

**EDU 306:
Child Development
Antenatal Development**

DR. KATRINA A. KORB
UNIVERSITY OF JOS

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Child Development before Conception

- Parental health affects a child's development before conception
 - To conceive a healthy child, **both** parents should reduce
 - ✦ Caffeine
 - ✦ Alcohol
 - ✦ Tobacco
 - ✦ Other drugs

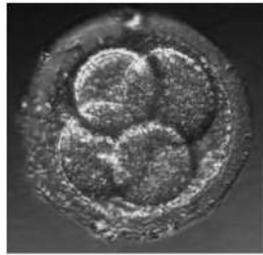
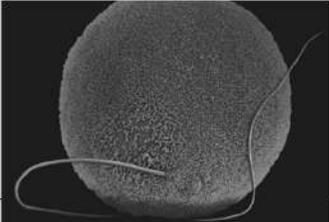
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Conception

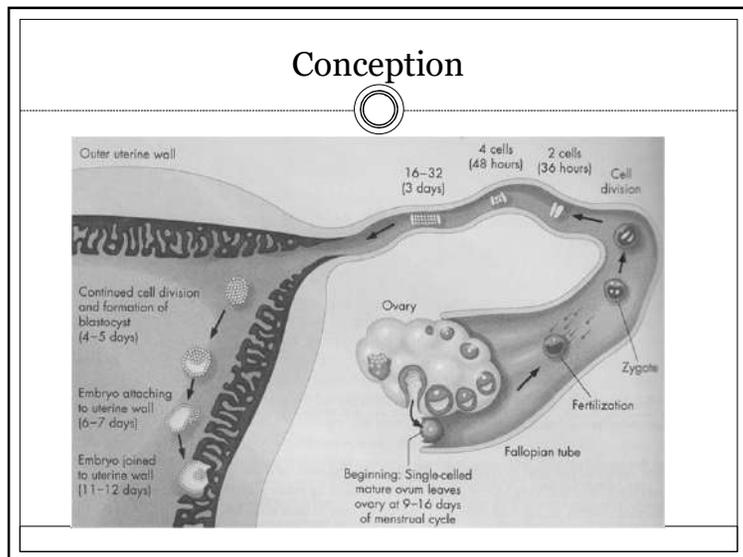
- **Fertilization:** Process of fertilization with fusion of male and female gametes to form a zygote
 - **Gamete:** Cell containing half the number of chromosomes that is able to unite with one from the opposite sex to form a new individual
 - **Zygote:** Fertilized ovum

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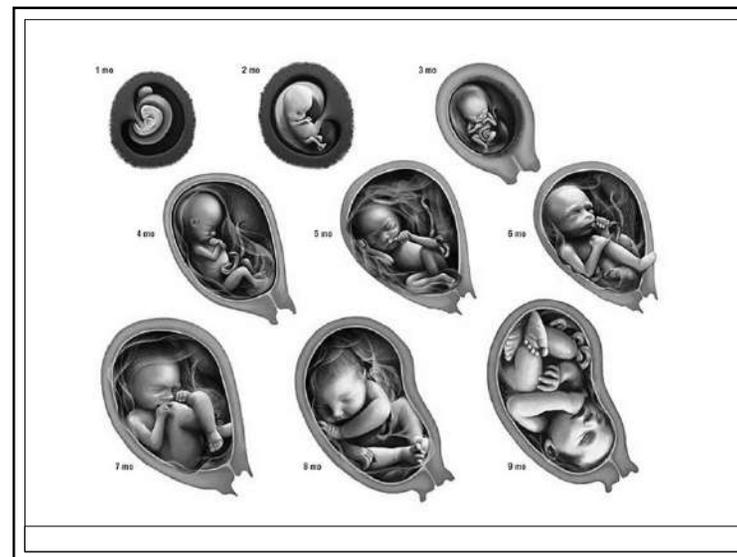
Conception

Conception	Zygote
	
	

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Periods in Antenatal Development

Period	Weeks	Size	Major Events
Germinal	0-2	Microscopic	Zygote (fertilized ovum) divides into multiple cells rapidly. Implants into uterine wall.
Embryo	2-8	Less than 1 inch long	Heart, muscles, backbone, brain, and spinal cord begin to form. Form arms, legs, toes, and fingers.
Fetus	9-38	2 inches to 20 inches	Rapid growth. Hear heartbeat. Sex of fetus can be identified. Mother feels movement. Lungs mature and brain develops.

