Growth & Development

Objectives:
• Understand the relationship between skin color and solar radiation
• Understand the implications of lactose intolerance
• Understand how the nervous and hormonal systems regulate growth
• Understand the stages of human growth
• Understand how growth studies are conducted
• Understand proportional growth and aging

Skin Color
melanin: phenomelanin/eumelanin
melanocytes
ultraviolet radiation
skin cancer (melanoma)
tanning
vitamin D3 - calcium absorption
Gloger’s Rule
Lactose Intolerance

- lactose: milk sugar
- lactase: enzyme
- lactase deficiency

Human Growth

Growth (quantitative) cellular growth
  - hyperplasia: increase in cell number
  - hypertrophy: increase in cell size

Development (qualitative) cellular differentiation
  - positive growth
  - involution or aging

Famous Quotes

"Growth is the study of life from the womb to the tomb"
"Growth is the study from sperm to worm"
Reasons to Study Growth

- To understand variation
- Interaction of genes and environment
- Biology & culture
- Adaptation at all stages in growth
- Twin studies - growth
- Growth processes very susceptible to stress

Stages of Growth

Prenatal
- Ovum: 0-14 days
- Embryo: 14 days - 8 wks.
- Fetus: 8 wks. - birth

Postnatal

- Neonatal: 0-4 wks.
- Infancy: 1st year
- Childhood
  - early (1-6 yrs)
  - late (7-12)
- Adolescence:
  - ♀ 10.5 - 13 yrs.
  - ♂ 12.5 - 15.5 yrs.
Methods of Studying Growth

Distance or cumulative curve

Velocity of Growth

Incremental curve

Growth Studies

1. **Longitudinal**: Measures sample of like-aged individuals over many years.

2. **Cross-sectional**: A large group of children representing all ages that are measured at once.

3. **Mixed studies**: Follow groups of children aged 6, 9, 12 and 15 years old for three years.
Adolescence

The transition from childhood to adulthood. Most humans and primates experience a growth spurt. Marked changes in behavior, physical and sexual development occur during puberty. There is an increase in stature, weight gain, and the appearance of secondary sexual characteristics. Females experience their first menarche.

Relative or Proportional Growth

From newborn to adulthood:
1. Head doubles (2X)
2. Trunk region increases 3X
3. Upper limb 4X
4. Lower limb 5X

At birth, average weight: 7.5 lbs.; length: 20 inches. At one year of age, body weight: 20 lbs.; length: 30 inches.

Changing Proportions

Newborn Face:Vault
1:8
Adult 1:2
Birth height x 3.5 = adult height
Birth weight x 20 = adult weight
Morphological (Scammon’s) Curve

1. General
2. Reproductive
3. Brain & Head
4. Lymphoid

Aging

Programmed stage?
Life expectancy
Life span

Study Guide – Exam I

• When: October 2 at 9 AM (arrive before 9 AM for early start)
• What: ~75 multiple choice questions
• Bonus question (5 pts.)
• Covers: Chapter 1-4 & 14-16 and PPT lecture material
• Bring hand calculator
• Study sessions