Human reproduction

L1 Human reproductive organs

Male Reproductive System

The male reproductive system consists of several important organs that work together to produce and deliver sperm. The primary organs include the testes, glands, urethra, scrotum, and sperm duct.

1. Testes: The testes are responsible for producing sperm. They are located in the scrotum, which is a pouch-like structure outside of the body that helps regulate the temperature of the testes.
2. Glands: The glands in the male reproductive system produce fluids that mix with sperm to create semen. These fluids nourish and protect the sperm, helping them survive and swim.
3. Urethra: The urethra is a tube that connects the bladder to the outside of the body. It serves two functions in males - it carries urine from the bladder during urination and also allows semen to pass through during ejaculation.
4. Scrotum: The scrotum is a sac-like structure that contains the testes. Its main function is to regulate and maintain the temperature of the testes, ensuring optimal sperm production.
5. Sperm Duct: The sperm duct is tube that carries sperm from the testes to the urethra. During ejaculation, sperm travel through the sperm duct and mix with fluids from the glands to form semen.

Female Reproductive System

The female reproductive system is designed to produce and protect eggs, as well as provide a suitable environment for the developing foetus, if fertilization occurs. The primary organs include the ovary, oviduct (fallopian tube), uterus, and uterine lining.

1. Ovary: The ovaries are responsible for producing and releasing eggs. They also produce hormones, such as oestrogen and progesterone, which regulate the menstrual cycle and support pregnancy.
2. Oviduct (Fallopian Tube): The oviduct, also known as the fallopian tube, is a narrow tube that connects the ovary to the uterus. It serves as a passageway for the egg to travel from the ovary to the uterus. Fertilisation of the egg usually occurs in the oviduct.
3. Uterus: The uterus, is a hollow, muscular organ where a fertilized egg implants and develops into a foetus. It provides an ideal environment for the developing embryo by supplying nutrients and oxygen.
4. Uterine Lining: The uterine lining, also called the endometrium, is the inner lining of the uterus. It thickens and becomes rich in blood vessels in preparation for potential implantation of a fertilised egg. If fertilisation does not occur, the uterine lining is shed during menstruation (a period).

Adaptations of Gametes

Gametes are specialised cells involved in sexual reproduction. In humans, sperm cells are the male gametes, and egg cells are the female gametes. Both sperm and egg cells have unique adaptations to increase the chances of successful fertilization.

1. Sperm Adaptations: Sperm cells are specially adapted for swimming and reaching the egg. They have a streamlined shape and a long tail, called a flagellum, which propels them forward. Sperm also contain a high amount of mitochondria, which releases energy for their journey to the egg.
2. Egg Adaptations: Egg cells are adapted to receive and support fertilization. They are much larger than sperm cells and contain nutrient-rich cytoplasm to nourish the developing embryo. The egg is also surrounded by a protective jelly coating called the zona pellucida, which helps to prevent multiple sperm from fertilizing it.

Independent practice

1. Explain why the male and female reproductive systems are organs systems.
2. If a persons testes are damaged due to disease, explain what the effect may be on their ability to have a child.
3. The scientific term for the release of egg cells is known as ovulation. Where will ovulation occur?
4. What could be the consequence of a person who has a blocked fallopian tube.
5. What is the name of the reaction that takes place in the mitochondria that releases energy.

Extended writing questions (paragraph needed)

1. Explain why it is important for the gametes to be specialised.
2. What is the link between puberty and the human reproductive system?

L2 The Menstrual cycle

What are Periods?

Periods, often referred to as menstruation, are a natural process that occurs in the bodies of people with female reproductive systems. It happens roughly once a month (between 21-35 days is normal, average is 28 days) and involves the shedding of the uterine lining.

The Menstrual Cycle

The menstrual cycle is a recurring process that prepares the female body for possible pregnancy. Although it may seem like a single event, it is actually a series of different stages. Let's take a closer look at each stage:

Menstruation

The menstrual cycle begins with menstruation. This stage typically lasts around 3 to 7 days. During menstruation, the body sheds the uterine lining which was previously prepared for a potential pregnancy. This shedding leads to the release of blood and tissue from the uterus, which exits the body through the vagina.

