

EXCRETION AND HOMEOSTASIS

DEFINE# REMOVE METABOLIC WASTE

THE WASTE INCLUDE;

- ❖ CO₂**
- ❖ NITROGENOUS**
- ❖ EXCESS WATER**
- ❖ MINERAL SALTS**
- ❖ TANNINS**
- ❖ EXCESS QUININE AND RESINS**

**IF THESE SUBSTANCES ARE LEFT IN BODY
THEY ARE TOXIC.**

**WASTES SHOULD BE REMOVED AS
QUICKLY AS THEY ARE FORMED.**

**THE METABOLIC PROCESSES ALSO
RELEASE HEAT AND CHANGE OF pH IN THE
BODY.**

**THEREFORE, A CONSTANT ENVIRONMENT
MUST BE MAINTAINED BY THE BODY.**

THIS IS CALLED HOMEOSTASIS

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**THEREFORE HOMEOSTASIS IS;
THIS IS THE MAINTAINANCE OF A
CONSTANT INTERNAL ENVIRONMENT OF
THE BODY.**

**AND EGESTION IS;
THIS IS THE REMOVAL OF UNDIGESTED
AND INDIGESTIBLE FOOD MATERIALS FROM
FOOD VACUOLES.**

#####--SECREATION-----□

**SECREATION IS, THE RELEASE OF
CERTAIN USEFUL SUBSTANCES
PRODUCED BY THE CELLS. SUCH
INCLUDE HORMONES, ENZYMES,
OXALATES, SEBUM AND MUCUS.**

EXCRETION IN PLANTS

**PLANTS HAVE VARIOUS EXCRETORY WASTES
LIKE;**

**CO₂, OXYGEN, EXCESS WATER, SAPS, RESINS
AND GUMS.**

**THEY HOWEVER DO NOT HAVE AN ELABORATE
EXCRETORY ORGANS AS ANIMALS.**

THIS IS BECAUSE;

- ❖ **THEIR WASTE ACCUMULATE SLOWLY**
- ❖ **THEIR WASTES ARE CARBOHYDRATES
WHICH ARE LESS TOXIC**

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- ❖ **STORED IN LESS HARMFUL STATE**
- ❖ **NITROGENOUS WASTE IS USED TO SYNTHESIZE NEW PROTEIN FOR GROWTH.**

- ❖ **REUSED E.G CO₂ AND O₂**
- ❖ **CONVERTED TO LESS TOXIC SUBSTANCES**

USES OF EXCRETORY PRODUCTS IN PLANTS

PRODUCTS	PLANT OBTAINED	USES
CAFFEINE	TEA AND COFFEE	- MILD CNS STIMULANT - PRODUCE INSECTICIDES
COCAINE	COCA PLANT	- ANAESTHESIA - INDUCES EUPHORBIA

NICOTINE	TOBACCO PLANT	• CNS STIMULANT • CARCINOGENIC
MORPHINE	OPIUM POPPY PLANT	• INDUCES SLEEP • CAUSE HALLUCINATION • PAIN RELIEVER

COLCHICINE	AUTUMN CROCUS	• CANCER THERAPY • INDUCE POLIPLOIDY IN PLANTS
RUBBER	LATEX OR RUBBER PLANT	• USED IN SHOE INDUSTRY • CHEWING GUM
	BHANG	• MANUFACTUR

KHAT

**KHAT
PLANT OR
*Catha
edulis***

- **MEDICAL
PURPOSES**
- **MILD
STIMULANT**

HEROIN

**OPIUM
POPPY**

- **INDUCE DRUG
DEPENDENCE**
 - **IT IS
ADDICTIVE**
- **NARCOTIC
DRUG**

EXCRETION AND HOMEOSTASIS IN ANIMALS

❖ **EGESTION - THIS IS THE REMOVAL OF
UNDIGESTED AND INDIGESTIBLE
FOOD MATERIALS FROM THE BODY.**

❖ **SECRETION - THIS IS THE
PRODUCTION AND RELEASE OF
USEFUL SUBSTANCES FROM THE
CELLS AND GLANDS**

EXCRETION IN UNICELLULAR ORGANISMS. (A PROTOZOA E.G AMOEBA)

THEY EXCRETE WASTE THROUGH THE VACUOLE.

THEY MAINLY DEPEND ON DIFFUSION.

THE WASTE DIFFUSE FROM CYTOPLASM WHERE THEY ARE HIGHLY CONCENTRATED ACROSS THE CELL MEMBRANE INTO THE SURROUNDING WATER WHERE ITS LOW CONC.

#####-----USING VACUOLES-----□

####DIAGRAM

- ❖ **WATER ENTERS VACUOLE**
- ❖ **VACUOLE ENLARGES**
- ❖ **VACUOLE MOVES TO THE CELL MEMBRANE**
- ❖ **RELEASES CONTENTS TO THE SURROUNDING**

SOON AFTER, ANOTHER VACUOLE FORMS IN CYTOPLASM TO CONTINUE THE PROCESS.

EXCRETION IN ANIMALS

ANIMALS HAVE AN ELABORATE **EXCRETORY SYSTEM MADE OF TISSUES AND ORGANS.**

DUE TO THIS, SIMPLE DIFFUSION WOULD NOT SERVE AS AN EXCRETORY MEDIUM HERE.

THE EXCRETORY TISSUE AND ORGANIS INCLUDE;

❖ **FLAME CELLS** IN FRESH WATER
INVERTEBRATE E.G FLAT WORMS,
ROTIFERAS

❖ **NEPHRIDIA** OF THE ANNELIDS

❖ **MALPHIGIAN TUBULES** IN INSECT
GILLS

❖ **LUNGS** IN MAMMALS

❖ **LIVER** IN MAMMALS

❖ **KIDNEYS** OF VERTEBRATES.

