



Female and male reproductive system

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Female and male reproductive system

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[Link to the lesson](#)

Before you start you should know

- there are two types of reproduction – sexual and asexual;
- hormones play an important role in reproduction and development;
- sexual reproduction involves gametes: egg cell and sperm (spermatozoid).

You will learn

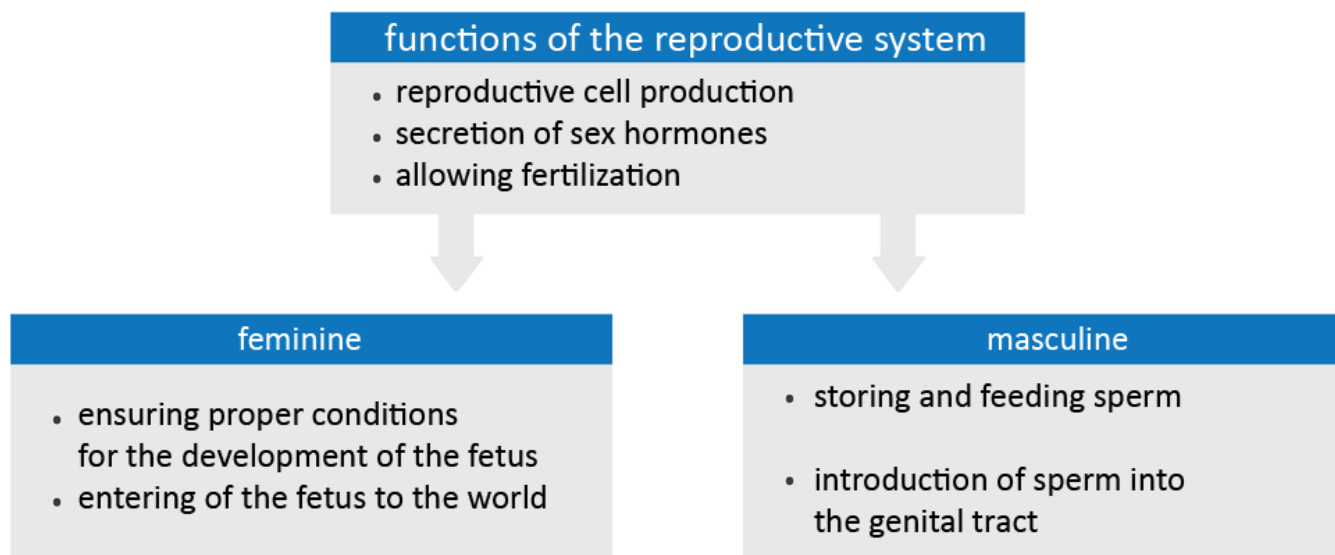
- discuss sexual characteristics;
- recognize the organs of the female and male reproductive systems;
- discuss the functions of the genital organs;
- compare the structure of the sperm (spermatozoid) and egg cell.

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe dotyczące żeńskiego i męskiego układu rozrodczego

Sexual features

Reproduction, or giving birth to offspring and ensuring the continuity of the species, is the most important task of the reproductive system to which the human body is properly adapted.



Functions of the reproductive system
Source: Dariusz Adryan, licencja: CC BY 3.0.

Sexual features are divided into primary, secondary and tertiary. Primary and secondary characteristics are internal and external organs of the reproductive system. In the internal organs is the production of reproductive cells and their transport, in the female organs also the development of the fetus. External genital organs are involved in the transmission of reproductive cells. Tertiary features are not directly related to the act of reproduction and are mainly related to differences in the appearance and behavior of women and men.

Categories	female	male
primary	ovary	testicles
secondary	fallopian tubes, uterus, vagina, vulva	scrotum, penis, vas deferens
tertiary	wide hips	narrow hips
	narrow arms	wide shoulders
	high voice	low voice
	developed mammary glands	facial hair

Tertiary sexual characteristics
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Task 1

Explain how the development of sexual characteristics is subject to hormonal regulation.

Female reproductive system

The female reproductive system produces female **gametes** – **egg cells**– and creates conditions for fertilization and development of the embryo and later the fetus. We divide the female reproductive organs into external and internal ones.

