

### Prenatal Development Part I: Normative Development

- Germinal Period
- Period of the Embryo
- Period of the Fetus
- Sex Differences
- Birth
- APGAR Scale

#### ■ GERMINAL PERIOD (conception to 2/3 weeks)

- Week 1: Fertilization and Implantation
  - fertilization in fallopian tube
  - 24 hours later, cell multiplication begins
  - 3-4 day journey to uterus
  - well-timed arrival (menstrual cycle) at uterus
  - 3-4 days to implant in uterine lining
  - zygote becomes blastocyst
- **Note** : 60% of all zygotes never implant

- Week 2: Embryonic System Develops (all from blastocyst cells)
  - **Placenta** attaches to wall of uterus; an organ that allows for exchanges of oxygen, nourishment, and waste products between blood systems of pregnant woman and developing organism. Also controls production of hormones important to pregnancy.
  - **Umbilical Cord** connects embryo/fetus to placenta. Contains blood vessels that carry blood back and forth
- \*\*by 16th week, transports 300 quarts of fluid per day!
- **Amnion** is a membrane that holds amniotic fluid
- By 3rd week, central nervous system begins to develop (neural tube), at which point referred to as an embryo.

#### ■ PERIOD OF THE EMBRYO (3-8 Weeks) [marked by growth into specific body systems]

- Development proceeds in two directions:
  - Cephalocaudal (head to tail)
  - Proximodistal (spine to extremities)
- By 4 weeks: head, brain, blood vessels begin to form
- By end of first month:
  - heart begins to beat
  - ears, nose, mouth begin to form
  - arm and leg buds appear
- Fifth week:
  - 1/4 inch long (10,000 x size of zygote)
  - lungs begin to develop
  - upper arms -> forearms -> hands -> fingers
  - legs -> feet -> toes

- Sixth week:
  - brain begins to produce patterns of electrical activity
  - gonads (sex glands) begin to develop
- Seventh week:
  - spontaneous movement of the embryo
  - fully developed limbs
  - muscles maturing; bones beginning to harden
- By end of eighth week, organogenesis (organ development) is completed, and organism is virtually fully formed except for the sex organs.
- \*\*Now called a *fetus*

#### ■ PERIOD OF THE FETUS (9 weeks - Birth)

- organism will grow from 1/4 oz and 1" length to 7 lbs and 20 inches in length
- 3rd Month
  - sex organs take shape, gender is set
  - definable/irregular periods of activity and rest
  - swallows, digests and urinates
- 2nd Trimester (4-6 months): detail & improved functioning
  - hair develops
  - pregnant woman feels movement (17-18 weeks)
  - heartbeat detected on stethoscope
  - skeleton continues to harden
  - organ function improves
  - much more responsive to stimuli

#### ■ AGE OF VIABILITY

- A very small number of fetuses can survive birth at 23 weeks.
- 50% survive at 26 weeks (but 14% of these suffer severe mental retardation)
- Bottom line: the longer the gestation and the bigger the fetus, the better the chances of survival.
- 3rd Trimester (7-9 months)
  - basically a time of refinement of existing structures, especially respiratory and cardiovascular systems.
    - gains of approx. 5.5 lbs
    - regular periods of rest and activity by 28 weeks
    - reverses position (head down) by 33-34 weeks
    - 100% chance of survival by 36 weeks
  - 37 weeks = "*full term*"

#### ■ SEX DIFFERENCES

- males more active than females
- females more sensitive to external stimuli
- females advanced in skeletal development
- males more vulnerable (120-150 male embryos for every 100 female; 105 males born for every 100 females). Males also more likely to suffer birth defects
- BIRTH - Three stages of Labor and Delivery
  - First Stage: (longest) - contractions lead to dilation and shortening (effacement) of cervix (avg. 8-10 hours)
  - Transition: head passes through cervix, into vaginal opening
  - Second Stage: head, rest of body born (avg. 1-2 hrs)
  - Third Stage: placenta is born
- APGAR SCALE
  - Five characteristics evaluated on a three-point scale ranging from 0-2:
    1. heart rate; 2. respiratory effort; 3. muscle tone; 4. color; 5 reflex irritability