

Pregnancy and Prenatal Development

Pregnancy

= menstrual cycle is interrupted as a result of fertilization

: all mammals use internal fertilization = more successful than external fertilization

- in humans, pregnancy lasts approximately 266 days

a) the ovum is fertilized by sperm in the oviduct creating a **zygote**

b) as the zygote moves down the fallopian tube it undergoes **cleavage** (mitotic divisions) becoming a **blastocyst** (hollow ball).

c) the blastocyst reaches the uterus and attaches to the endometrium through a process called **implantation**

d) the outer layer of the blastocyst produces **human chorionic gonadotropic hormone** (HCG) which ensures LH production = corpus luteum is maintained

- corpus luteum is maintained so it can produce estrogen and progesterone to keep the uterine lining (endometrium) thick.

= high levels of HCG in urine indicate pregnancy (pregnancy tests)

e) the blastocyst develops a **chorion** (outer membrane) which, together with the uterine wall, form the **placenta**.

- a yolk sac is produced (as in other animals) but it is not functional

f) an **allantois** (membrane network of blood vessels) is produced connecting the blastocyst to the placenta through the **umbilical cord**

g) the umbilical cord carries food and O₂ to the blastocyst and carries wastes and CO₂ away.

- these substances diffuse through a fluid containing antibodies

= there are 2 separate circulatory systems

h) a third membrane, called an **amnion** develops around the blastocyst

- it fills with fluid and provides protection

i) cells of the blastocyst continue to divide and part of the cell layer folds inwards to form a **gastrula**

j) further development of the gastrula results in 3 cell layers called **germ layers** which develop into different tissues:

: **ectoderm** = skin, nerves, brain, spinal cord

: **endoderm** = digestive structures

: **mesoderm** = muscle, bones, major body organs

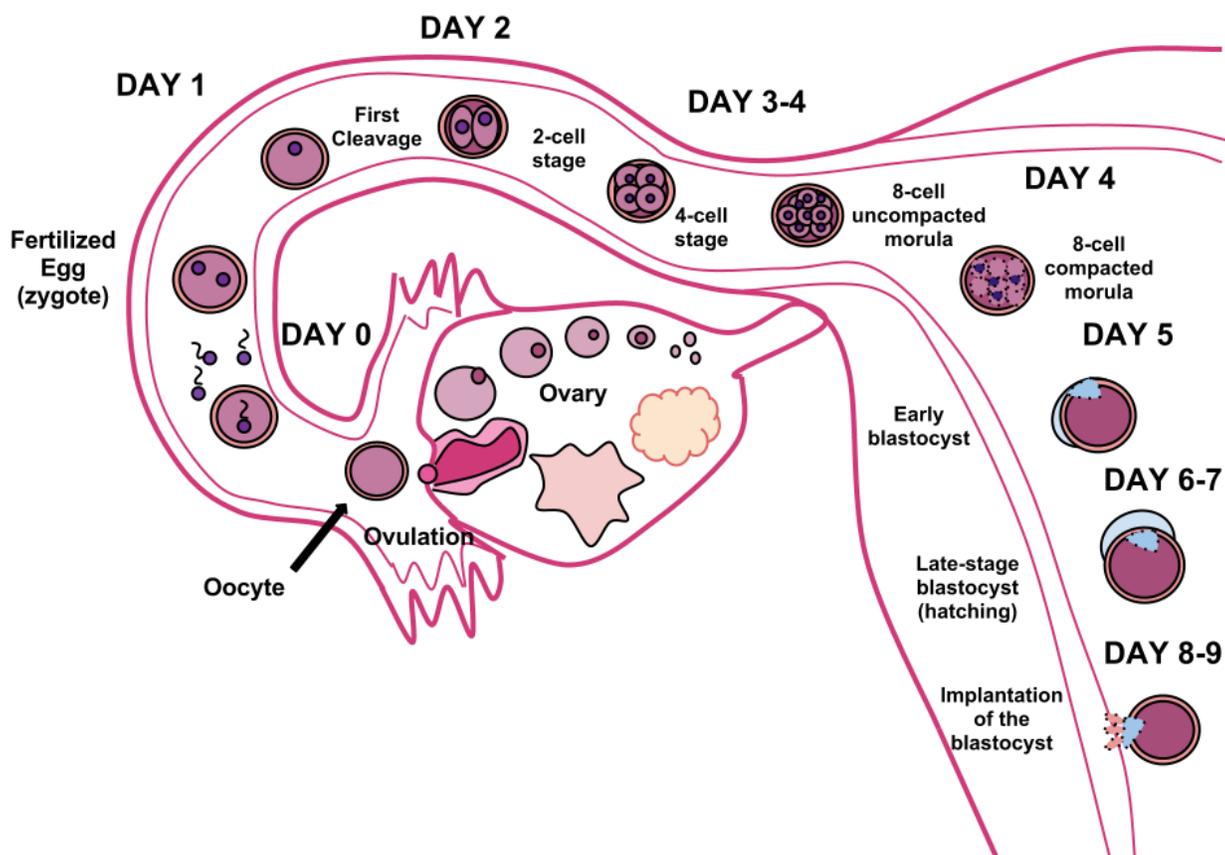
- if the blastocyst or gastrula divides in half = identical twins

