

## Pregnancy

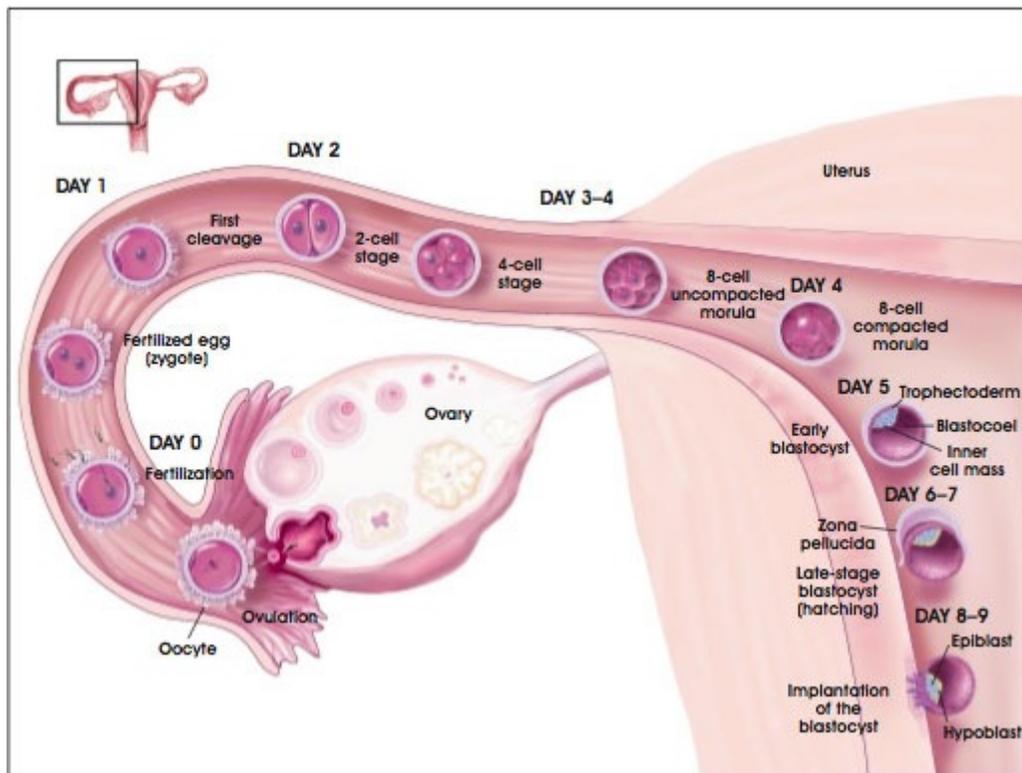
Human **pregnancy** is the carrying of one or more offspring in the womb of a woman, from the moment of conception to the moment of childbirth.

Childbirth usually occurs about 38 weeks after conception. In women who have a menstrual cycle length of four weeks, this is approximately 40 weeks from the last normal menstrual period. The normal term for delivery is between 37 weeks and 42 weeks.

### Terminology

The term embryo is used to describe the developing offspring during the first 8 weeks following conception. The term fetus is used from about 2 months of development until birth.

### The Early Stages of Pregnancy

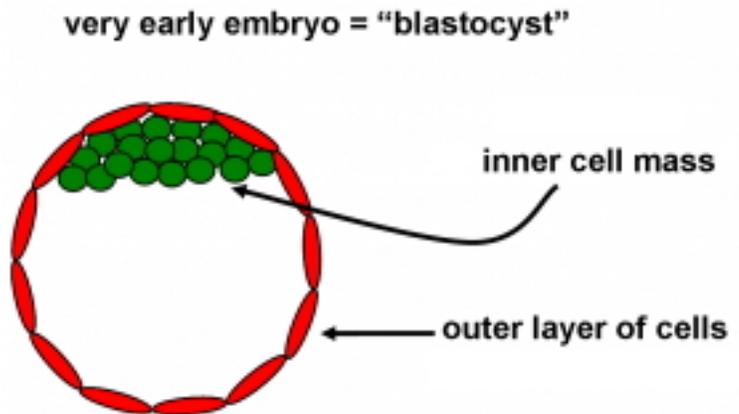


The process that leads to pregnancy begins with the fusion of a sperm cell and an egg cell to produce a **zygote**. This fusion is known as **fertilization**.

Within the first 24 hours following fertilization, the zygote undergoes a rapid series of three mitotic cell divisions. At the end of this stage, called **cleavage**, the developing embryo consists of 8 cells.

After the 8-cell stage, as the number of cells continues to increase, they begin to form a structure called a **blastocyst**.

