

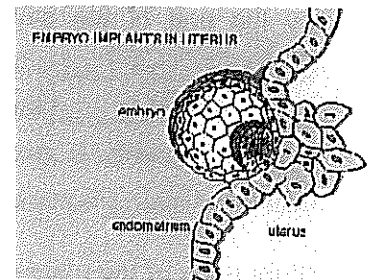
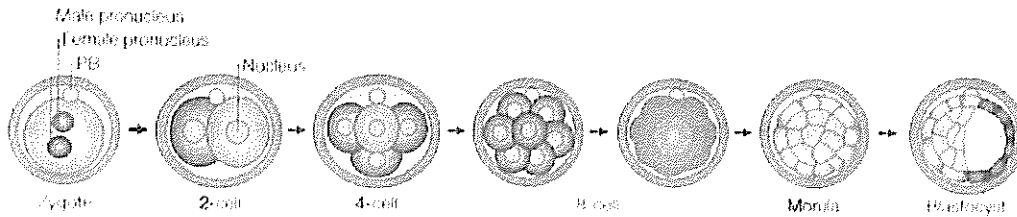
2B. Pregnancy (Chap 12)

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

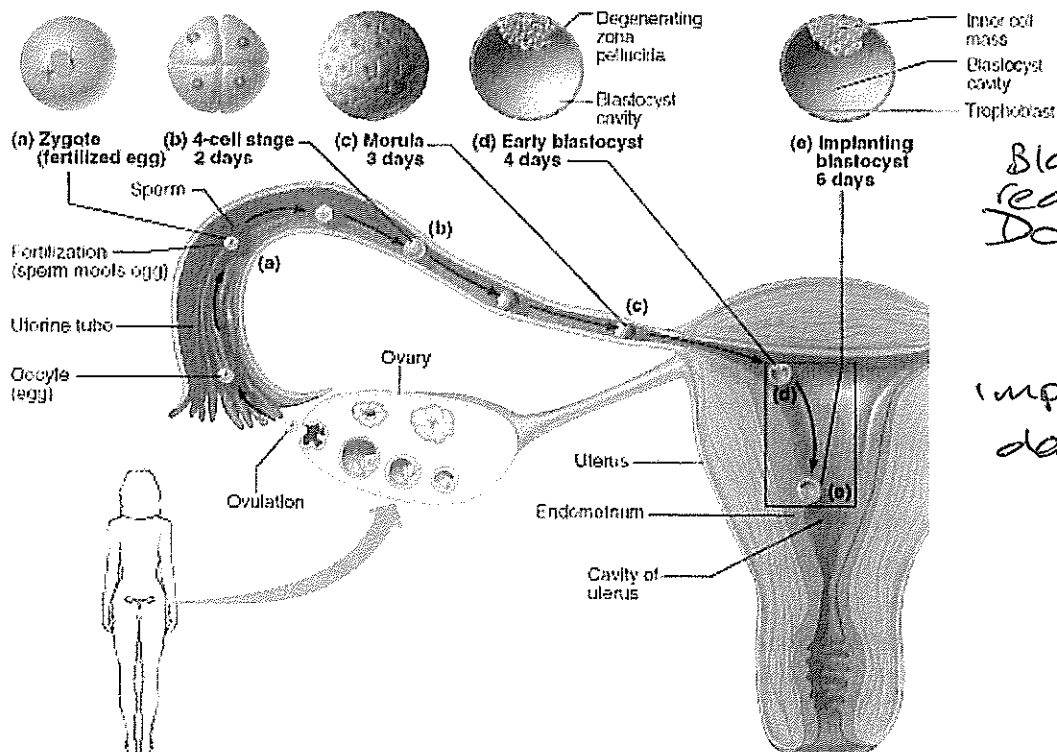
- union of sperm + ova
- fallopian tube.

