

The Reproductive System And Pregnancy

Lisa Le

Kimberly Jeckel

BIO202C03

Red Rocks Community College

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The human body is quite amazing as all the organs and systems work together to carry out many vital functions. An important system that some may take for granted would be the reproductive system. The male and female reproductive systems are two homologous organ systems that are developed from the same embryonic tissues. Even though they are homologous structures, they do vary in some functions. Like stated earlier, the human body is able to do many amazing things. However, the female reproductive system and its hormones can do miraculous things when it comes to pregnancy. Many changes start to occur when the female body becomes pregnant. There are many stages that the body goes through when the mother is developing another human inside her and even after that. Hormones will play a tremendous role in the whole pregnancy process. It will be responsible for regulating the ovarian cycle, in utero development, and the process of labor and giving birth. Not only is learning about pregnancy important, it will also be good to know the difference between the different gametogenesis, oogenesis and spermatogenesis. It is important to know those two concepts because without them, pregnancy would not exist.

The female body goes through many changes during pregnancy and postpartum in the mother. The first stage that the female body goes through when becoming pregnant is fertilization. Once a month, an egg from one of the female ovaries will be released. The egg will be released into the fallopian tube, and this will start a process called ovulation (Healthwise Staff, 2019). So this is when the egg can become fertilized if the sperm is able to swim up and reach the egg in the fallopian tube. If the sperm is successful and penetrates the egg, the egg will be fertilized and start developing. The two gametes will fuse together to form a zygote (Rye et al., 2019). It will then take a couple more days for the egg to travel down the fallopian tube to the uterus. Once it gets into the uterus, it will attach itself to the lining of the uterus, and this is called

implantation (Healthwise Staff, 2019). After this event, embryonic development will start to come into play. It will start off with the single-celled zygote which will then go into a rapid cell division phase. The rapid, multiple rounds of cell division is called cleavage, and this will form the blastula (Rye et al., 2019). The blastula will either go through partial or total cleavage, and this will then form a blastocyst and the blastula will create two layers of cells. After this change, the next step of development would be the formation of the body plan. The blastula will now rearrange itself to form 3 layers of germ cells going through a process called gastrulation (Rye et al., 2019). These germ cell layers will give rise to muscle cells, connective tissue, the nervous system, the epidermis, and columnar cells for the digestive system and many internal organs. All these cell layers will go through further development to form and differentiate to different organs of the body. This process is called organogenesis, and it is characterized by the rapid and precise movements of the cells within the embryo (Rye et al., 2019). Once all the embryonic development stages are done, it will be followed by fetal development. Fetal development is part of the first trimester of pregnancy. Fetal development will occur around the second half of the first trimester; more specifically, after the eighth week (Cleveland Clinic, n.d.). During this time, the baby will gain more weight and grow a little more in size. The limbs on the baby will start to fully develop and so will its fingers and toes. The baby will start to be able to open and close its fists and mouth at this stage. Nails will start to develop and so will the external ears. The reproductive organs will start to develop, and by the third month, the baby is fully formed. The organs will still need some time to fully develop and function properly. After this takes place, the mother will then go into the second trimester. Miscarriage will drop considerably since most of the critical development has been done (Cleveland Clinic, n.d.). Everything will start to be more defined for the baby. Teeth and bones will become more dense, and now the baby will be able to

move a little more. The nervous system will start to function, reproductive organs will be fully developed, and muscles and hair on the baby will start forming. The body at this point will keep forming the skin around the baby, and its body will begin to reserve body fat. Hearing will be fully developed, and the baby will now begin to respond to different stimuli (Cleveland Clinic, n.d.). This will then lead into the third and last trimester of pregnancy. The baby's brain will be rapidly developing at this point, and most internal systems are finished developing. The lungs will continue to finish developing and close at this stage. The baby will learn its reflexes and will continue to grow in size and gain weight (Cleveland Clinic, n.d.). Once the 37 week mark hits, the mother can go into labor and give birth at any time. When the body is ready to go into labor, contractions will start and become more regular and closer together. Abdominal cramps and fluid leakage may occur as well. Labor will occur in three different stages. Contractions will be the first stage, and the second stage will consist of the cervix becoming thinner and dilated (Childbirth, 2020). The second stage will be the most active stage. Crowning will start, and this is when the baby's scalp comes into view as the mother keeps pushing. Once the baby is fully delivered and out, the third stage is delivering the placenta (Childbirth, 2020). If there are complications during labor and the mother cannot push out the baby, a C-section will be the next option for delivering the baby. After the labor/childbirth process, the postpartum period is next. Postpartum is about six weeks after childbirth (SickKids, 2009). This time is said to be a very important period for the mother and the newborn. There will be many changes that will occur during this time, physically and emotionally. The reproductive tract will slowly start returning to how it was before pregnancy, and the mother's breasts will start to produce milk to nourish the baby. Some mothers may start developing problems during this time like infections, constipation, hemorrhoids, and other conditions (SickKids, 2009). With all the changing emotions, mothers

may start to feel irritable, anxious, depressed, or prone to sudden mood swings. If the depression starts becoming a problem, seeking a doctor for early treatment will be very important.

