ❖ ↓ muscle strength for chewing
- ❖ ↓ saliva production
- ♣ ↓ ptyalin in saliva
- Weakened gag reflex
- ❖ ↓ gastric acid secretion
- ♦ ↓ emptying of esophagus and
- stomach ♣ ↓ intrinsic factor
- Thickened bile
- Thinned gastric mucosa
- ❖ ↓ ability of small intestine to absorb sugars and lipids
- ❖ ↓ hepatic enzymes and storage capacity

#### **Genitourinary Aging Changes**

- 1 number of nephrons
- J glomerular filtration rate and tubular
- Change in renal threshold
- ❖ ↓ blood flow to kidneys
- ♦ ↓ bladder capacity from 500 ml to 250
- ❖ ↓ bladder tone
- ❖ ↓ muscle tone of urethra
- Benign prostatic hyperplasia common in males

#### Consequences:

kidneys

- | creatinine clearance
- ↓ ability to concentrate urine risk of urinary retention
- · incidence of incontinence
- urinary frequency; nocturia Effects on drug clearance via
  - Changes in body image

### Consequences

- I taste sensation
- | appetite
- thewing ability • 1 digestion of starch
- · Possible swallowing difficulty
- Indigestion, flatus
- · Risk of pernicious anemia
- problems with elimination
- 1 tolerance for fats
- Possible change in drug metabolism
- Difficulty gaining weight

# ge-Related Changes

#### ♣ ↓ number of nerve cells in 8<sup>th</sup> ♦ ↑ production of cerumen ↑ amount of keratin in cerumen

cranial nerve

Atrophy of rigidity of ossicles

**Hearing Aging Changes** 

❖ ↓ elasticity of tympanic membrane

#### Consequences

- Presbycusis (hearing loss due to age-related changes in the inner ear)
- High frequency loss occurs
- Tone discrimination loss
- · Difficult following conversations
- Cerumen impaction
- Social isolation

#### Visual Aging Changes:

- Yellowing, opacity, rigidity of the lens
- pupil size
- ↓ accommodation
- Less efficient absorption of intraocular fluid
- Narrowing of visual field
- ↓ lacrimal secretions
- 1 number of cones in retina

#### Consequences

- Presbyopia –inability to focus properly
- Distorted depth perception
- 1 colour discrimination
- Need for Stronger light
- · Increased sensitivity to glare
- Drier cornea

#### Musculoskeletal Aging Changes

- Muscle cells atrophy
- Generalized symmetrical muscle
- Demineralization of bones
- Deterioration of cartilage surface
- Thinning of intervertebral discs
- Loss of cartilage in vertebral
- Loss of elastic fibers in muscle
- Kyphosis

#### Consequences:

- ↓ muscle strength after age 70
- Two-inch loss of height between ages 20 and 70
- incidence of osteoporosis
- ↓ flexibility
- ↓ mobility
- risk of falls
- Gait changes
- - aortic volume and systolic blood
  - No change in resting heart rate
  - risk of extra systoles
  - Electrocardiogram changes

#### \*

- **Integumentary Aging Changes:** Thinning and atrophy of epidermis ↓ strength and elasticity of epidermis
- \* 1 blood flow
- vascular fragility
- Loss of subcutaneous fat
- size and function of sweat glands \*
- \* sebaceous secretions
- "Clustering" of melanocytes
- number of nerve cells
- Thinning and graying of scalp, pubic, and axilla hair
- Thickening of nasal and ear hair
- facial hair in women
- ↓ blood supply to nailbed
- longitudinal striations in nails
- Accumulation of "debris" under nails

#### Consequences:

- susceptibility to infection, trauma, malignant lesions, pressure ulcers
- Skin is dry, scaly, wrinkled
- J skin turgor
- ↓ ability to maintain body temperature and homeostasis; baseline temperature may be lower than normal
- Slower rate of healing
- Slower absorption of drugs by subcutaneous route
- "Liver Spots"
- · Nails thicken, grow slowly, become brittle and yellowed
- risk of splitting, infections of the nails

#### Respiratory Aging Changes:

- 1 elasticity of lungs
- 1 number of alveoli
- † size of alveoli
- ↑ diameter of alveolar ducts and
- bronchioles ↓ ciliary action
- † anteroposterior chest diameter
- Weakening of
- respiratory muscles ↓ coughing reflex
- Calcification of costal cartilages

- Consequences
- 50% increased residual capacity
- ↓ vital capacity
- mobility of bony thorax

   ↓ arterial blood oxygen
- j oxygen uptake during
- exercise
- risk of infection amount of dead air
- space
- ↓ exercise tolerance 
   ↓ gas exchange

#### **Neurological Aging Changes:**

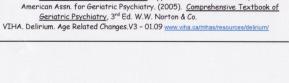
- ❖ ↓ number of neurons
- ♣ ↓ weight of brain
- Histological changes in brain;
  - † intracellular pigment, ↓ protein synthesis, senile

some of the enzymes in

- plaques
- ❖ ↓rate of conduction in peripheral nerves
- Change in sleep patterns Depletion of dopamine and
- ♦ ↑ accumulation of lipofuscin query diminished brain cholinergic reserve

#### Consequences: ↓ Adaptability

- Slower response to stimuli
- J Sensation
- Impaired proprioception Gait changes
- 1 deep tendon reflexes
- Slower voluntary movement
- Sleep pattern disturbances Susceptibility to environmental temperature
- changes 
   ↓ short-term memory



Sources: Brown, Jeri B., Bedford, Nacy K., White, Sarah J. (1999) Gerontological

Protocol for Nurse Practitioners. Lippincott Williams & Wilkins, Inc.;



## Cardiovascular Aging

- Changes † amount of collagen and fat in
- cardiac muscle Thickening and rigidity of valves
- \* ↓ oxygen utilization Myocardial hypertrophy, but over-all heart size is not affected
- Coronary artery blood flow
- decreased
- ↑ peripheral resistance myocardial irritability
- ↓ blood flow to all organs
- Consequences • 1 stroke volume, cardiac output ↓ ability to increase heart rate in response to stress
- pressure