Lining Thickening

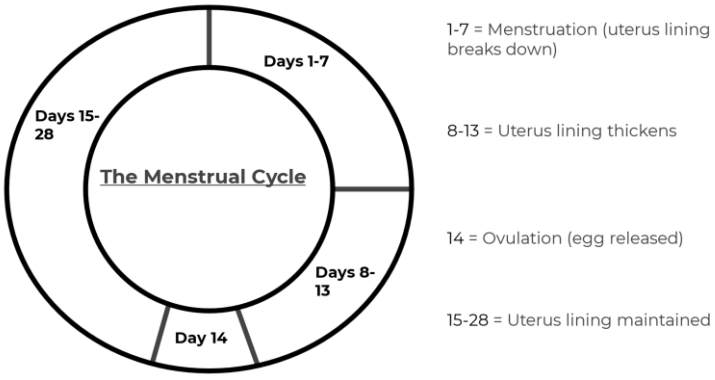
After menstruation, the body enters the lining thickening stage. This is when the uterus starts building up a new layer of tissue, known as the endometrium, in preparation for a possible pregnancy. Hormones, such as oestrogen and progesterone, play a crucial role in this process. The endometrium becomes thicker and more blood vessels develop to support a fertilized egg.

Ovulation

Ovulation is the next stage in the menstrual cycle and typically occurs around the middle of the cycle, approximately 14 days before the start of the next period. During this stage, one of the ovaries releases an egg. This egg then travels through the fallopian tubes, where it may be fertilized by sperm if sexual intercourse has taken place.

Lining Maintenance

Following ovulation, the body enters the lining maintenance stage. If fertilization occurs, the fertilized egg implants itself into the thickened uterine lining. This is where the endometrium, previously built up during the lining thickening stage, plays a vital role by providing nourishment and support for the developing embryo. If fertilization does not occur, the thickened lining is not required and will eventually be shed during the next menstrual period.



Independent practice

1. What is menstruation, and how long does this stage typically last in the menstrual cycle?
2. What might happen if a person cannot produce oestrogen and progesterone.
3. When does ovulation usually occur, and what happens during this stage of the menstrual cycle?
4. Explain the purpose of the lining maintenance stage in the menstrual cycle and what happens if fertilization occurs during this stage.
5. What triggers the release of blood and tissue from the uterus during menstruation?

Longer Answer Questions:

1. Explain the significance of the menstrual cycle in preparing the female body for possible pregnancy. Include details about the different stages and the role of hormones.
2. Suggest the potential implications for reproductive health due variations in the length of the menstrual cycle.

L4 Pregnancy and birth.

Reproduction is a process through which living organisms can create new life. In humans, this process involves the fusion of a sperm cell and an egg cell, leading to the formation of a zygote.

During sexual intercourse between a man and a woman, the erect penis is inside the vagina. The sperm cells are released from the testes, mix with fluids from the glands, and travel through the sperm duct and out the urethra. This release is known as ejaculation.

As the male ejaculates, millions of sperm cells are released into the vagina. From there, they start their journey through the cervix, which is the narrow passage connecting the vagina to the uterus. Only a small fraction of the released sperm cells manage to reach beyond the cervix.

Next, the sperm cells continue their arduous journey through the uterus. The uterus is a pear-shaped organ where a fertilized egg will eventually implant and grow into a baby. The walls of the uterus are lined with a soft, thick layer called the endometrium, which provides a nurturing environment for the developing embryo.

The sperm cells swim using their tails, called flagella, allowing them to move towards their destination. Only a few hundred sperm cells survive this journey and manage to reach the fallopian tubes. These tubes extend from the uterus and are responsible for transporting the egg from the ovary to the uterus. It is within the fallopian tubes that fertilization occurs.

When a mature egg is released from the ovary during ovulation, it travels through the fallopian tubes. If a sperm cell successfully reaches the fallopian tubes at the same time as the egg, fertilisation can occur. The sperm cells surround the egg, but only one of them will penetrate the egg's protective coating and fuse with the egg's nucleus.

Once the sperm cell successfully fertilises the egg, the formation of a zygote takes place. The zygote is the first cell of a new individual and contains the genetic material from both the mother and the father. This single cell will then begin to divide and multiply rapidly, forming an embryo.

The embryo will continue to develop as it travels through the fallopian tubes and towards the uterus. Along the way, it undergoes several stages of development, eventually implanting itself into the soft lining of the uterus. This implantation marks the beginning of pregnancy.

<u>Independent practice</u>

1. Explain what fertilisation is.
2. Describe the journey of the sperm cell inside the male reproductive system.
3. Describe the journey of the egg cell.
4. State the difference between a zygote and an embryo.
5. Explain around what day of the menstrual cycle a woman is most likely to become pregnant.

The different stages of pregnancy.

Pregnancy, also known as gestation, is the period when a baby develops inside a woman's body. This incredible journey lasts for about 40 weeks and is divided into three trimesters. Each trimester brings new changes and developments for both the mother and the baby. The first trimester, which spans from week 1 to week 12, while the second trimester covers week 13 to week 27 and finally the third trimester week 28 to 40 weeks/birth.