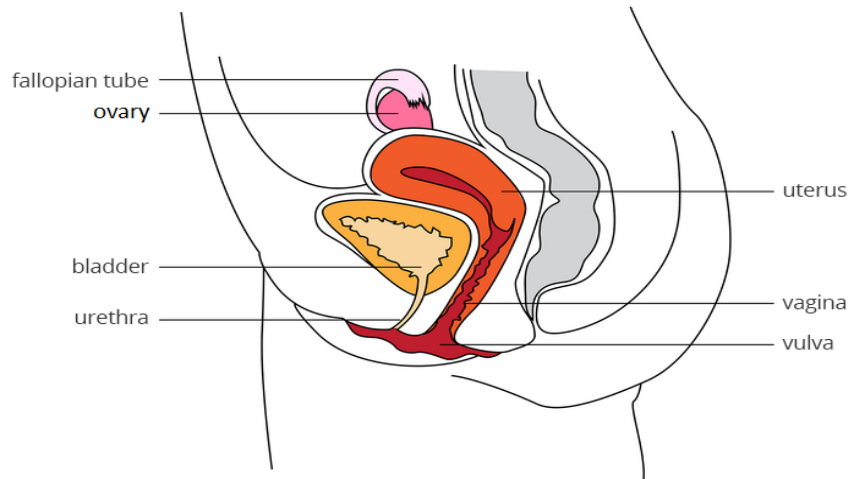
The external genital organs are:

- **pubic mound**, built of fat, covered with pubic hair;
- **labia** smaller and larger (vulva), which in the form of skin folds protect the entrance to the vagina and the outlet of the urethra;
- **clitoris**, which contains particularly many sensory cells that enhance sexual arousal.

The internal genital organs include:

- **ovaries** –organs of the size of plums with ovarian follicles; each of them contains an egg cell at various stages of development; when the egg matures, it breaks and releases, and this goes to the fallopian tube;
- **Fallopian tube**, from the ovary which takes the form of a funnel; this structure makes catching the egg easier; the walls of the fallopian tube are made of smooth muscle and lined with ciliated epithelium; muscle contraction and cilia movement allows the egg to move towards the uterus, which connects the other end of the fallopian tube;
- **uterus** – an organ whose walls are built of highly developed smooth muscle tissue and covered with a thick layer of mucous membrane allowing the implantation of the embryo; muscles during pregnancy extend, adjusting the size of the uterus to the size of the developing fetus; during the birth they shrink, helping the child to leave the mother's body; the uterus has the shape of a pear; its wider part, called the stem, is directed upwards, the bottom, narrower, forms the downward facing neck;
- **vagina** – muscular passage of the one part comprising the cervix and the other opens out on the outside; through the vagina to the genital track the male reproductive cells enter; this is also where menstrual blood is discharged, and during childbirth through the vaginal canal, the child enters into the world.

Female reproductive system, side view



Female reproductive system, side view

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Task 2

Heavy and large the egg is deprived of the ability of to move. Indicate the features of the structure of the female reproductive system, which are adaptation to the transport of reproductive cells.

Male reproductive system

The male reproductive system is responsible for the production of sperm (spermatozoid) and male sex hormones and the introduction of male reproductive cells into the female reproductive tract. It is made of external and internal organs.

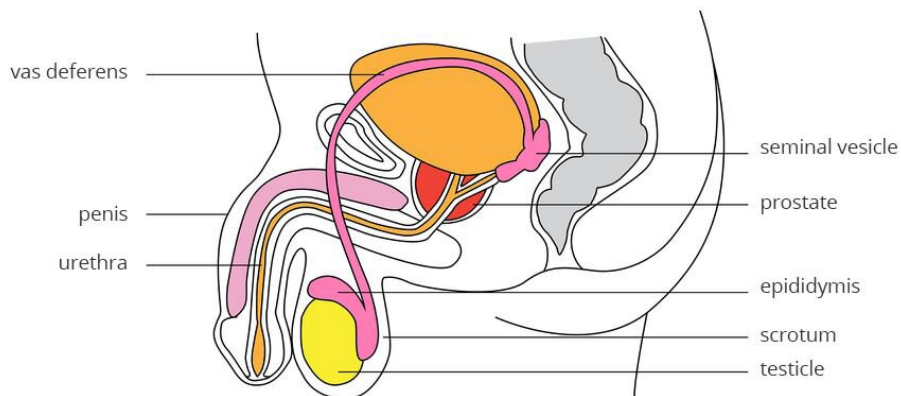
The external sexual organs are:

