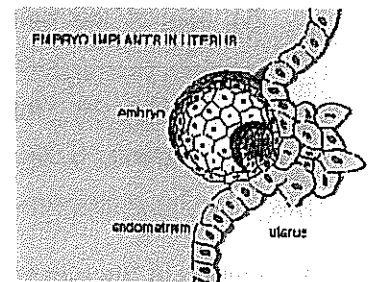
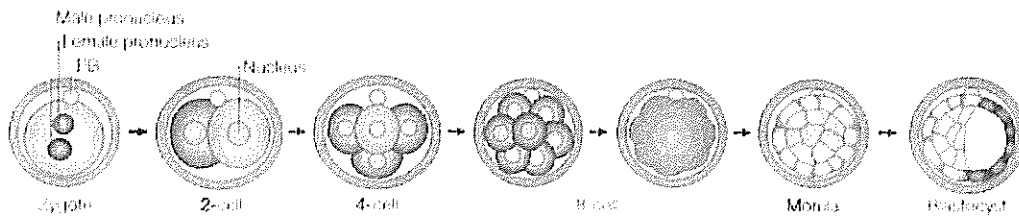


2B. Pregnancy (Chap 12)

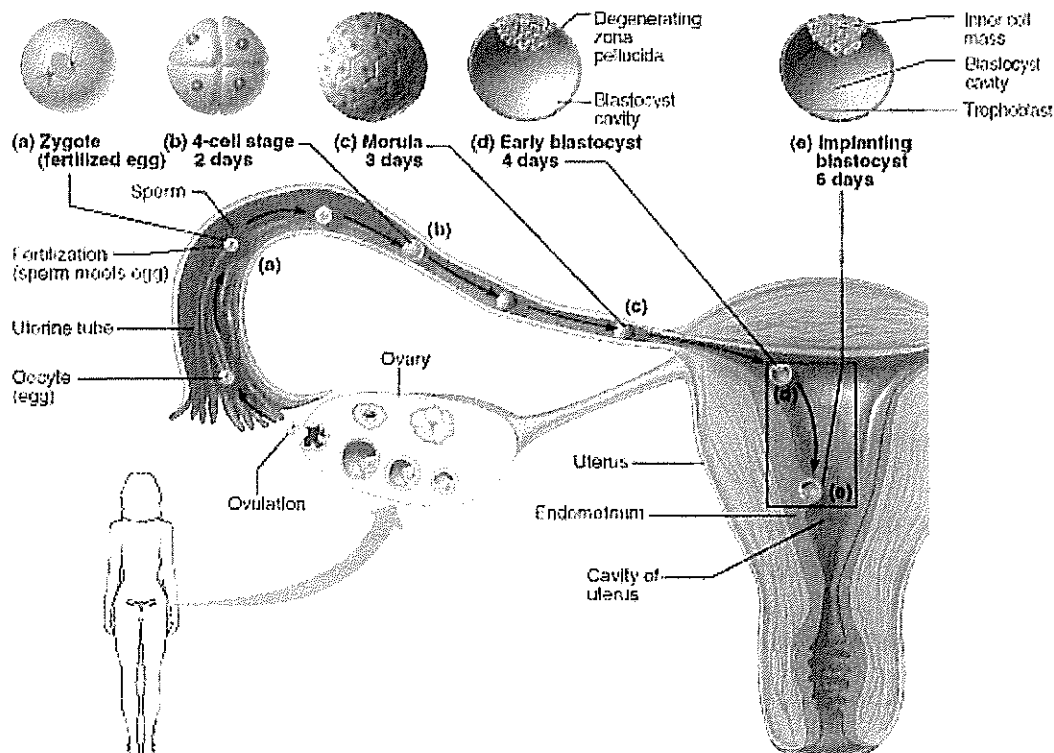
1. Define **fertilisation** and where does it exactly occur?