What occurs during pregnancy.

The journey from fertilization to foetus is a remarkable process that begins when a sperm fertilizes an egg. This fertilized egg, called a zygote, then implants itself into the lining of the uterus. As the zygote develops, the placenta forms and attaches to the uterus, providing vital nutrients and oxygen to support the growing embryo. Through the umbilical cord, the baby receives these essential substances from the mother, while waste products such as urea and carbon dioxide are carried away. Over time, the embryo transforms into a foetus, developing organs, limbs, and a beating heart. Throughout this journey, the amniotic fluid surrounds and protects the growing baby, allowing for movement and supporting lung development. This incredible process culminates in the birth of a baby.

The Birth Process: A Journey into the World

When it comes to the birth process, it happens in three stages: dilation, contractions, and afterbirth.

The first stage begins with the cervix slowly opening (dilating) to allow the baby to pass through the birth canal. This stage can last for several hours, and the contractions become more intense as the cervix reaches its full dilation of 10 centimetres.

The second stage is the delivery of the baby. The mother will experience strong contractions that help push the baby out. With each contraction, the mother will be encouraged to push until the baby's head emerges, followed by the rest of the body. It's a remarkable moment as the baby enters the world!

After the baby is born, the third stage of birth begins with the delivery of the placenta. Once the placenta is safely expelled from the mother's body, the uterus continues to contract to prevent excessive bleeding. These contractions, known as afterbirth contractions, help the uterus return to its pre-pregnancy size.

Independent practice

1. Order the following stages after fertilisation: embryo, baby, zygote, foetus.
2. Explain the importance of the placenta and the umbilical cord.
3. People often say that birth starts with the waters breaking, what fluid would the waters be?
4. Explain the term dilation regarding birth.
5. Suggest why newborn twins are often smaller than single pregnancy newborns.

Extended writing. (paragraph needed)

1. Explain how the foetus can develop.
2. Describe the human birth process.

L5 Effects of life style

The Impact of a Mother's Lifestyle on the Developing Baby

During pregnancy, a mother's lifestyle plays a crucial role in the development and well-being of her baby. The choices she makes regarding her habits and behaviours can have lasting effects on the baby. In this text, we will explore the impact of alcohol, drugs, and cigarettes on the developing baby.

Effects of Alcohol

Consuming alcohol during pregnancy can have severe consequences for the baby. When a pregnant woman drinks, the alcohol passes through her bloodstream and reaches the baby through the placenta. This can lead to a range of developmental issues known as Foetal Alcohol Spectrum Disorders (FASDs).

Babies exposed to alcohol in the uterus may experience physical, intellectual, and behavioural problems. They might have a lower birth weight, suffer from learning disabilities, have difficulties with coordination and motor skills, and exhibit behavioural challenges. The severity of these effects can vary depending on the amount and timing of alcohol consumption.

Impact of Drugs

Using illicit drugs during pregnancy poses significant risks to the developing baby. Drugs like cocaine, heroin, methamphetamines, and marijuana can all negatively impact the baby's health and development.

Drug use during pregnancy increases the chances of preterm birth, low birth weight, and developmental delays. Babies born to mothers who used drugs may experience withdrawal symptoms after birth, known as Neonatal Abstinence Syndrome (NAS). These infants may face challenges in neurological development, cognition, and behavioural regulation.

Some prescription and over the counter drugs can also impact the developing foetus, and so should not be given during pregnancy.

Effects of Cigarette Smoking

Smoking cigarettes during pregnancy can have a range of detrimental effects on both the mother and the baby. Cigarette smoke contains harmful chemicals that are carried into the mother's bloodstream and reach the baby through the placenta.

Babies exposed to cigarette smoke may have a higher risk of preterm birth, low birth weight, and stillbirth. The toxic chemicals in tobacco smoke can impair the baby's lung development and increase the likelihood of respiratory problems, such as asthma, in childhood. Additionally, smoking during pregnancy raises the risk of sudden infant death syndrome (SIDS).

Independent practice

1. Explain how drugs or alcohol can pass into the developing foetus's bloodstream.
2. State some symptoms of Foetal Alcohol syndrome.
3. Suggest why it is recommended for women trying to conceive a baby that they do not drink any alcohol.
4. Why does premature birth affect a baby?
5. Explain why a pregnant women will not be prescribed certain medications.

Extended writing Paragraph needed.

1. Evaluate if smoking should be made illegal during pregnancy.