- **scrotum** –a thin, hair-covered dermal-muscular bag, in which there are testicles, epididymides and the initial parts of vas deferens;
- **penis** has a dual role: it is part of the urinary system, because it contains the urethra, it is also an organ that introduces gametes to the female genital tract; in the penis there are sinuses to which blood may flow in, causing it to stiffen and enlarge; this state is called **erection** and enables sexual act.

The internal sexual organs include:

- **testicles** – glands made of long and thin seminal tubules, in which male reproductive cells – sperm (spermatozoid) are produced; between the tubules are the cells that produce male sex hormones; the presence of these hormones in the fetal life determines the appearance of primary and secondary male sex characteristics;
- **epididymis** – organs adjacent to the testicles in which sperm (spermatozoid) are stored;
- **vas deferens**, that start in the epididymis and lead the sperm to the urethra; the secretions of seminal vesicles and prostate gland are also discharged into the vas deferens; it contains nutrients and stimulates sperm to move in the female reproductive track and allows them to reach the egg cell; sperm suspension in liquid secretion of seminal vesicles and prostate is called **semen** (sperm).

Male reproductive system, side view



Male reproductive system on the side

Source: Tomorrow Sp. z o.o., licencja: CC BY 3.0.

Task 3

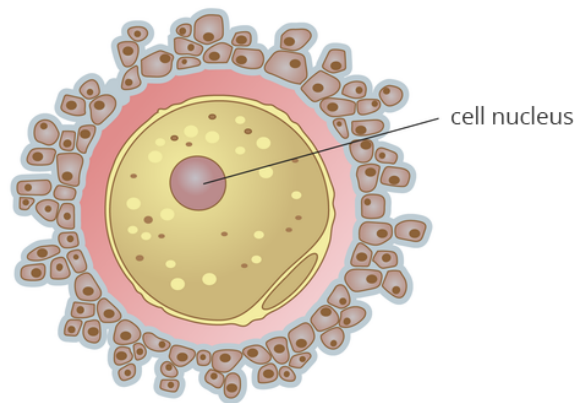
The urethra in women is shorter, in men longer. Explain why there is a difference.

Gametes

The female gamete, or the reproductive cell, is the **egg cell**. It does not have the ability to move and is the largest of human cells. It ripens on average every 28 days in the ovarian follicle, most often in one ovary, alternately – once in the left, once in the right. When the egg cells matures too much, there is a chance that dizygotic twins will be created during the fertilization process. Capable of fertilization, a mature egg cell contains egg yolk, which is a nourishing material for the embryo. The embryo will use it until it is implanted in the

endometrium. The movement of female gametes in the fallopian tube takes 72 hours. After this time, it loses her ability to be fertilized.

Egg cell



Egg cell

Source: Andrzej Bogusz, licencja: CC BY 3.0.

Mature **spermatozoid (sperm)** is made of a head, tail and acrosome. The tail is the longest part of the sperm (spermatozoid) and allows it to actively move towards the egg cell. The energy needed for movement arises in the mitochondria that fill it in large numbers. The sperm (spermatozoid) is the proper reproductive cell that penetrates inside the egg cell. It contains a cell nucleus and a very small amount of cytoplasm. On the surface of the head there is a reservoir (acrosome) with enzymes used for dissolving the egg coat. They allow the sperm to penetrate inside the female gamete. Sperm (spermatozoid) with a tail is more than 20 times smaller than the diameter of the egg.

Ovum and sperm (spermatozoid), connecting with each other in the process of fertilization, give birth to a new organism that inherits the traits of father and mother.

Process | of fertilization

Film dostępny na portalu epodreczniki.pl

Process of fertilization

Source: GroMar Sp. z o.o., licencja: CC BY-SA 3.0.

Animacja p.t. "Process of fertilization" przedstawiająca proces zapłodnienia komórki jajowej komórką plemnika. Wiele plemników otacza komórkę jajową, ale tylko jeden może przedostać się do jej wnętrza. Kiedy jeden z plemników przebija się przez błonę komórkową komórki jajowej, dociera do jej jądra i łączy się z nią.