Development after fertilisation:

After fertilisation the _____ begins to _____ (this is known as _____). There is no growth during this time (only a form of M_____). It continues to divide, into a solid ball of cells (called a M_____), and then the cells arrange themselves to form a hollow, fluid filled ball of cells called a B_____. The _____ eventually becomes the embryo. It becomes a blastocyst when the embryo reaches the uterus. Some of the outer cells become the P_____.



After a few days the blastocyst sinks into the _____ to become firmly attached to the wall. This process is called _____, which usually occurs just one week after fertilisation. There are e_____ that are released from the outer cells of the blastocyst which alter the structure of the endometrium. Once attached the endometrium, the blastocyst gains nourishment for growth and development by absorbing _____ from the glands and blood vessels of the lining.



So many terms, what do I call it?

Zygote (first cell produced after fertilisation) → **Morula** (solid ball of cells formed after cleavage) → **Blastocyst** (hollow, fluid filled ball of cells) → **Embryo** → after 2 months is called a **Foetus**

_____ **Period** (first 2 months) → _____ **Period**.

Maintenance:

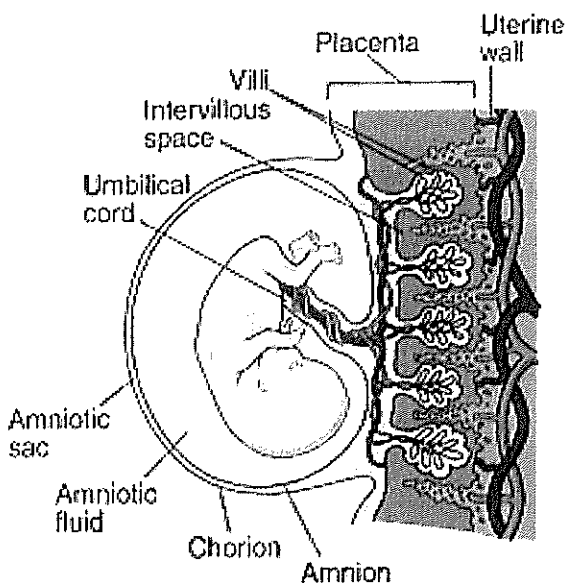
The development of the embryo will all depend on the _____. It is maintained by high levels of _____ in the blood which stop it _____. The _____ is responsible for producing the hormones in the early stages of pregnancy, until the _____ takes over the maintenance role.

The Placenta:

By the end of the embryonic period, membranes have developed around the foetus. One of these is the _____. The placenta is an organ that supplies _____ to and removes _____ from the foetus. It is completely formed by the end of the _____ month. Not only does it supply nutrients, is also serves as an _____, producing _____ which help to maintain pregnancy.

Functions of the placenta (Table 12.1 in the textbook): Endocrine, Excretory, Immune, Nutritional and Respiratory

Development of the Placenta:



- begins to develop as the blastocyst is implanted in the endometrium
- _____ (small, finger-like projections with many blood vessels) develop from the outer layer of cells. The villi penetrate the _____ and become surrounded by pools of the mother's blood. The large number of villi = large _____ (more area for exchange).
- Even though there is foetal and maternal blood, they do not normally mix, because a few layers of cells that separate the two.

- The exchange of materials occurs through _____ and _____. (Includes oxygen, nutrients from mother's blood, and removal of wastes from foetal blood).
- Placenta attached to the foetus by the _____. Comprises of two _____ (carry blood to the capillaries of the Chorionic villi) and one _____ (carries blood from the placenta back to the foetus).

Embryonic Membranes:

Membrane	Description
<i>Amnion</i>	
<i>Amniotic Fluid</i>	
<i>Chorion</i>	

Cell Differentiation, Stem Cells and the Primary Germ Layers:

Once implanted the inner cell mass of the blastocyst undergoes changes. This results in three layers of cells (the primary germ layers). These embryonic tissues differentiate into all the tissues and organs of the body.

Define Cell Differentiation

What is a stem cell? Where can we get stem cells from?

