

Chapter 1 : The Urinary System

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After completing this section, you should know: The processes that take place in them are upset if the temperature is too high or too low, or if the fluid around or inside them is too acid or alkaline. Homeostasis is the name given to the processes that help keep the internal conditions constant even when external conditions change. There are a number of organs in the body that play a part in maintaining homeostasis. For example, the skin helps keep the internal temperature of bird and mammals bodies within a narrow range even when the outside temperatures change see Chapters 5 and 16 ; the lungs control the amount of carbon dioxide in the blood see Chapters 8 and 16 ; the liver and pancreas work together to keep the amount of glucose in the blood within narrow limits see Chapter 5 and the kidneys regulate the acidity and the concentration of water and salt in the blood also see Chapter How the kidneys do this will be described later in this chapter. Hormones are chemicals that carry messages around the body in the blood and are central to many of the homeostatic processes mentioned above. Their role will be described in more detail in Chapter Water In The Body[edit] Water is essential for living things to survive because all the chemical reactions within a body take place in a solution of water. The exact proportion depends on the type of animal, its age, sex, health and whether or not it has had sufficient to drink. The rest is outside the cells extracellular fluid where it is found in the spaces around the cells tissue fluid , as well as in the blood and lymph. These losses must be made up by water in food and drink and from the water that is a by-product of chemical reactions. If the animal does not manage to compensate for water loss the dissolved substances in the blood may become so concentrated they become lethal. To prevent this happening various mechanisms come into play as soon as the concentration of the blood increases. A part of the brain called the hypothalamus is in charge of these homeostatic processes. The most important is the feeling of thirst that is triggered by an increase in blood concentration. This stimulates an animal to find water and drink it. The kidneys are also involved in maintaining water balance as various hormones instruct them to produce more concentrated urine and so retain some of the water that would otherwise be lost see later in this Chapter and Chapter Desert Animals[edit] Coping with water loss is a particular problem for animals that live in dry conditions. Some, like the camel, have developed great tolerance for dehydration. For example, under some conditions, camels can withstand the loss of one third of their body mass as water. They can also survive wide daily changes in temperature. This means they do not have to use large quantities of water in sweat to cool the body by evaporation. Smaller animals are more able than large ones to avoid extremes of temperature or dry conditions by resting in sheltered more humid situations during the day and being active only at night. The kangaroo rat is able to survive without access to any drinking water at all because it does not sweat and produces extremely concentrated urine. Water from its food and from chemical processes is sufficient to supply all its requirements. If these substances were not removed they would poison cells or slow down metabolism. All animals therefore have some means of getting rid of these wastes. The major waste products in mammals are carbon dioxide that is removed by the lungs, and urea that is produced when excess amino acids from proteins are broken down. Urea is filtered from the blood by the kidneys. An artery from the dorsal aorta called the renal artery supplies blood to them and the renal vein drains them. They are covered by a fibrous coat or capsule and if cut in half lengthways longitudinally two distinct regions can be seen - an inner region or medulla and the outer cortex. A cavity within the kidney called the pelvis collects the urine and carries it to the ureter, which connects with the bladder where the urine is stored temporarily. Rings of muscle sphincters control the release of urine from the bladder and the urine leaves the body through the urethra see diagrams The cortex and medulla are seen to be composed of masses of tiny tubes. These are called kidney tubules or nephrons see diagrams A human kidney consists of over a million of them. It surrounds a tuft of capillaries called the glomerulus that carries high-pressure blood. Together the glomerulus and capsule act as a blood-filtering device see diagram The holes in the filter allow most of the contents of the blood through except the red and white cells and large