Task 4

Explain how sperms (spermatozoids) get their energy necessary to move in female reproductive tracts.

Exercise 1

Assign individual internal reproductive organs to the appropriate group.

vas deferens, testicles, fallopian tubes, epididymis, vagina, uterus, ovary

Female reproductive system	
Male reproductive system	

Exercise 2

Indicate all terms correctly describing the female gamete (egg cell)

- has the ability to move
- is the largest of human cells
- it matures in the ovarian follicle
- contains nutrient for the embryo

Exercise 3

Combine the names of the sperm parts with the function they perform

the actual reproductive cell containing father's genetic material, supplies the sperm with energy thanks to numerous mitochondria, allows active sperm movement towards the egg cell, a reservoir containing enzymes dissolving the ovum shells and egg cell coats

head	
mitochondrion	
tail	
acrosome	

Summary

- Reproduction is a life process that ensures the continuity of the species.
- Primary, secondary and tertiary sexual characteristics are adaptation to reproduction.
- The female reproductive system is designed to produce eggs cell, create conditions for embryo and fetal development, and release the baby to the world.
- The male reproductive system is responsible for the production of sperm (spermatozoid) and introducing them to the female reproductive tract.
- In the fertilization process, germ cells are involved: egg cell and sperm (spermatozoid).
- The ovum (egg cell) is an immobile female gamete containing genetic material from the mother.
- Sperm (spermatozoid) is a busy male gamete containing genetic material from his father; it is made of a head and tail

Homework

Task 5.1

Explain why the reproductive system (genital) is also called the genitourinary system.

Keywords

egg cell, sperm (spermatozoid), fertilization, female reproductive system, male reproductive system

Glossary

sexual characteristics

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe słowa sexual characteristics

cechy płciowe – charakterystyczne cechy budowy i fizjologii związane z płcią; umożliwiają rozmnażanie

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Nagranie dźwiękowe słowa gametes

gamety – komórki rozrodcze

egg cell

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe słowa egg cell

komórka jajowa – gameta żeńska; żeńska komórka rozrodcza

spermatozoid (sperm)

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe słowa spermatozoid

plemnik – gameta męska; męska komórka rozrodcza

Lesson plan (English)

Title: Female and male reproductive system

Author:

Target group

7th-grade student of the elementary school.

General requirements

IV. Reasoning and applying the acquired knowledge to solving biological problems. Student:

1. interprets information and explains causal relationships between phenomena, formulates conclusions.

Specific requirements

III. The human body

12. Reproduction and development. Student:

1) recognizes the elements of the male and female reproductive system (in the scheme, as described, etc.) and names their functions.

The general aim of education

Students discuss the structure and functions of the human reproductive system.

Criteria for success

- discuss the functions of the human reproductive system;
- explain what sexual characteristics are: primary, secondary and tertiary;
- describe the structure of the female and male reproductive system;
- discuss the structure of reproductive cells (egg cell and sperm);
- explain the fertilization process.

Key competences

- communication in the mother tongue;
- communication in foreign languages;
- mathematical competence and basis competences in science and technology;
- digital competence;
- learning to learn;
- social and civic competences.

Methods/forms of work

Presentation, didactic discussion, exercises concerned.

Individual work and collective work.

Teaching aids:

- abstract;
- tablets/computers;
- interactive whiteboard or traditional blackboard;
- review charts showing the structure of the female and male reproductive organs and the structure of human reproductive cells (optional).

Before the lesson

The teacher instructs students to familiarize themselves with the content of the abstract.

Lesson phases

Introduction

1. The teacher gives the subject and the purpose of the lesson in a language that the student understands as well as the criteria for success.
2. The teacher gives the topic of the lesson, the students write it in their notebooks.

Realization

1. The selected students discuss the functions of the reproductive system and human sexual characteristics. The teacher displays an interactive illustration titled „Tertiary sexual characteristics” and compares to the student's statements, explaining that tertiary sexual characteristics, although not directly related to the act of reproduction, in most cases allow to explicitly determine the sex of an adult, because they are conditioned primarily by the type of hormones produced by the body.
2. The teacher selects a further three people. Each of them discusses one of the following topics:
 - construction of the female reproductive system;
 - construction of the male reproductive system;
 - the structure of reproductive cells (egg cell and sperm).

