CONCEPTION, IMPLANTATION, DEVELOPMENT, FETAL CIRCULATION


FERTILIZATION: (p 1089) ovum good for only 24 hrs, sperm for 48. Sperm take only few minutes to reach fallopian tube.

After fertilization, fate of zygote: has large amt of cytoplasm, cleavage distributes it to cells.

CLEAVAGE: (p 1092) division without growth during 3 days to uterus.

implantation.

Implantation (p 1093), trophoblastic cells invade endometrium: nutrition for 2 months due to endometrial erosion

Human Chorionic Gonadotropin maintains corpus luteum until placenta forms. Can cause nausea

EMBRYONIC MEMBRANES (p 1083):

- amniotic cavity forms above cell mass endoderm, then mesoderm spreads around inside of blastocoel. Blood forms first here

- yolk sac forms under, penetrates umbilical stalk

- allantois [sausage like]: extends fr lower gut out pocket forms in endoderm near base of yolk sac, surrounded by mesoderm, forms bladder

- chorion mesoderm spreads around blastocyst, combines with trophoblast to

- amnion ectoderm splits, lines superior cavity, becomes covered with mesoderm form chorion

In mammalian embryo, early cells do not have fixed fate: Environment determines fate of cells. Position, not particular cells.

Ontogeny recapitulates phylogeny.

SECOND WEEK: inner cell mass forms a plate with two layers:

ectoderm and endoderm: together form germinal disc. Organogenesis, Differentiation, Induction: processes of specification of form and function

Induction: process whereby embryonic tissues are induced to develop into differentiated tissues.

zB: brain forms three out pockets: fore, mid, hind. out pocket from fore touches ectoderm, induces lens

THIRD WEEK:

GASTRULATION (p 1094) forms mesoderm by primitive streak, cells migrate down and between original two layers. others migrate to head end, forming notochord first.

somites segmented structures (mesoderm) lining either side of nerve cord, leading to vertebrae, sets of muscles, enervation, limb buds, lining of coelom, kidneys, gonads, muscles and bones

Organs derived from embryonic tissues:

Ectoderm: nervous system, skin, enamel of teeth, some glands (anterior pituitary, mammary glands)

Mesoderm: muscle, skeleton, kidneys, gonads, spleen, adrenal cortex, membranes lining body cavities. Circulatory sys

Endoderm: lining of GI tract, lungs, lining of bladder, urethra. glands: liver, pancreas, thymus, thyroid, parathyroid.


Neural Crest cells fate: sensory ganglia along spine, Schwann cells, sympathetic NS, adrenal medulla, pigment cells, tooth forming cell, meninges, cartilage contributing to bony structure of jaws and face, cranium.

FIFTH WEEK: gill pouches form, develop into tiny bones of middle ear, eustachian tube, tonsils, thymus, parathyroid.

heart begins to beat

induction of eyes and ears as brain grows out, touches ectoderm,

Dev of kidney: pronephros, then mesonephros along somites, later adult kidney.

organ formation completed by the 12th week except for CNS.

Teratogenic effects strongest in first 12 weeks, avoid all drugs, attention to good nutrition.

Smoking: reduced birth wt, incr abortion, stillbirth, heart defects, orofacial defect, SIDS, lower IQ

Alcohol: leading teratogen, 2x sp abort, decr birthwt, F.A.S: growth retard, joint, CV, lead cause ment retrd

3RD MONTH Placenta (p 1097) functioning, makes estrogen and progesterone. Embryo become fetus.

chorion forms villi, surrounded by pools of maternal blood. Surface area of placenta: 16 square meters

umbilical cord forms from combination of yolk sac and allantois

FETAL CIRCULATION (p 768):

circ: 1) two umbilical arteries flow to placenta branch off of the R & L common iliac arteries

2) umbilical vein flows from placenta carries oxygenated blood, nutrients

heart: 3) ductus venosus bypass around fetal liver (for umbilical vein), empties into inferior vena cava

4) foramen ovale bypass pulmonary circuit hole between R and L atria,

5) ductus arteriosus bypass lungs pulmonary trunk empties into descending aorta