: incomplete division= conjoined (Siamese) twins

- fraternal twins = 2 or more eggs fertilized by different sperm

(fertility drugs stimulate follicles to cause multiple eggs to mature in 1 cycle)

- p.552



Prenatal Development

- is divided into 3 trimesters
- **First Trimester** = 0 - 3 months
 - : by the 9th week is referred to as a fetus
 - : all limbs and major organs are formed
 - : weight = 1 g, length = 2 - 3 cm
- **Second Trimester** = 4 - 6 months
 - : lots of movement by the fetus
 - : all body systems are complete but not developed
(infants born this prematurely commonly die or have serious health problems)
 - : ultrasound usually done at about 20 weeks
- **Third Trimester** = 7 - 9 months
 - : body systems finish developing
 - : fetus does most of its weight gain
 - : at birth average infant is 530 mm long and weighs about 3400 g
- **Figure 15.16 p. 554**

Birth

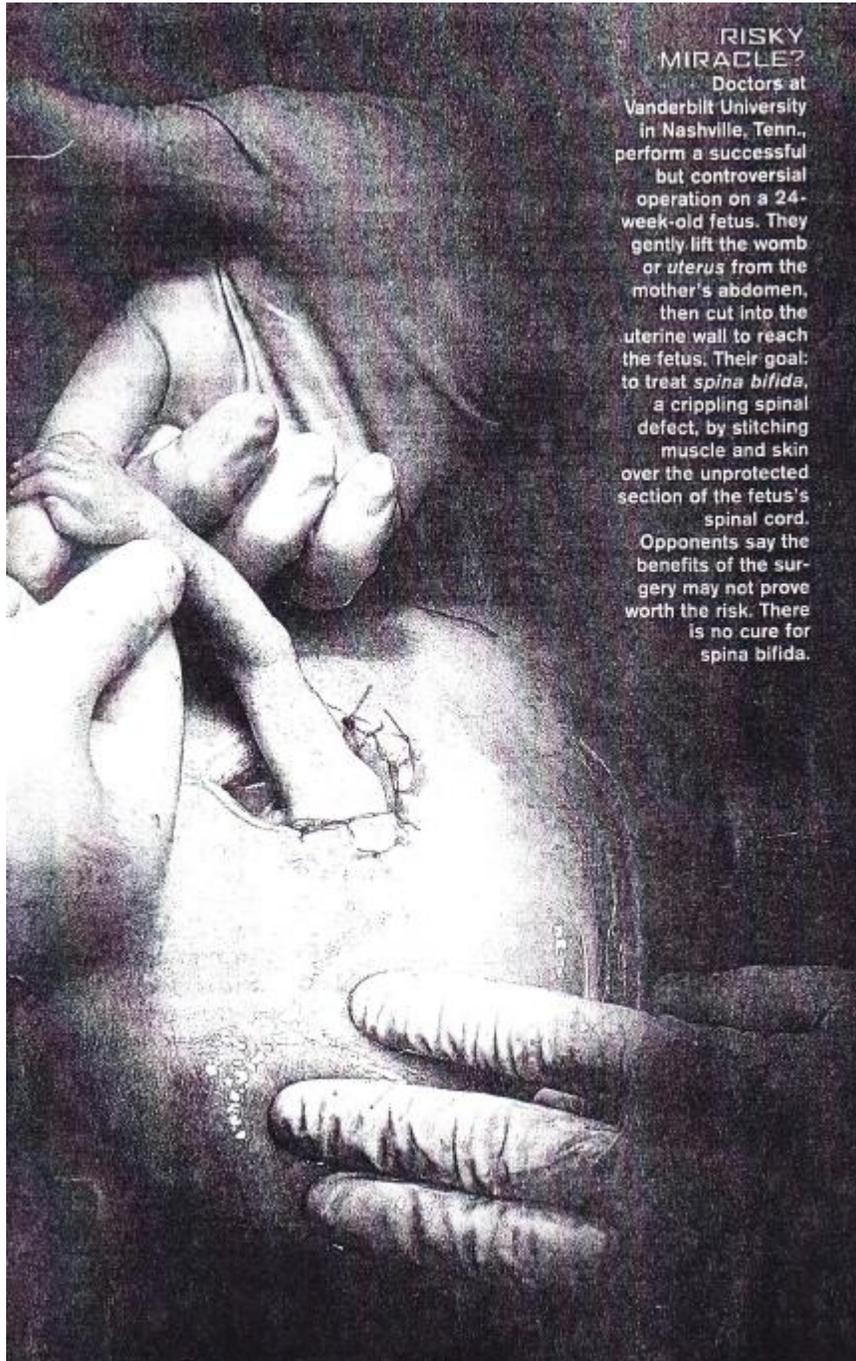
- by the 9th month the baby is ready to be born:
 - a) the hormone **relaxin** - is produced by the placenta causing loosening of the pelvic ligaments to facilitate the passage of the baby.
 - b) the pituitary produces **oxytocin** which causes the involuntary muscles surrounding the uterus contract and relax (**labour**)
 - c) the amnion breaks and its fluid is released
 - d) contractions force the infant through the vagina
 - e) the pituitary produces **prolactin** to stimulate the mammary glands to produce milk
 - : the menstrual cycle usually does not begin again until after milk production stops