	Potency of Stem cells
<i>Totipotent</i>	
<i>Pluripotent</i>	
<i>Multipotent</i>	

Primary Germ layers: are embryonic tissues that will differentiate into all the tissues and organs of the body

	Develops into...
<i>Ectoderm</i>	
<i>Mesoderm</i>	
<i>Endoderm</i>	

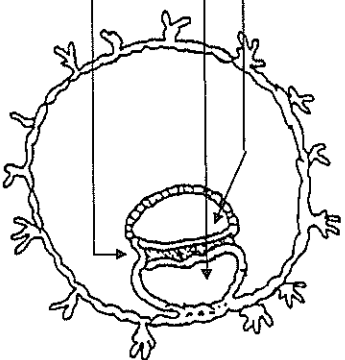
The development of the foetus

A thickening on one side of the blastocyst enlarges and develops two spaces:

- the amniotic _____
- and the _____ sac.

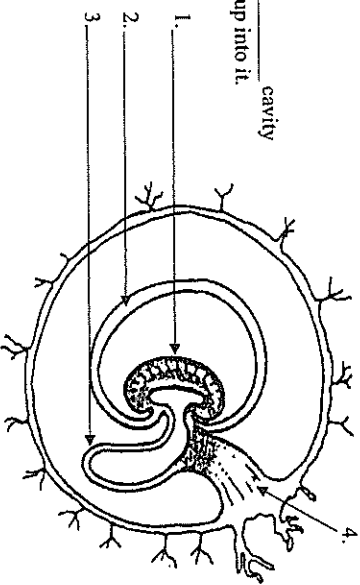
The plate of tissue between the spaces is destined to become the new individual.

The remaining tissue forms the foetal membranes.



The amniotic cavity is lined with ectoderm – this forms the _____ and _____ system of the foetus. The yolk sac is lined with endoderm – this forms the gut lining and viscera of the foetus. The tissue between, the mesoderm, forms the remaining tissues such as _____ and _____.

As pregnancy advances the _____ cavity enlarges and the foetus mushrooms up into it.



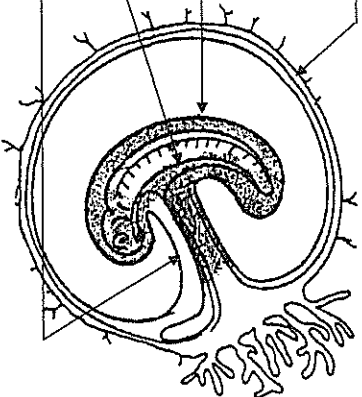
Eventually the amnion meets and fuses with the _____ to form a single thin membrane containing _____ fluid.

The amniotic fluid _____ the growing baby, and permits it to move _____ as soon as muscles, nerves and bones develop.

The entire body surface of the foetus is covered in ectoderm.

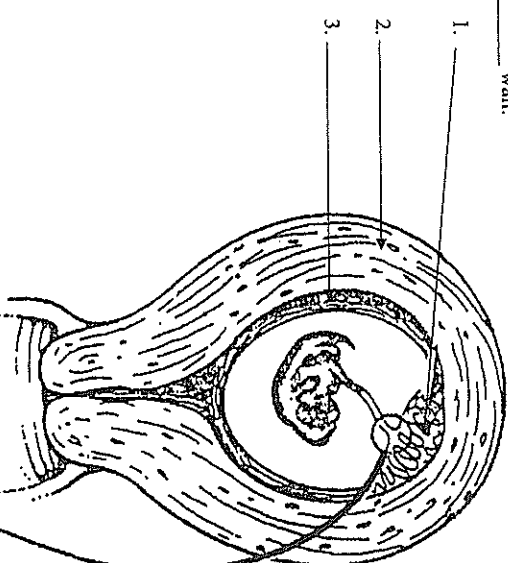
Part of the yolk sac is pinched off inside the foetus to form the primitive gut.

The body stalk and remaining yolk sac become clothed in amnion to form the umbilical cord.