During the answers, students use the illustrations in the abstract or from the traditional board.

3. The teacher presents an animation showing the course of the fertilization process and discusses the process in detail. He asks students to explain the formation of twins. Ask students whether they know the names of sexually transmitted diseases, etc.
4. Students carry out the commands given in the abstract, as well as interactive exercises checking the level of knowledge learned during the lesson.
5. The teacher initiates a discussion during which the correct solutions for all the exercises performed by the students are discussed.

Summary

Students ask questions, ask for additional explanations and complete their notes.

Homework

Describe the location of the ovaries, uterus and testicles in the human body.

The following terms and recordings will be used during this lesson

Terms

sexual characteristics

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe słówka sexual characteristics

cechy płciowe – charakterystyczne cechy budowy i fizjologii związane z płcią; umożliwiają rozmnażanie

gametes

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe słówka gametes

gamety – komórki rozrodcze

egg cell

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe słowa egg cell

komórka jajowa – gameta żeńska; żeńska komórka rozrodcza

spermatozoid (sperm)

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Nagranie dźwiękowe słowa spermatozoid

plemnik – gameta męska; męska komórka rozrodcza

Texts and recordings

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe dotyczące żeńskiego i męskiego układu rozrodczego

Female and male reproductive system

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Mature spermatozoid (sperm) is made of a head, tail and acrosome. The tail is the longest part of the sperm (spermatozoid) and allows it to actively move towards the egg cell. The energy needed for movement arises in the mitochondria that fill it in large numbers. The sperm (spermatozoid) is the proper reproductive cell that penetrates inside the egg cell. It contains a cell nucleus and a very small amount of cytoplasm. On the surface of the head there is a reservoir (acrosome) with enzymes used for dissolving the egg coat. They allow the sperm to penetrate inside the female gamete. Sperm (spermatozoid) with a tail is more than 20 times smaller than the diameter of the egg.

Ovum and sperm (spermatozoid), connecting with each other in the process of fertilization, give birth to a new organism that inherits the traits of father and mother.

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- Sperm (spermatozoid) is a busy male gamete containing genetic material from his father; it is made of a head and tail

Lesson plan (Polish)

Temat: Żeński i męski układ rozrodczy

Autor:

Adresat

Uczeń klasy VII szkoły podstawowej.

Wymagania ogólne

IV. Rozumowanie i zastosowanie nabytej wiedzy do rozwiązywania problemów biologicznych.

Uczeń:

1. interpretuje informacje i wyjaśnia zależności przyczynowo-skutkowe między zjawiskami, formułuje wnioski.

Wymagania szczegółowe

III. Organizm człowieka.

12. Rozmnażanie i rozwój. Uczeń:

1) rozpoznaje elementy budowy układu rozrodczego męskiego i żeńskiego (na schemacie, według opisu itd.) oraz podaje ich funkcje.

Cel lekcji

Uczniowie omawiają budowę i funkcje układu rozrodczego człowieka.

Kryteria sukcesu

- wymienisz funkcje układu rozrodczego człowieka;
- wyjaśnisz, czym są cechy płciowe: pierwszorzędowe, drugorzędowe i trzeciorzędowe;
- opiszysz budowę żeńskiego i męskiego układu rozrodczego;
- omówisz budowę komórek rozrodczych (komórki jajowej i plemnika);
- przedstawisz przebieg procesu zapłodnienia.

Kompetencje kluczowe

- porozumiewanie się w języku ojczystym;
- porozumiewanie się w językach obcych;
- kompetencje matematyczne i podstawowe kompetencje naukowo-techniczne;
- kompetencje informatyczne;
- umiejętność uczenia się;

- kompetencje społeczne i obywatelskie.

Metody/formy pracy

Prezentacja, dyskusja dydaktyczna, ćwiczenia przedmiotowe.

Praca indywidualna oraz praca zbiorowa.

