

Gerontology: October 10, 2012

Why do we age? Biological Theories of Aging & Physical Changes

Biological Theories of Aging

What causes aging?

Can we slow the aging process?

Should we attempt to stop aging?

What is the difference between normal aging & disease?

The Biology of Aging

Primary aging: unavoidable/inevitable

- Senescence

Secondary aging: experienced by most, not all

- Function of disease, disuse, and abuse

Why do we age? Cellular Theories

***Hayflick Limit: Cells can only divide so many times (primary, #1). Most likely explanation*

Cross-linking: Proteins produce molecules that make the body stiffer not an adequate explanation.

Free Radicals: Unstable molecules, damage proteins, fats, and lipids, contribute to diseases.

Why do we age? Rate-of-Living Theories

Wear & Tear Theory: Aging occurs because of the system wearing out over time.

Autoimmune Theory: Aging is a function of the body's immune system becoming defective, producing antibodies against itself.

Can aging be reversed or delayed?

Telomeres: (end of chromosomes) – telomeres shorten with age; evidence Progeria

Growth Hormones: replace deleted hormones

Caloric restriction/Anti-Aging Compounds:

- Reducing calorie intake by 50-70%
- Increased life expectancy and delayed disease

Anti-Aging Compounds: Animal studies

Can we predict longevity?

Heredity: How long did your parents live?

Gender differences in life expectancy: Why?

- Social Factors: health attitudes, habits, lifestyle, and occupations
- Biological Factors: resistance to infection

Important Lifestyle Practices: Do not smoke, moderate alcohol use, healthy diet, regular exercise, social integration.

Changes in Physical Appearance

Visible signs of aging:

- Skin changes (wrinkles); gray hair
- Lose height, gain weight

Good news? Some can be modified

Sensory Deficits with Age: The Lesser-Studied Senses

Decreased sensitivity to:

- Smell
 - Taste (to some extent)
 - Temperature
 - Pain?
- Increased instability of posture & gait

Age-Related Changes in Vision

Presbyopia: Farsightedness

- Problems adapting to the dark
- Increased sensitivity to glare
- Diminished depth perception

Vision Problems in Later Life

Glaucoma:

- Hardening of the eyeball & buildup of fluid in eye
- Untreated, can destroy vision

Macular Degeration

- Deterioration of the retina
- Leading cause of blindness in older adults

Cataracts:

- Cloudy, opaque areas in the lens of eye that prevent light from passing through
- Surgery can remove this problem

- Hearing difficulties increase with age

- Greater for males than females
- Some corrected by hearing aides

- Implications for relationships

Age-Related Changes in the Cardiovascular System

Age-related structural changes:

- Accumulation of fat deposits
- Stiffening of the heart muscle
 - Decreased in ability to cope with physical exertion
 - Still, moderate exercise slows these age-related changes

Age-Related Changes in the Respiratory System

Decrease in:

- Vital capacity: Amount of air we can take into lungs
- Ability to exchange oxygen & carbon dioxide
 - Rate of decline slower when physically active
 - Difficult to distinguish between normal aging and effects of pollution.

Age-Related Changes in the Reproductive System

For Women: Menopause

- Signals end of childbearing
- Around 50-55 years
- Few women experience serious problems

Symptoms: hot flashes, night sweats, headaches, mood changes, etc.

For Men:

- DO NOT lose childbearing capacity
- DO experience decline in testosterone
- Decline in quantity of sperm
- Physiological changes in sexual performance

Changes in Sleep

- 40% of older people complain of sleep problems

- Increased likelihood of insomnia
- Takes longer to fall asleep
- Fewer hours of slow-wave sleep
- Breathing disturbances more common

Lifestyle changes to improve sleep

Sex in Later Life

Myth: Age-related physiological changes detrimentally affect sexual functioning

- May occur less often, but still meaningful
- Old ideas from limited, cross-sectional studies
- Desire for sexual activity DOES NOT diminish with age

- Older adults do not differ significantly in sexual activity compared to their younger selves.