

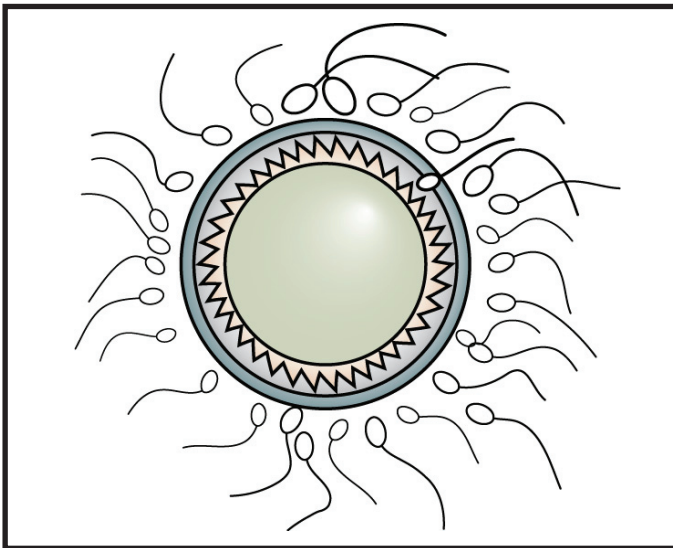
# Conception and Gestation

After an animal goes through puberty, it is able to produce offspring. The process of producing a new life begins with conception and continues through gestation. This lesson will discuss conception and the gestation of the fetus.

## Conception

During mating, the male mammal deposits semen in the female's vagina near the cervix. The sperm travels through the cervix and the uterus into the oviduct. If an egg is present, conception occurs when the head of the single sperm penetrates the egg, which usually takes place in the upper third of the oviduct. The union of the egg and sperm (pictured in Figure 4.1) creates a new life called an embryo.

Figure 4.1 - Conception



Conception is the same in cattle, swine, sheep, dogs, and rabbits. In some of these species, however, more than one egg may be released and fertilized. The sow, bitch, and doe are all litter-bearing animals. They produce multiple ova when ovulating.

While conception is similar in fowl, some differences do exist. The male deposits semen in the cloaca. The semen then travels up the oviduct to the infundibulum, where the egg is fertilized. Fertilization takes place on the yolk at a point called the germinal disk, which contains the nucleus. In contrast to the other animals, sperm from fowl remain viable for weeks while stored in the folds of the infundibulum. Conception can therefore still occur quite some time after mating.

## Methods of Impregnation

A female animal can be bred naturally or artificially. Natural breeding involves the copulation of the male and the female. Artificial methods of breeding involve human intervention in impregnation.

Two methods are used to artificially impregnate animals. One method is called artificial insemination (AI). In AI, semen is collected from the male and carefully stored to ensure the survival of the sperm. The stored semen is then ready to use when the female is in estrus. The semen is inserted into the reproductive tract using an inseminating tube (mammals) or syringe (fowl).

Another method used to artificially impregnate animals is embryo transfer (ET). In ET, injections of FSH are used to stimulate the female to ovulate many eggs. The induced eggs are fertilized either naturally or artificially. Once the eggs are fertilized, the embryos are collected from the female. Individual embryos are inserted into host females for the rest of the gestation period. ET cannot be used in fowl.

## Pregnancy Determination Procedures

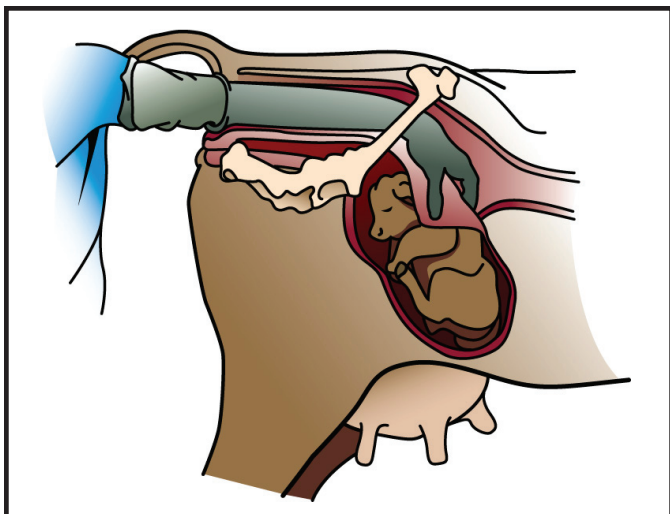
Being able to determine whether or not an animal is pregnant is very important. It allows the producer to make appropriate production decisions for his or her animals.

One way to determine pregnancy is by a visual inspection. If pregnant, a female will not have the visual signs of estrus. Also, the female may appear to have an enlarged abdomen later in the pregnancy.