protein molecules. The fluid flowing from the capsule into the rest of the kidney tubule is therefore very similar to blood plasma and contains many useful substances like water, glucose, salt and amino acids. It also contains waste products like urea. **Processes Occurring In The Nephron**[edit] After entering the glomerulus the filtered fluid flows along a coiled part of the tubule the proximal convoluted tubule to a looped portion the Loop of Henle and then to the collecting tube via a second length of coiled tube the distal convoluted tubule see diagram From the collecting ducts the urine flows into the renal pelvis and enters the ureter. Note that the glomerulus, capsule and both coiled parts of the tubule are all situated in the cortex of the kidney while the loops of Henle and collecting ducts make up the medulla see diagram As the fluid flows along the proximal convoluted tubule useful substances like glucose, water, salts, potassium ions, calcium ions and amino acids are reabsorbed into the blood capillaries that form a network around the tubules. Many of these substances are transported by active transport and energy is required. The main function of the collecting ducts is then to remove more water from the urine if necessary. These processes are summarised in diagram Normal urine consists of water, in which waste products such as urea and salts such as sodium chloride are dissolved. Pigments from the breakdown of red blood cells give urine its yellow colour. The main part of this reabsorption takes place in the collecting tubes. The amount of water removed from the collecting ducts is controlled by a hormone called antidiuretic hormone ADH produced by the pituitary gland, situated at the base of the brain. When the blood becomes more concentrated, as happens when an animal is deprived of water, ADH is secreted and causes more water to be absorbed from the collecting ducts so that concentrated urine is produced. When the animal has drunk plenty of water and the blood is dilute, no ADH is secreted and no or little water is absorbed from the collecting ducts, so dilute urine is produced. In this way the concentration of the blood is controlled precisely. The body fluids of fish that live in fresh water have a higher concentration of dissolved substances than the water in which they swim. In other words the body fluids of fresh water fish are hypertonic to the water see chapter 3. Water therefore flows into the body by osmosis. To stop the body fluids being constantly diluted fresh water fish produce large quantities of dilute urine. **Marine Fish**[edit] Marine fish like the sharks and dogfish have body fluids that have the same concentration of dissolved substances as the water isotonic have little problem with water balance. However, marine bony fish like red cod, snapper and sole, have body fluids with a lower concentration of dissolved substances than seawater they are hypotonic to seawater. This means that water tends to flow out of their bodies by osmosis. To make up this fluid loss they drink seawater and get rid of the excess salt by excreting it from the gills. **Marine Birds**[edit] Marine birds that eat marine fish take in large quantities of salt and some only have access to seawater for drinking. This excretes a concentrated salt solution into the nose to get rid of the excess salt. **Diabetes And The Kidney**[edit] There are two types of diabetes. The most common is called sugar diabetes or diabetes mellitus and is common in cats and dogs especially if they are overweight. It is caused by the pancreas secreting insufficient insulin, the hormone that controls the amount of glucose in the blood. If insulin secretion is inadequate, the concentration of glucose in the blood increases. Any increase in the glucose in the blood automatically leads to an increase in glucose in the fluid filtered into the kidney tubule. Normally the kidney removes all the glucose filtered into it, but these high concentrations swamp this removal mechanism and urine containing glucose is produced. The main symptoms of this type of diabetes are the production of large amounts of dilute urine containing glucose, and excessive thirst. The second type of diabetes is called diabetes insipidus. It occurs when the pituitary gland produces insufficient ADH, the hormone that stimulates water re-absorption from the kidney tubule. When this hormone is lacking, water is not absorbed and large amounts of dilute urine are produced. Because so much water is lost in the urine, animals with this form of diabetes can die if deprived of water for only a day or so. **Other Functions Of The Kidney**[edit] The excretion of urea from the body and the maintenance of water balance, as described above, are the main functions of the kidney. However, the kidneys have other roles in keeping conditions in the body stable i. Excess acid is constantly being produced by the normal chemical reactions in the body and the kidney eliminates this. **Abnormal Ingredients Of Urine**[edit] If the body is not working properly, small amounts of substances not normally present may be found in the urine or substances normally present may appear in abnormal amounts. The presence of glucose may indicate diabetes see above. Urine with red blood cells in it is called haematuria, and