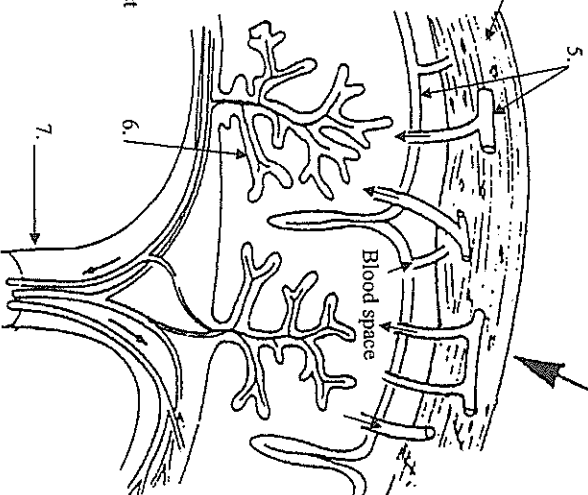
The chorion, at first, is covered by a thick network of branching villi, which absorb nutrients. In the earliest days these nutrients come from simple digestion of endometrial cells. Later they are absorbed from irregular pools of _____ which develop around the chorion.

With the formation of the _____ cord, the area at its base becomes thickened and specialised as the _____, a disc of tissue firmly attached to the _____ wall.



The villi of the _____ become occupied by blood vessels from the growing foetus, and blood from the foetus is pumped through the villi. The villi project into large spaces which are filled by blood from the maternal circulation. Only the chorionic lining separates the _____ of the mother and child.

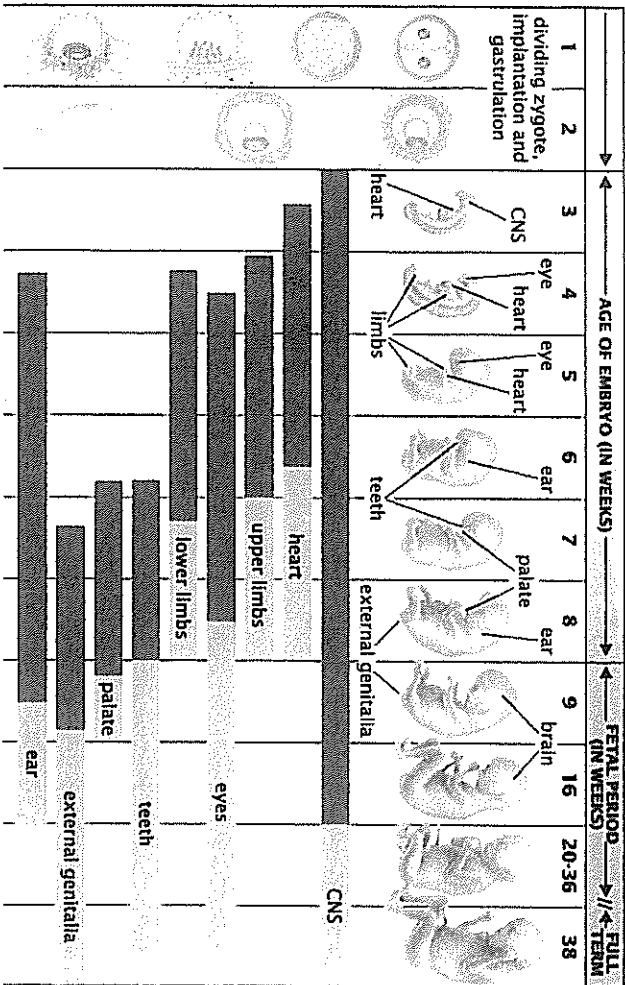
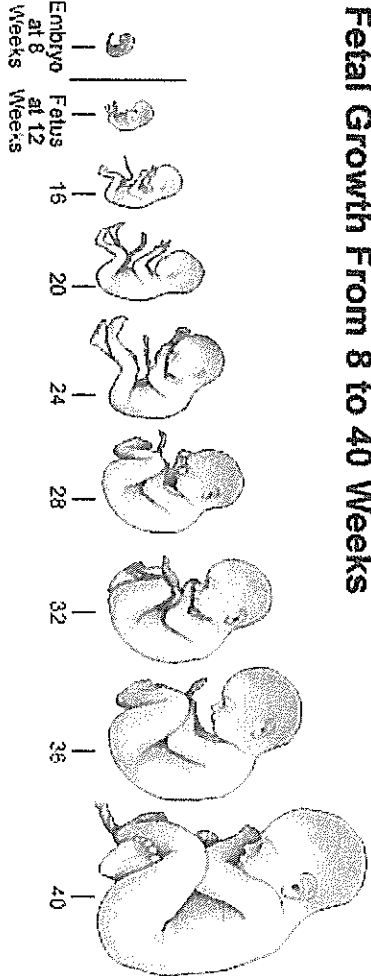
_____ and _____ are exchanged across the placenta, _____ are removed, and soluble nutrients are absorbed to support the growing foetus. The placenta can also protect against harmful bacteria, but many _____ and most _____ can readily pass through and harm the foetus.