Rectal palpation is another way to determine pregnancy. It is widely used for cattle and horses. The determination is made by feeling the uterus, as illustrated in Figure 4.2. After putting on a sterile glove to protect against infection, insert the hand into the female's rectum, which lies above the reproductive tract. Once the hand is inside the rectum and past the pelvic bones, feel for the cervix below. It should feel something like the neck of a soda bottle. After confirming the location of the cervix, extend the hand and arm to the uterus to feel for a fetus floating in the distended uterus. In the cow, button-like cotyledons, which are the points of attachment between

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Figure 4.2 - Rectal Palpation in the Cow



the placenta and the uterus, may also be felt. A modified version of rectal palpation is used in sheep; a rod is inserted in the rectum and used to move the fetus so that it can be felt through the abdomen.

Abdominal palpation can also be used to determine pregnancy. It is utilized for dogs and rabbits. Abdominal palpation is actually a routine physical check, in which the abdomen is examined externally with the hands. The person doing the palpation feels for an enlarged uterus, an indication that the female is pregnant. Care should be taken when using this method to determine pregnancy, because exerting too much pressure on the abdomen could damage the embryos.

Ultrasonic sound is used for pregnancy checks for many species. The equipment necessary includes a transducer, a machine unit, and some type of sealant. The sealant is placed between the transducer and the body to exclude air. When the transducer is correctly placed, ultrasonic sound waves are transmitted through the body. The sound waves are reflected by tissue. When the waves encounter a fetus, the unit will sound or light up, indicating that the female is pregnant. Figure 4.3 shows a sow being pregnancy checked with ultrasonic sound.

Pregnancy can be determined in other ways. A laboratory may provide pregnancy results from blood tests. X-rays can be used to reveal pregnancy as well.

## Gestation

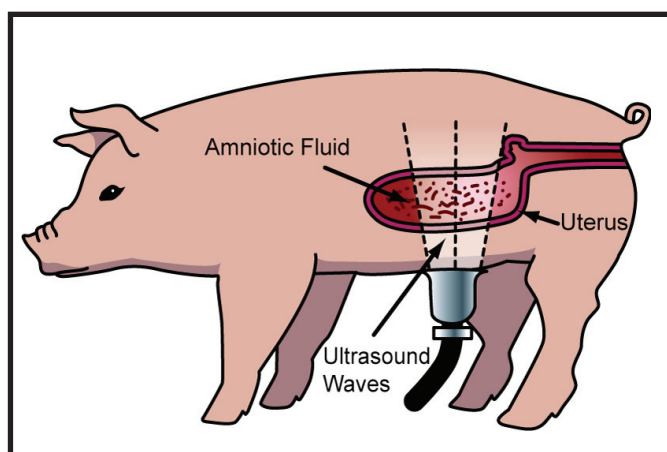
Gestation is the period of development of mammalian young that begins at conception and ends at birth. Another name for gestation is pregnancy. During gestation, the fetus receives nutrients and oxygen from the mother through the placenta, the membranous tissue that surrounds the fetus in the uterus. The fetus in turn gives off carbon dioxide and waste products that are absorbed by the placenta.

Gestation can be divided into three stages, which are referred to as the cell division, embryonic, and fetal stages. The cell division stage begins right after conception. The fertilized egg undergoes 16 or more divisions while moving through the oviduct to the uterus. The cell divisions are energized by substances within the egg called cytoplasm.

The next stage is the embryonic stage. During this stage, the embryo differentiates body parts, and organs are formed. The embryo gets nourishment from the mother's uterine secretions. When the embryonic stage is complete, the fetus has been formed.

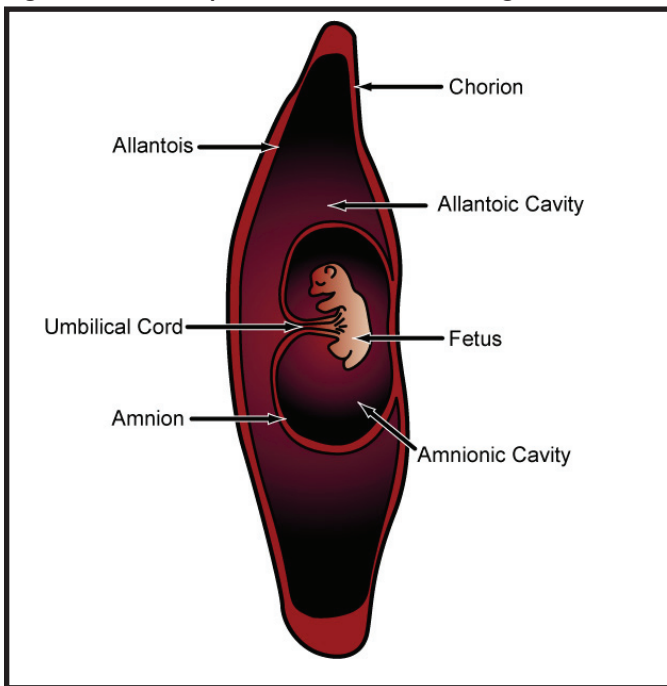
The last stage is called the fetal period. During the fetal period, the fetus continues to grow until birth. This stage is also known as the time of growth.