Środki dydaktyczne

- abstrakt;
- tablety/komputery;
- tablica interaktywna lub tradycyjna;
- plansze poglądowe przedstawiające budowę narządów żeńskiego i męskiego układu rozrodczego oraz budowę komórek rozrodczych człowieka (opcjonalnie).

Przed lekcją

Nauczyciel poleca uczniom, żeby zapoznali się z treścią abstraktu.

Fazy lekcji

Wstępna

1. Nauczyciel określa cel lekcji i informuje uczniów o jej planowanym przebiegu. Przedstawia kryteria sukcesu.
2. Nauczyciel podaje temat lekcji, uczniowie zapisują go w zeszytach.

Realizacyjna

1. Uczeń wskazany przez nauczyciela omawia funkcje układu rozrodczego oraz cechy płciowe człowieka. Nauczyciel wyświetla ilustrację interaktywną pt. „Trzeciorzędowe cechy płciowe” i uzupełnia wypowiedź ucznia, wyjaśniając, że trzeciorzędowe cechy płciowe, jakkolwiek nie związane bezpośrednio z aktem rozmnażania, w większości przypadków pozwalają jednoznacznie określić płeć osoby dorosłej, ponieważ uwarunkowane są przede wszystkim rodzajem wytwarzanych przez organizm hormonów.
2. Prowadzący lekcję wskazuje kolejne trzy osoby. Każda z nich omawia jeden z poniższych tematów:
 - budowa żeńskiego układu rozrodczego;
 - budowa męskiego układu rozrodczego;
 - budowa komórek rozrodczych (komórki jajowej i plemnika).

Uczniowie w trakcie odpowiedzi korzystają z ilustracji zamieszczonych w abstrakcie lub z plansz poglądowych w wersji tradycyjnej.

3. Nauczyciel prezentuje animację przedstawiającą przebieg procesu zapłodnienia i szczegółowo omawia ten proces. Prosi uczniów o wyjaśnienie powstawania bliźniąt. Pyta uczniów czy znają nazwy chorób przenoszonych drogą płcią itp.
4. Uczniowie samodzielnie wykonują zamieszczone w abstrakcie polecenia oraz ćwiczenia interaktywne sprawdzające stopień opanowania wiadomości poznanych w czasie lekcji.
5. Nauczyciel inicjuje dyskusję, w trakcie której omówione zostają prawidłowe rozwiązania wszystkich ćwiczeń samodzielnie wykonanych przez uczniów.

Podsumowująca

Uczniowie zadają pytania, proszą o dodatkowe wyjaśnienia i uzupełniają notatki.

Praca domowa

Opisz położenie jajników, macicy i jąder w organizmie człowieka.

Słownictwo

W tej lekcji zostaną użyte m.in. następujące pojęcia oraz nagrania

Pojęcia

sexual characteristics

[Nagranie dostępne na portalu epodreczniki.pl](#)

Nagranie dźwiękowe słowa sexual characteristics

cechy płciowe – charakterystyczne cechy budowy i fizjologii związane z płcią; umożliwiają rozmnażanie

gametes

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egg cell

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Teksty i nagrania

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Nagranie dźwiękowe dotyczące żeńskiego i męskiego układu rozrodczego

Female and male reproductive system

Reproduction, or giving birth to offspring and ensuring the continuity of the species, is the most important task of the reproductive system to which the human body is properly adapted.

Sexual features are divided into primary, secondary and tertiary. Primary and secondary characteristics are internal and external organs of the reproductive system. In the internal organs is the production of reproductive cells and their transport, in the female organs also the development of the fetus. External genital organs are involved in the transmission of reproductive cells. Tertiary features are not directly related to the act of reproduction and are mainly related to differences in the appearance and behavior of women and men.

The female reproductive system produces female gametes – **egg cells**– and creates conditions for fertilization and development of the embryo and later the fetus. We divide the female reproductive organs into external and internal ones.

The external genital organs are:

- **pubic mound**, built of fat, covered with pubic hair;
- **labia** smaller and larger (vulva), which in the form of skin folds protect the entrance to the vagina and the outlet of the urethra;

- **clitoris**, which contains particularly many sensory cells that enhance sexual arousal.