The entire placenta, when fully developed, is about 18 cm across and 3 cm thick. It weighs about 500g. It resembles a _____ since the villi (which have a total surface area of about 10 m²) are tightly packed. Towards the end of the pregnancy the placenta takes about 10% of the output of the heart of the mother.

After 3 – 4 months of pregnancy, the _____ degenerates and production of _____ and _____ is taken over by the _____ glands of the foetus and the _____ working together. The production of progesterone and oestrogen increases steadily throughout pregnancy.

Fetal Growth From 8 to 40 Weeks



LOSS OF CONCEPTUS	MAJOR MORPHOLOGICAL ABNORMALITIES	FUNCTIONAL DEFECTS AND MINOR MORPHOLOGICAL ABNORMALITIES
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Month of pregnancy	Length and Weight at end of month	Developmental events
1	0.6cm	<ul style="list-style-type: none"> Spinal column and central nervous system begin to form Limb buds appear, which will go on to form the arms and legs later Heart begins beating
2	3cm, 1g	<ul style="list-style-type: none"> Eyes form but eyelids are fused shut Nostrils evident but plugged with mucous Head nearly as large as the rest of the body Detectable brain waves Bone formation begins Limb buds differentiate into paddle-like hands and feet with ridges which later separate into fingers and toes Blood cells and major blood vessels form Genitals present but sexes not yet distinguishable
3	9cm, 30g	<ul style="list-style-type: none"> Eyes well developed beneath the eyelids which are still fused Nose develops a bridge External ears present Limbs are well formed, with finger and toe nails present Very weak foetal movements that are not felt by mother Liver is prominent and produces bile Palate is fusing Sexes can be distinguished visually
4	14cm, 100g	<ul style="list-style-type: none"> The body is now larger in proportion to head Skin is bright pink Hair forms on scalp Joints begin to form Lips exhibit sucking movements Kidneys well formed Heartbeat can be heard with a stethoscope
5	19cm, 200-450g	<ul style="list-style-type: none"> Entire body covered with fine hair called lanugo Brown fat forms which will be used for heat production after birth Foetus now bent forward into "foetal position" because of crowding Mother can feel foetal movement (quickening)
6	27-35cm, 550-800g	<ul style="list-style-type: none"> Eyelids are unfused and eyes open Eyelashes form Skin is wrinkled, pink and translucent Lungs begin producing surfactant, which is a wetting agent that reduces surface tension and prevents the lungs from collapsing Rapid absolute weight gain
7	32-42cm, 1100-1350g	<ul style="list-style-type: none"> Skin wrinkled and red Testes descend into scrotum, if male
8	41-45cm, 2000-2300g	<ul style="list-style-type: none"> Fat deposition just beneath the skin, foetus appears plumper and more "babyish" Lighter and less wrinkled skin
9	50cm, 3200-3400g	<ul style="list-style-type: none"> More fat deposited beneath the skin Lanugo (Fine body hair covering) is shed Nails extend to or beyond fingertips

Major events of prenatal development. Note the length at end of month is measured as crown-to-rump length, which is measured from the top of the head to the bottom of the buttocks.