Complications:

- a variety of factors prior to and during birth may necessitate surgery to remove the baby.
 - = a **Caesarean Section**

RISKY MIRACLE?

Doctors at Vanderbilt University in Nashville, Tenn., perform a successful but controversial operation on a 24-week-old fetus. They gently lift the womb or uterus from the mother's abdomen, then cut into the uterine wall to reach the fetus. Their goal: to treat *spina bifida*, a crippling spinal defect, by stitching muscle and skin over the unprotected section of the fetus's spinal cord. Opponents say the benefits of the surgery may not prove worth the risk. There is no cure for *spina bifida*.



Pregnancy and Prenatal Development

Pregnancy

- = menstrual cycle is interrupted as a result of fertilization
 - : all mammals use _____ = more successful than external fertilization
- in humans, pregnancy lasts approximately _____
 - a) the ovum is fertilized by sperm in the _____ creating a _____
 - b) as the zygote moves down the fallopian tube it undergoes _____ becoming a _____
 - c) the blastocyst reaches the uterus and attaches to the _____ through a process called _____
 - d) the outer layer of the blastocyst produces _____ (HCG) which ensures LH production = _____
 - corpus luteum is maintained so it can produce estrogen and progesterone to keep the uterine lining (endometrium) thick.
 - = high levels of HCG in urine indicate _____
 - e) the blastocyst develops a _____ which, together with the uterine wall, form the _____
 - a _____ is produced (as in other animals) but it is not functional
 - f) an _____ is produced connecting the blastocyst to the placenta through the _____
 - g) the umbilical cord carries food and O_2 to the blastocyst and carries wastes and CO_2 away.
 - these substances diffuse through a fluid containing antibodies
 - = _____
 - h) a third membrane, called an _____ develops around the blastocyst
 - it fills with fluid and provides protection
 - i) cells of the blastocyst continue to divide and part of the cell layer folds inwards to form a _____
 - j) further development of the gastrula results in 3 cell layers called _____ which develop into different tissues:
 - : **ectoderm** =
 - : **endoderm** =
 - : **mesoderm** =
- if the blastocyst or gastrula divides in half = _____
 - : incomplete division = _____
- fraternal twins = _____
(fertility drugs stimulate follicles to cause multiple eggs to mature in 1 cycle)

Prenatal Development

- is divided into 3 trimesters

- **First Trimester** = _____

: by the 9th week is referred to as a _____

: _____

: weight = 1 g, length = 2 - 3 cm

- **Second Trimester** = _____

: lots of movement by the fetus

: _____

(infants born this prematurely commonly die or have serious health problems)

: ultrasound usually done at about 20 weeks

- **Third Trimester** = _____

: body systems finish developing

: _____

: at birth average infant is 530 mm long and weighs about 3400 g

- **Figure 15.16 p. 554**

Birth (figure 15.17 p. 556)

- by the 9th month the baby is ready to be born:

a) the hormone _____ is produced by the placenta causing loosening of the pelvic ligaments to facilitate the passage of the baby.

b) the pituitary produces _____ which causes the involuntary muscles surrounding the uterus contract and relax _____

c) the amnion breaks and its fluid is released

: the amnion can break before labour starts which will cause labor to begin

d) contractions force the infant through the vagina

e) the pituitary produces _____ to stimulate the mammary glands to produce milk

: the menstrual cycle usually does not begin again until _____