may indicate inflammation of the kidney, or urinary tract, cancer or a blow to the kidneys. Sometimes free haemoglobin is found in the urine. This indicates that the red blood cells in the blood have haemolysed the membrane has broken down and the haemoglobin has passed into the kidney tubules. The presence of white blood cells in the urine indicates there is an infection in the kidney or urinary tract. Protein molecules are usually too large to pass into the kidney tubule so no or only small amounts of proteins like albumin is normally found in urine. Large quantities of albumin indicate that the kidney tubules have been injured or the kidney has become diseased. High blood pressure also pushes proteins from the blood into the tubules. Casts are tiny cylinders of material that have been shed from the lining of the tubules and flushed out into the urine. Tests can be carried out to identify any abnormal ingredients of urine. A colour change occurs in the presence of an abnormal ingredient. Birds therefore do not have a bladder and instead of excreting urea, which needs to be dissolved in large amounts of water, birds produce uric acid that can be discharged as a thick paste along with the feces. This is the white chalky part of the bird droppings that land on you or your car. Summary[edit] The excretory system consists of paired kidneys and associated blood supply. Ureters transport urine from the kidneys to the bladder and the urethra with associated sphincter muscles controls the release of urine. The kidneys have an important role in maintaining homeostasis in the body. They excrete the waste product urea, control the concentrations of water and salt in the body fluids, and regulate the acidity of the blood. A kidney consists of an outer region or cortex, inner medulla and a cavity called the pelvis that collects the urine and carries it to the ureter.

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*The kidneys, ureters, urinary bladder and urethra. ***Main characteristics of the kidneys -Right kidney is slightly lower than the left due to the position of the liver.*

What are papillae and where are they located? What is the roof of the oral cavity called 2 parts: What are the three salivary glands and where are they located? What are the two types of movements within the alimentary canal? What are the three main functions of the digestive system? What is the name of the opening where the esophagus pass through the diaphragm? What layer of the alimentary canal carries out absorption? What valve opens from the esophagus to the stomach? What structure connects the tongue to the floor of the mouth? What digestive enzyme is produced by the salivary glands? The part of the stomach that sits slightly above the esophagus is called the fundus What is the hardest substance found in the body? The central cavity of the tooth is made of dentin The top of the tooth is called the crown The part of the tooth that extends below the gums is called the root What is food called after it has been broken down into a paste? What causes jaundice in newborns? Trace the path of food once it enters the colon follow through the parts ascending colon to transverse colon to descending colon What is the function of the pancreas? What does the bile duct connect? Where is the hepatic portal vein located? Trace the path of food from the stomach and through all of the parts of the small intestine: What is the function of the gall bladder? What membrane holds the coils of the small intestine together? What is the function of the intestinal villi? What part of the colon is located right before the rectum? Where is the cecum located? What part of the system stores waste prior to its elimination? What is a mass movement? What is the function of the large intestine? If part of the small intestine pokes through the abdominal muscles, a person has a hernia Hepatitis A,B, or C affects which organ of the digestive system? What substance is mainly responsible for breaking down fats? What is lactose intolerance? What is another name for gastroesophageal reflux disease? The biliary system refers to the liver, pancreas and gall bladder. What are the three ducts found in that system? If a person has dysentery , they have a dangerous form of diarrhea Be able to label structures of the digestive system on an image. This includes a close-up view of the stomach and biliary system 1.

Chapter 3 : Study Guide - Digestive System

The Urinary System The Urinary System Chapter The Urinary System Functions of the Urinary System. â€¢ Elimination of waste products to the kidney.

Chapter 4 : calendrieldelascience.com - Acupuncture Points - Urinary Bladder UB 15

This chapter discusses the neuronal mechanisms that operate in the normal filling and emptying phases of the bladder function. The experimental evidence derives mostly from animal studies, but there are no reasons to believe that human bladder reflexes have a fundamentally different organization.

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Chapter 6 : mastering A&P chapter 26 urinary system Flashcards | Easy Notecards

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Chapter 7 : Top Urinary System Quizzes, Trivia, Questions & Answers - ProProfs Quizzes

This chapter discusses the neuronal mechanisms that operate in the normal filling and emptying phases of the bladder function. The experimental evidence derives mostly from animal studies, but.

Chapter 8 : Ch. 17 Urinary System (Kidney Labeling) - PurposeGames

Infiltration structure of the urinary system renal tube The urinary structure that is most closely associated with reabsorption of water, electrolytes & nutrients.

Chapter 9 : Chapter Urinary System Quiz - ProProfs Quiz

Chapter 15 The Urinary System There is a progressive decline in urinary function Chapter 15 jk [Compatibility Mode] Author.