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- ### Germinal Stage
- 3 Major Events
 - Rapid cell division
 - Cells become increasingly specialized
 - Attach umbilical cord to the placenta
 - ✦ Allows zygote to receive nutrients from the mother
 - ✦ Protects zygote from harmful agents called teratogens
 - **Source of Teratogens:** Mother's drug consumption, x-rays, lead and mercury, diseases

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Embryonic Stage

- Begins with implantation of the zygote to the uterine wall
- Most important development is formation of major organs: heart, lungs, liver, eyes and ears
 - This is critical because once cell differentiation is complete, it cannot be redone
 - Exposure to teratogens can be particularly harmful at this stage, resulting in major malformations

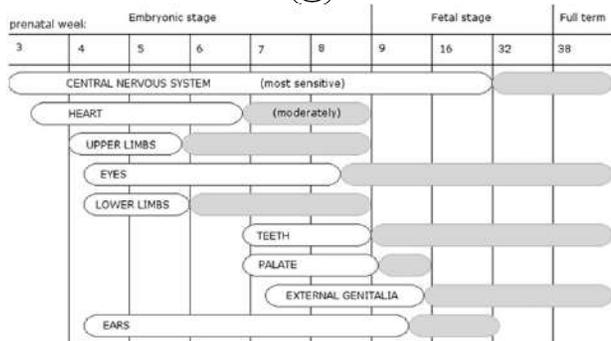
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Fetal Stage

- From 9th week until birth
 - Bones begin to harden
- Major achievements
 - Rapid growth in size
 - Baby begins to hear and be sensitive to light
 - **Age of viability:** Fetus can survive outside of the womb by about 7 months

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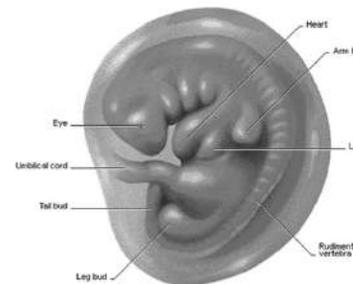
Antenatal Development



Adapted from Moore, K. L. and Persaud, T. V. N. *Before We Are Born: Essentials of Embryology and Birth Defects*. Phila: W. B. Saunders, 1998.

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Embryo: 5 Weeks



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First trimester (0-3 months)

- End of the first month:
 - Has a heartbeat
 - Eyes, ears, nose, and arms begin to form
- 8-12 weeks: Genitalia begin to form

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7 weeks + 9 weeks

7 Weeks

9 Weeks



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Second trimester (4-6 months)

- 4th month: Averages at least one movement per minute
- 6th month: Follows daily pattern with more movement at some times in the day than others
- 24 weeks: Clearly identified as male or female

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Third Trimester

- Can survive birth at 28 weeks with good medical care
- Triple its weight in the last trimester
- Practices behaviors like swallowing and breathing
- Heart rate slows when it hears its mother's voice showing that baby pays attention to its mother.

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Antenatal Intellectual Development

- Fetuses can differentiate sounds by 33 weeks (8 months)
 - Brain shows a high level of activity when hearing different languages or unusual voices
 - Fetuses respond to music
- In a research study, mothers were asked to recite a short poem 3 times a day for the last 4 weeks of pregnancy
 - Babies' heart rates slowed when their mother recited that poem, but did not slow when their mother recited other poems.