Figure 4.3 - Determining Pregnancy Using Ultrasonic Sound



# Conception and Gestation

Figure 4.4 - Embryonic Membranes of a Pig



## Embryonic Membranes

Three membranes form the placenta that surrounds the embryo in the uterus. These thin tissues protect and provide nourishment to the developing offspring. The embryonic membrane system is shown in Figure 4.4.

The outermost embryonic membrane is the chorion, and the innermost membrane is the amnion. The chorion is connected to the uterus. Nourishment from the mother as well as waste disposal is provided through the points where the membrane is attached to the uterus. The amnion is a sac that surrounds the embryo and contains fluid. The embryo floats within the amniotic fluid, which protects the embryo from shock. The amnion is connected to the embryo's navel by the umbilical cord, which has veins and arteries that provide nourishment for the embryo.

The third membrane is between the amnion and the chorion. This membrane is called the allantois. The allantois is an extension of the urinary system of the fetus that passes through the umbilical cord. As the pregnancy progresses, the allantois occupies more space than the other two membranes. The fluid contained within the allantoic cavity comes from the kidney of the fetus.

## Factors Influencing Gestation Length

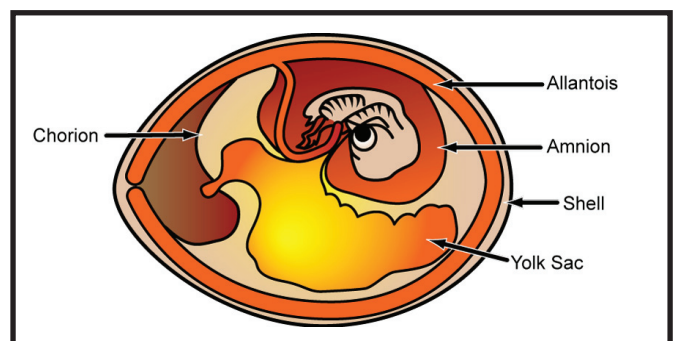
The length of gestation is often influenced by the mother's characteristics. The two most important characteristics are the mother's breed and age. Gestation length may be longer for one breed than another. The mother's age can also factor into the length of gestation; an older animal may have a shorter pregnancy. In addition, gestation length is very dependent on the individual animal. Two mothers may be of the same breed and age but still have gestation periods of different lengths.

Some other factors may also influence the length of gestation. The weather, for example, may have an effect on how long gestation lasts; extremely cold weather may trigger early delivery. The sire chosen for breeding has an effect on gestation length as well. A particular sire may consistently produce offspring with a longer or shorter gestation length than the offspring of another sire.

## Incubation

Because fowl pass the fertilized egg out of the body surrounded by a protective shell, they do not experience a gestational period like that found in mammals. However, the embryo does go through a period of fetal growth called incubation that is similar to gestation. Incubation is the period from when a hen sits on an egg or it is placed in an incubator until the chick emerges at hatching. During incubation, the developing embryo is nourished by the yolk. The membranes that surround the embryo are the same as those found in mammals, although the chorion and allantois eventually merge to form the chorioallantoic membrane, which functions as a respiratory organ. Figure 4.5 is a picture of the embryo during incubation.

Figure 4.5 - Chick Embryo



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Table 4.1 - Gestation and Incubation Lengths

Species	Gestation Length	
	Average (days)	Range (days)
Cattle	281	274-290
Swine	114	112-116
Sheep	147	144-151
Horses	336	330-350
Dogs	63	56-70
Rabbits	31	30-32
Fowl (Incubation)	Chicken - 21	---
	Turkey - 28	---

## Gestation and Incubation Lengths

Gestation lengths vary among species, as shown in Table 4.1. A cow has an average gestation length of 281 days, although it may range from 274 to 290 days. A sow averages 114 days, with a range of 112 to 116. The ewe's average gestation length is 147 days, with a range of 144 to 151 days. Gestation in a mare may range from 330 to 350 days, though the average is 336 days. A bitch may have a gestation length of anywhere from 56 to 70 days, with an average of 63 days. The average gestation length for a doe is 31 days, with a range of 30 to 32 days. The average length of incubation varies for different species of fowl, but the average is 21 days for chickens and 28 days for turkeys.

## Summary

Conception occurs when the egg and sperm unite. This act begins the gestation or incubation period, which continues until birth or hatching. During gestation and incubation, the fertilized egg goes through several stages of development while it is protected and nourished through a system of membranes. The length of gestation varies among species as well as within a particular species.

## Credits

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