The blastocyst is a hollow ball of cells consisting of an outer layer of cells surrounding an inner cell mass. The inner cell mass will eventually become the embryo, while the outer layer of cells becomes the placenta.



Throughout these early stages, the developing embryo has been continually moving along the oviducts, towards the uterus. Approximately 8-10 days after fertilization, the blastocyst reaches the uterus and begins the stage known as implantation.

During **implantation**, the blastocyst burrows its way into the inner wall of the uterus. The moment of implantation is considered the official beginning of pregnancy.

After implantation, the placenta forms from the outer layer of cells of the blastocyst. The **placenta** connects the developing embryo to the uterine wall to allow nutrient uptake, waste elimination, and oxygen exchange via the mother's blood supply. The **umbilical cord** is the connecting cord from the embryo to the placenta.

### **Stages of Pregnancy**

Pregnancy is typically divided into three periods, or trimesters, each about 3 months long.

#### **First Trimester**

Weeks 1 to 13 of the pregnancy are called the first trimester.

The first two weeks of this trimester are the two weeks before conception, and include the woman's last period. Notice that this means the embryo's age is actually 2 weeks less than whatever week of pregnancy a woman is in.

The third week is the week in which fertilization occurs, and the fourth week is when implantation takes place. At the end of the fourth week, the embryo is the size of a poppy seed.

The fifth week is the start of the embryonic period. This is when the embryo's brain, spinal cord, heart, and other organs begin to form. An embryo at 5 weeks is the size of a sesame seed (1.6 to 3.2 mm long), and looks more like a tiny tadpole than a human.

In the sixth week, the embryo is as long as a lentil (4.2 to 6.3 mm long). The heart continues to develop and begins to beat (100-160 times a minute). Basic facial features begin to form, as do arm buds and a tail.

By week 7, the developing embryo has doubled in size. It is now the size of a blueberry (about 13 mm long). The eyes, nose, and nasal pits have begun to form. Leg buds form and hands form that look like flat paddles on the arms.

In the eighth week, the embryo is the size of a kidney bean (15-18 mm long). Lungs begin to form. The brain continues to develop. Arms and legs are longer, with clearly visible hands and feet (though fingers and toes are webbed at this time). The development of the genitalia begins.

By the ninth week, the embryo is the size of a grape (about 25 mm long). Hair follicles have begun to form. The locations of the elbows and knees are visible. The embryo begins to move its arms and legs, though it cannot be felt yet.

The tenth week (embryo is now 8 weeks old) marks the transition from embryo to fetus. The fetus is much less susceptible to environmental hazards than the embryo was.

In the last 3 weeks of this trimester (weeks 10-12), fetal length increases to the size of a lime (30 to 80 mm long). Facial features continue to develop. Eyelids and earlobes are nearly fully developed. Tooth buds, which will form the baby teeth, appear. The limbs are long and thin. The fetus can make a fist with its fingers.

After week 13, gender can be predicted with nearly 100% accuracy.

## **Second Trimester**

Weeks 14 to 27 of the pregnancy are called the second trimester.

During weeks 14-16, the fetus grows to the size of an avocado (about 10 cm long). Hair develops on the head. The skin is almost transparent. More muscle and bones have developed, and the bones become harder. The fetus moves quite actively, and makes sucking motions with its mouth.

By week 20, the fetus is the size of a banana (about 25 cm from head to heel). During this week, eyebrows and eyelashes will appear. Nails appear on the fingers and toes. The fetus becomes much more active; so much so that the mother can now feel the fetus moving.

At 23 weeks, the fetus is now the size of a large mango (about 30 cm long). It weighs nearly a pound. The fetus now has a startle reflex. Footprints and fingerprints form around this time.

By week 27, the fetus is the size of a head of cauliflower (about 36 cm long) and weighs almost 2 pounds. It sleeps and wakes at regular intervals, opens and closes its eyes, and may even suck its fingers. The brain is very active. The lungs, while immature, could function at this stage.

## **Third Trimester**

Weeks 28 to 40 of the pregnancy are called the third trimester.

During weeks 28 to 31 the fetus is developing its eyesight, and may be able to see light through the womb. It also begins to store body fat in preparation for life outside the womb. The muscles and lungs continue to mature, and the head grows to make room for the developing brain. At the end of this period, the fetus is about 39 cm long, weighs around 3 pounds, and is heading into a growth spurt.

In the remaining weeks, the fetus will grow at a tremendous rate. By the time it is born (usually in week 40), it will have grown to an average of 50 cm in length, and weigh an average of 7.5 pounds.