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Influences on Antenatal Development

- **Maternal Nutrition:** Baby depends entirely on mother for its nutrition
 - Poor maternal nutrition influences:
 - ✦ Miscarriages
 - ✦ Infant mortality
 - ✦ Malformations in the baby
 - ✦ Low birth weight
 - ✦ Underdeveloped brains
 - ✦ Cognitive delays
 - ✦ Aggressive and criminal behavior

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Influences on Antenatal Development

- **Maternal Stress/depression** can lead to:
 - ✦ Premature birth
 - ✦ Smaller babies
 - ✦ Delayed development of infants
- **Maternal diseases** can affect the baby in different ways
 - **Malaria** causes many miscarriages and premature deliveries
- **Mothers taking prescription drugs** can lead to malformations amongst babies

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Influences on Antenatal Development

- **Smoking** by mothers and second-hand smoke (e.g., fathers) can cause:
 - Poor baby growth
 - Higher infant mortality
 - Babies who continually cry, have shorter attention spans, and other behavioral and intellectual difficulties
- Nicotine in cigarettes makes blood vessels constrict, which reduces the nutrients available to the baby.

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Influences on Antenatal Development

- **Alcohol** kills the brain cells of babies
 - **Fetal Alcohol Syndrome:** Abnormal facial features, poor growth, poor coordination, learning disabilities, low IQ, poor judgment, hyperactive behavior.



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Antenatal Care

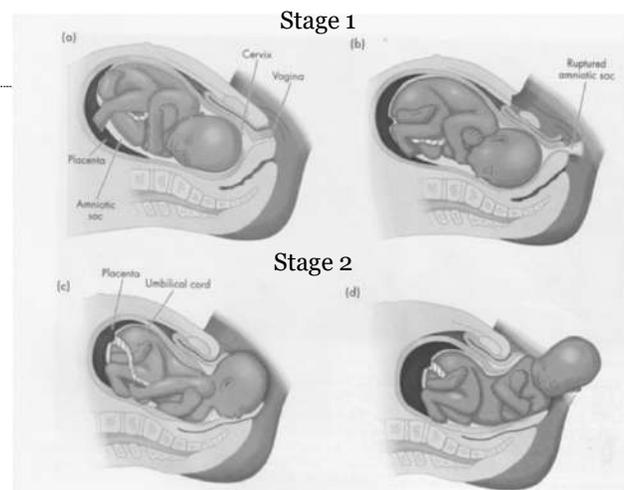
- **Antenatal care** is very important
 - When the woman feels the baby move, she should go to a clinic
- **Eat plenty of food with a variety of vitamins and minerals**
 - Eat plenty of green leaf, meat, and eggs to improve iron intake
- **Avoid diseases**
 - WHO recommends malaria prophylaxis after 12 weeks of pregnancy.
 - Sleep under treated nets
 - Prompt treatment of diseases

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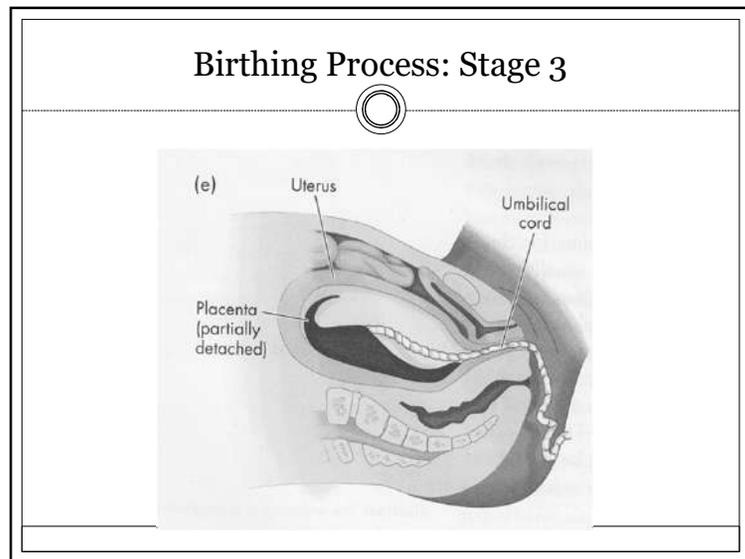
Stages of Labor

- **Stage 1: Dilation of the Cervix**
 - Contractions become stronger and more frequent
 - Contractions cause dilation – opening – of the cervix
 - Lasts 12 hours for a first delivery, and 6 hours for later deliveries
- **Stage 2: Delivery of the Baby**
 - Lasts 1 hour for the first delivery; 30 minutes for later
- **Stage 3: Delivery of the Placenta**
 - Lasts 10-30 minutes

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