***Early development of the embryo***

Gestation is often divided into three stages:

(1) the ovum stage, which extends from 0–13 days,

(2) the embryo stage which extends from 14 days, when germ layers begin to form until 45 days, and

(3) the fetus stage and this is from 46 days until parturition.

After fertilization, the zygote divides many times without significant growth (**cleavage**).The first cleavage produces a 2-cell embryo, followed by 4-cell, 8-cell, 16-cell embryos and so forth.

During the cleavage process, the embryo enters the uterus as a 16- 32cell embryo (**morulla**) within 3-4 days.

Peristaltic contractions transport the embryo to the uterus. These contractions appear to be controlled by a balance of estrogen and progesterone.

During the next several days, fluid collects inside the embryo, forming a cavity surrounded by single spherical layer of cells, (the trophoblast) with a group of cells, (the inner cell mass) at one edge to form **blastocyst**.

A mass of cells, destined to become the fetus.

The embryo or blastocyst, as it is called at this point, begins to elongate ending the period of cleavage.

The nutritive requirement of the developing blastocyst are satisfied by diffusion from yolk in the oocyte and by secretion of the oviduct and uterus (uterine milk) until it become fixed in position in the uterus.

At about day 8 the zona pellucida begins to fragment and the blastocyst hatches. This is then followed by a period of blastocyst elongation. Development of the so-called germ layers begins from about the fourteenth day and characterizes the beginning of the embryo phase. **Inner cell mass of embryo is** developing to fetus. Through formation of the 3 germ layers (**Ectoderm, Mesoderm and Endoderm).**

**1**. **Ectoderm**

In general forms The ectoderm gives rise to the external structures such as skin, hair, hooves and mammary glands and also the nervous system.

**2**. **Mesoderm**

In general forms structural tissue including: Muscle, Circulatory system, and reproductive system heart, muscles and bones.

**3**. **Endoderm**

In general forms internal organs including: Digestive system, liver, and endocrine glands. After differentiation, fetus has all the necessary parts & mostly have an increase in size.

**How can you determine the age of fetus ?**

In cow : fetus age (days) =2.5 (Y + 21)

In sheep : fetus age (days) =2.1 (Y + 17)

Y : it mean the distance between the crown to the anus (cm).