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First D.Pharm - Sub-Code - 15Human anatomy and physiology - theoryURINARY SYSTEM

The urinary system is the main excretory system of the body. It consists of

- ① two kidneys
- ② two ureters.
- ③ urinary bladder.
- ④ urethra.

Kidney :

They are two bean shaped organs lying on the posterior abdominal wall, on each side of the vertebral column.

Functions of the kidneys:

- 1) Excretion of water and waste products of protein metabolism.
- ② Excretion of excess salt.
- ③ Excretion of harmful substances, drugs and toxins
- ④ Regulation of pH of blood.

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Blood supply to kidney :-

Kidneys are supplied by renal arteries which are branches of abdominal aorta.

Venous blood of kidney is drained by renal veins which open into inferior vena cava.

Formation of urine :-

The formation of urine by kidneys involves three processes.

- (1) Glomerular filtration.
- (2) Tubular secretion.
- (3) Tubular reabsorption.

Ureter :-

It is the duct which carries urine from the kidney to bladder.

It is a tube like structure measuring about 26 cm in length.

Ureter is made of

- (1) an outer fibrous layer.
- (2) middle muscular layer.
- (3) inner mucous layer.

URINARY BLADDER.

It is a pear shaped muscular sac which acts as a reservoir for urine.

It lies in the pelvic cavity behind symphysis - pubis. The lowest part of bladder is called base and the upper part is called fundus.

URETHRA.

It is a canal through which urine passes from the bladder to the outside. It differs in the males and females. But sphincter is present in both.

male urethra - It is about 20cm in length, it consists of three parts.

- ① pelvic part.
- ② perineal part.
- ③ penile part.

Female urethra - It is short and measures about 4cm in length. It starts from the base of bladder at the trigone. It opens externally in front of vaginal opening.

Composition of urine -

The volume of urine excreted in man varies from 1 to 2 litres daily. The colour of urine is pale amber, odour is aromatic and reaction is slightly acidic (pH 6). Specific gravity varies from 1.010 to 1.025.

Urine consists of -

- ① water - 96%
- ② Urea - 2%
- ③ uric acid and salts - 2%

DISEASES OF THE URINARY SYSTEM,

- ① Glomerulo nephritis. - inflammation of glomeruli
- ② Pyelitis. - inflammation in pelvis of kidney.
- ③ Polyuria. - Secretion of large quantities of urine
- ④ Anuria. - cessation of urine secretion.
- ⑤ Renal calculi - deposition of insoluble substance in urinary tract.
- ⑥ cystitis. - inflammation

OEDEMA -

It is water logging of the tissues. It occurs as swelling of the body or any part of the body due to retention of fluid.

variety of oedema,

- ① oedema of renal failure
- ② cardiac oedema.
- ③ oedema of lymphatic obstruction
- ④ oedema of thrombosis.

② PROCESS OF REPRODUCTION

Reproduction occurs due to the activity of the essential sex organs of the male and female. They are the testes in males and the ovaries in females.

The testes and ovaries are also called as gonads, testes being the male gonad and ovary the female

- gonad. These gonads produce sex cells.
- testes produce the male sex cells called -
- Spermatozoa.
- ovary produce female sex cells called ova.

Fertilisation -

After a sexual intercourse, the union of spermatozoon and ovum (fertilisation) normally takes place in the fallopian tube.

On a sexual intercourse, a number of spermatozoa are deposited in the vagina.

These spermatozoa are propelled by the activity of their tails towards the fallopian tube.

Only one spermatozoon is required for fertilisation.

The spermatozoon penetrates the ovum and unites with it and thus fertilisation occurs.

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Development of the foetus.

After implantation in the endometrium, the conceptus derives nutrition from the maternal blood. Organs get differentiated during the first 10 weeks of this period.

The embryo is now enclosed within two membranes.

① an inner membrane called amnion.

② an outer membrane called chorion.

The space between these two membranes is called the amniotic sac.

The space is filled with a fluid, called -
- liquor amnii. This fluid protects the foetus from injury.

During the first 8 weeks of development, the chorion is in direct contact with maternal blood. Its surface area is increased by the development of villi.

Formation of all the organs is complete by about 12 weeks and the foetus can be noticed by 17 weeks. Growth of the foetus is complete by 28 weeks but the baby is ready for the born at 40 weeks.

PLACENTA -

It is formed by about 8th weeks of pregnancy. It is formed from the part of the conceptus which is in direct contact with endometrium.

The foetus remains firmly attached to placenta till the birth of the baby.

Functions of placenta -

- (1) It provides nourishment from maternal blood to the foetus.
- (2) It provides oxygenation of foetal blood and removes waste products. It carries the function of lungs.
- (3) It acts as a barrier (blood placental barrier) which prevents the entry of certain drugs and microorganisms reaching the foetus.
- (4) It produces a hormone called chorionic - gonadotrophin. This hormone has a growth promoting effect and also helps in the development of glandular tissues of breast.

Umbelical Cord :-

It is a flexible structure which connects the foetus at the umbelicus to placenta. It contains blood vessels, a pair of umbelical arteries and one umbelical vein.

These blood vessels carry blood between the foetus and placenta.

When the baby is born, the umbelical cord is ligatured and cut.

The remnants of the cord dries up and falls from the baby a few days later.

This leaves a scar called umbelicus or navel marking the site of attachment of the umbelical cord.