The internal genital organs include:

- **ovaries** –organs of the size of plums with ovarian follicles; each of them contains an egg cell at various stages of development; when the egg matures, it breaks and releases, and this goes to the fallopian tube;
- **Fallopian tube**, from the ovary which takes the form of a funnel; this structure makes catching the egg easier; the walls of the fallopian tube are made of smooth muscle and lined with ciliated epithelium; muscle contraction and cilia movement allows the egg to move towards the uterus, which connects the other end of the fallopian tube;
- **uterus** – an organ whose walls are built of highly developed smooth muscle tissue and covered with a thick layer of mucous membrane allowing the implantation of the embryo; muscles during pregnancy extend, adjusting the size of the uterus to the size of the developing fetus; during the birth they shrink, helping the child to leave the mother's body; the uterus has the shape of a pear; its wider part, called the stem, is directed upwards, the bottom, narrower, forms the downward facing neck;
- **vagina** – muscular passage of the one part comprising the cervix and the other opens out on the outside; through the vagina to the genital track the male reproductive cells enter; this is also where menstrual blood is discharged, and during childbirth through the vaginal canal, the child enters into the world.

The male reproductive system is responsible for the production of sperm (spermatozoid) and male sex hormones and the introduction of male reproductive cells into the female reproductive tract. It is made of external and internal organs.

The external sexual organs are:

- **scrotum** –a thin, hair-covered dermal-muscular bag, in which there are testicles, epididymides and the initial parts of vas deferens;
- **penis** has a dual role: it is part of the urinary system, because it contains the urethra, it is also an organ that introduces gametes to the female genital tract; in the penis there are sinuses to which blood may flow in, causing it to stiffen and enlarge; this state is called **erection** and enables sexual act.

The internal sexual organs include:

- **testicles** – glands made of long and thin seminal tubules, in which male reproductive cells – sperm (spermatozoid) are produced; between the tubules are the cells that produce male sex hormones; the presence of these hormones in the fetal life determines the appearance of primary and secondary male sex characteristics;
- **epididymis** – organs adjacent to the testicles in which sperm (spermatozoid) are stored;
- **vas deferens**, that start in the epididymis and lead the sperm to the urethra; the secretions of seminal vesicles and prostate gland are also discharged into the vas

deferens; it contains nutrients and stimulates sperm to move in the female reproductive track and allows them to reach the egg cell; sperm suspension in liquid secretion of seminal vesicles and prostate is called **semen** (sperm).

The female gamete, or the reproductive cell, is the egg cell. It does not have the ability to move and is the largest of human cells. It ripens on average every 28 days in the ovarian follicle, most often in one ovary, alternately – once in the left, once in the right. When the egg cell matures too much, there is a chance that dizygotic twins will be created during the fertilization process. Capable of fertilization, a mature egg cell contains egg yolk, which is a nourishing material for the embryo. The embryo will use it until it is implanted in the endometrium. The movement of female gametes in the fallopian tube takes 72 hours. After this time, it loses her ability to be fertilized.

Mature spermatozoid (sperm) is made of a head, tail and acrosome. The tail is the longest part of the sperm (spermatozoid) and allows it to actively move towards the egg cell. The energy needed for movement arises in the mitochondria that fill it in large numbers. The sperm (spermatozoid) is the proper reproductive cell that penetrates inside the egg cell. It contains a cell nucleus and a very small amount of cytoplasm. On the surface of the head there is a reservoir (acrosome) with enzymes used for dissolving the egg coat. They allow the sperm to penetrate inside the female gamete. Sperm (spermatozoid) with a tail is more than 20 times smaller than the diameter of the egg.

Ovum and sperm (spermatozoid), connecting with each other in the process of fertilization, give birth to a new organism that inherits the traits of father and mother.

- Reproduction is a life process that ensures the continuity of the species.
- Primary, secondary and tertiary sexual characteristics are adaptation to reproduction.
- The female reproductive system is designed to produce eggs cell, create conditions for embryo and fetal development, and release the baby to the world.
- The male reproductive system is responsible for the production of sperm (spermatozoid) and introducing them to the female reproductive tract.
- In the fertilization process, germ cells are involved: egg cell and sperm (spermatozoid).
- The ovum (egg cell) is an immobile female gamete containing genetic material from the mother.
- Sperm (spermatozoid) is a busy male gamete containing genetic material from his father; it is made of a head and tail