Development after fertilisation:

After fertilisation the zygote begins to divide (this is known as cleavage). There is no growth during this time (only a form of Mitosis). It continues to divide, into a solid ball of cells (called a Morula), and then the cells arrange themselves to form a hollow, fluid filled ball of cells called a Blastocyst. The inner cell mass eventually becomes the embryo. It becomes a blastocyst when the embryo reaches the uterus. Some of the outer cells become the Placenta.



After a few days the blastocyst sinks into the endometrium to become firmly attached to the wall. This process is called implantation, which usually occurs just one week after fertilisation. There are enzymes 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 nutrients from the glands and blood vessels of the lining.



Blastocyst reaches uterus Day 5.

implant day 6-8.

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**

Embryonic Period (first 2 months) → Foetal Period.

Maintenance:

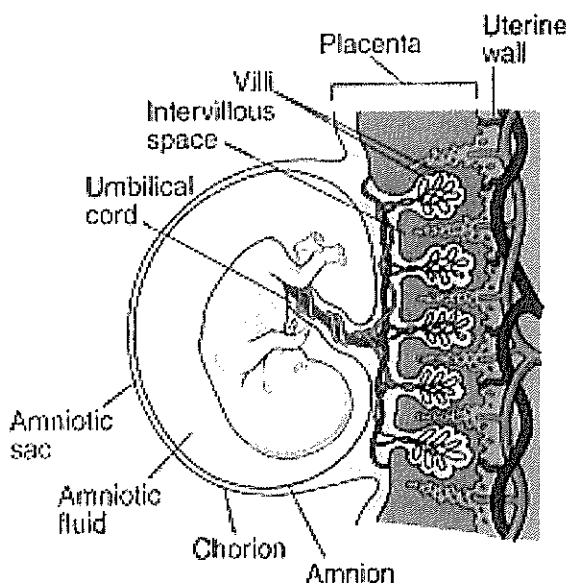
The development of the embryo will all depend on the Endometrium. It is maintained by high levels of progesterone in the blood which stop it breaking down. The Corpus luteum is responsible for producing the hormones in the early stages of pregnancy, until the placenta takes over the maintenance role.

The Placenta:

By the end of the embryonic period, membranes have developed around the foetus. One of these is the chorion. The placenta is an organ that supplies nutrients to and removes wastes from the foetus. It is completely formed by the end of the 3rd month. Not only does it supply nutrients, it also serves as an endocrine organ, producing O + P. 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
- chorionic villi (small, finger-like projections with many blood vessels) develop from the outer layer of cells. The villi penetrate the endometrium and become surrounded by pools of the mother's blood. The large number of villi = large surface area (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 diffusion and active transport. (Includes oxygen, nutrients from mother's blood, and removal of wastes from foetal blood).
- Placenta attached to the foetus by the umbilical cord. Comprises of two umbilical arteries (carry blood to the capillaries of the Chorionic villi) and one umbilical vein (carries blood from the placenta back to the foetus).

Embryonic Membranes:

Membrane	Description
Amnion (inner layer)	- Surrounds embryo. - secretes A. Fluid
Amniotic Fluid	can regulate temp - shock absorption.
Chorion (outer layer)	- mostly becomes placenta.

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

when unspecialised cells develop into specific types of cells.

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

an unspecialised cell. (not specialised for any particular role + capable of mitosis + differentiating.

inner cell mass / blastocyst + umbilical cord.

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→ embryonic stem cells
umbilical cord
placenta
Adult

Potency of Stem cells

Potency	Description
Totipotent (taken before ICMass)	has ability to develop into <u>ALL</u> types of cells (inc embryo + membranes) embryo
Pluripotent ICM.	can give rise to all, <u>but</u> embryonic membranes.
Multipotent	only give rise to specific cells that have specific function (eg. muscle for muscle)

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

	Develops into...
Ectoderm	<i>Epidermis</i> • Skin, hair, nails, teeth; eyes. • Nervous System.
Mesoderm	Muscles, bones, (CT) blood, cartilage. Epithelium - reproduction, blood vessels
Endoderm	Epithelium of major organs (lungs, bladder, alimentary canal).