The mother's body goes through tremendous changes when going through pregnancy, and so to her hormones. Hormones are important because they will regulate the ovarian cycle, in utero development, and the process of childbirth. The hormones that are involved in regulating the ovarian cycle are GnRH, LH, and FSH. GnRH is a hormone that is produced by the hypothalamus. This hormone is needed for the normal control of the function of the ovarian cycle. It is also responsible for signaling the pituitary gland to produce the gonadotropins FSH and LH (Anatomy & Physiology, n.d.). These two hormones that are produced stimulates the maturation of the follicles in the ovaries to trigger ovulation. The hypothalamus and the pituitary gland are both responsible for the regulation of the ovarian cycle. They control the periodicity of the ovulation (3.4 Oogenesis, n.d.). FSH is responsible for stimulating the follicles to grow and expand. LH also stimulates the granulosa and theca cells of the follicles to produce the sex steroid hormone estradiol, which is a type of estrogen (Anatomy & Physiology, n.d.). During ovulation, not only will estrogen be produced, but progesterone will also be produced by the corpus luteum. The ovarian cycle will last 28 days, and it is subdivided into two phases. The first is the follicular phase in which estrogen is produced. This will last about 14 days but it can vary. The second phase is the luteal phase. Progestogen will be produced and that will constantly last about 14 days (3.4 Oogenesis, n.d.). All these hormones are also produced by the placenta during pregnancy. These hormones play a crucial role in fetal growth, maturation, neonatal adaptation, and brain development. The hormones act as maturational and nutritional signals controlling tissue development and differentiation. This function interacts very closely to the in utero environment (Baud & Berkane, 2019). If anything happens to the placenta like a dysfunction or

any stress conditions, it can cause imbalances to the hormones. This could impair fetal maturation, growth, and other complications even when giving birth.

It is important to understand the differences of oogenesis and spermatogenesis to be able to understand how the whole reproductive system works. Gametogenesis is an important concept of the reproductive system, and it plays a huge role in pregnancy. Gametogenesis is the production of sperm and eggs that takes place through the process of meiosis (Libretexts, 2020). The production of eggs is called oogenesis. Oogenesis occurs in the outermost layer of the ovaries in the female reproductive system. It starts with a germ cell and undergoes mitosis to increase in number. At the end of mitosis, there are about one to two million cells in the embryo (Libretexts, 2020). Spermatogenesis is a similar concept but for the male reproductive system. Spermatogenesis produces sperm, and it occurs in the walls of the seminiferous tubules. These are diploid, undifferentiated cells, and they are called spermatogonia. These cells also undergo cell division called mitosis. When it goes through mitosis, one offspring will differentiate into a sperm cell that gives rise to the next generation of sperm (Libretexts, 2020).

The human body can do such amazing things, especially when creating another human being. The male and female reproductive systems are able to go through a process called gametogenesis. This is when the male reproductive system produces sperm, and the female reproductive system produces eggs. These two elements are crucial for pregnancy. When the sperm and the egg meet, fertilization can occur. The female body will then go through some changes to prepare to grow an embryo. The egg will fuse with the sperm to create a zygote, and then it will go through embryonic development to create a fetus. Once the embryo turns into a fetus after the first eight weeks of pregnancy, the rest of the fetus will continue to develop. The limbs and organs will slowly finish developing, and the fetus will start to get bigger in size.

When the pregnancy goes through all three trimesters, the baby will be ready to be delivered around 37 to 40 weeks of pregnancy. Contractions will start to appear and that is the initial start to labor. Time will go on and the mother will either be able to push out the baby or have a C-section. All of these things are possible due to hormones that the body releases. The hormones are very important since they are what starts the pregnancy all the way to having the baby. It helps regulate many things that the body needs in order to function properly. That is why the human body is so amazing.

References

3.4 Oogenesis. (n.d.). Retrieved December 09, 2020, from

<http://www.embryology.ch/anglais/cgametogen/oogenese04.html>

Anatomy and Physiology. (n.d.). Retrieved December 09, 2020, from

<https://openstax.org/books/anatomy-and-physiology/pages/1-introduction>

Baud, O., & Berkane, N. (2019, March 26). Hormonal Changes Associated With Intra-Uterine Growth Restriction: Impact on the Developing Brain and Future Neurodevelopment.

Retrieved December 09, 2020, from

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6443724/>

Childbirth | Stages of Labor | Effacement. (2020, November 13). Retrieved December 09, 2020,

from <https://medlineplus.gov/childbirth.html>

Cleveland Clinic. (n.d.). Fetal development: Month-By-Month Stages of Pregnancy. Retrieved December 09, 2020, from

<https://my.clevelandclinic.org/health/articles/7247-fetal-development-stages-of-growth>

Healthwise Staff. (2019, May 29). How Pregnancy (Conception) Occurs. Retrieved December 09, 2020, from <https://www.mottchildren.org/health-library/tw9234>

Libretexts. (2020, August 15). 43.3C: Gametogenesis (Spermatogenesis and Oogenesis).

Retrieved December 09, 2020, from

[https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book:_General_Biology_\(Boundless\)/43:_Animal_Reproduction_and_Development/43.3:_Human_Reproductive_Anatomy_and_Gametogenesis/43.3C:_Gametogenesis_\(Spermatogenesis_and_Oogenesis\)](https://bio.libretexts.org/Bookshelves/Introductory_and_General_Biology/Book:_General_Biology_(Boundless)/43:_Animal_Reproduction_and_Development/43.3:_Human_Reproductive_Anatomy_and_Gametogenesis/43.3C:_Gametogenesis_(Spermatogenesis_and_Oogenesis))

Rye, C., Avissar, Y., Jurukovski, V., Fowler, S., Wise, R., Roush, R., . . . Gair, J. (2019, May 01). 24.6. Fertilization and Early Embryonic Development. Retrieved December 09, 2020, from <https://opentextbc.ca/biology/chapter/24-6-fertilization-and-early-embryonic-development/>

SickKids. (2009, September 11). AboutKidsHealth. Retrieved December 09, 2020, from <https://www.aboutkidshealth.ca/Article?contentid=414>