**THESE ORGANS ARE SPECIALLISED TO
FUNCTION IN DIFFERENT HABITATS.**

EXCRETION IN MAMMALS (THE LUNGS)

THIS REMOVES CO₂ FORMED IN TISSUE RESPIRATION.

IT IS MADE UP OF SMALL AIRSACS CALLED THE ALVEOLI WITH THIN EPITHELIUM BELOW THE EPITHELIUM ARE BLOOD CAPILLARIES

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**BLOOD IN CAPILLARIES HAVE A HIGH
CONC OF CO₂**

**THIS CONC GRADIENT CAUSES CO₂ TO
DIFFUSE OUT OF THE BLOOD INTO
THE ALVEOLI**

**THE CO₂ IS THEN EXPELLED OUT OF
THE LUNGS IN A PROCESS CALLED
EXHALLATION**

THE SKIN

THIS IS THE LARGEST ORGAN IN THE BODY.

IT COVERS THE WHOLE BODY AND ALSO ENTERS BODY OPENINGS LIKE THE NOSE, EARS AND MOUTH.

IT HAS SEVERAL LAYERS ACCORDING TO THE EPIDERMIS AND DERMIS.

STRUCTURE AND FUNCTIONS OF THE SKIN

- ❖ **PROTECTION OF UNDERLYING TISSUES**
- ❖ **REGULATION OF BODY TEMPERATURE**
- ❖ **EXCRETION OF SALTS, EXCESS WATER AND UREA TRACES**
- ❖ **RECEPTION OF STIMULI LIKE HEAT, COLD**
- ❖ **SYNTHESIZE VITAMIN D**
- ❖ **FATS STORAGE**

PARTS OF THE SKIN

THE EPIDERMIS IS MADE UP OF THREE LAYERS;

❖ **CORNIFIED LAYER** - THE UPPERMOST LAYER MADE OF DEAD CELLS FILLED WITH KERATIN.

PROVIDES PROTECTION AGAINST MECHANICAL DAMAGE.

❖ **GRANULAR LAYER** - MADE OF LIVING CELLS WHICH GIVES RIZE TO CORNIFIED LAYER.

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❖ **MALPHIGIAN LAYER - THE INNERMOST LAYER.** MADE OF ACTIVELY DIVIDING CELLS GIVING RIZE TO NEW EPIDERMIS.

CONTAINS MELANIN PIGMENT GIVING SKIN COLOR. DARK SKINNED HAVE LARGE NUMBER OF MELANIN.

IT ALSO PROTECTS FROM HARMFUL UV RAYS.

THE DERMIS IS THICKER THAN THE EPIDERMIS.

IT IS BELOW THE MALPHIGIAN LAYER.

IT CONTAINS, SWEAT GLANDS, HAIR FOLLICLES, BLOOD CAPILLARIES, NERVE ENDINGS,, SENSORY ORGANS AND SABACEOUS GLANDS.

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SWEAT GLANDS - BECOMES STIMULATED
WHEN IT IS HOT AND RELEASE SWEAT
WHICH EVAPORATES CAUSING A COOLING
EFFECT.

BLOOD CAPILLARIES - CONTAIN BLOOD
SUPPLYING NUTRIENTS AND OXYGEN TO THE
SKIN TISSUES REMOVING WASTE PRODUCTS
LIKE CO₂

IT ALSO REGULATES TEMP IN THE BODY

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**HAIR FOLLICLES - REGULATE
TEMPERATURE**

NERVE ENDINGS - DETECT STIMULI

**SABACEOUS GLAND - GLANDS OPENING
NEXT TO THE HAIR FOLLICE. PRODUCE
SEBUM ACTING AS ANTISEPTIC TO KILL
PATHOGENS ON THE SKIN.**

**IT KEEPS THE HAIR AND EPIDERMIS
WATERPROOF AND FLEXIBLE. .**

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**SUB CUTANEOUS FAT - LAYER OF FAT
CELLS BENEATH THE DERMIS. ITS
ALSO CALLED THE ADIPOSE TISSUE.**

**IT BINDS THE SKIN TO THE
MUSCLES AND OTHER ORGANS
DEEP IN THE BODY**

**IT STORES FAT AND ACT AS
INSULATOR LAYER AGAINST
HEAT LOSS**

ADAPTATIONS OF THE SKIN TO ITS FUNCTION

- ❖ IT HAS CORNIFIED LAYER MADE OF DEAD CELLS WHICH **PROTECTS** THE INNER TISSUES FROM ENVIRONMENTAL HAZARDS.
- ❖ THE MALPHIGIAN LAYER **HAS MELANIN** PROTECTING BODY AGAINST HARMFUL UV.
- ❖ IT HAS SEBACEOUS GLAND SECREATING SEBUM ACTING AS AN **ANTISEPTIC** TO THE SKIN

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- ❖ IT IS RICHLY SUPPLIED WITH **BLOOD VESSELS TO SUPPLY NUTRIENTS**
- ❖ HAIR FOLLICLES FOR **TEMP REGULATION**
- ❖ ERECTOR PILI MUSCLES
- ❖ SWEAT GLANDS TO **PRODUCE SWEAT**
- ❖ IT HAS **NERVE CELLS**
- ❖ ADIPOSE TISSUE STORING FATS WHICH CAN BE OXIDIZED TO **PRODUCE ENERGY TO THE BODY**

THE KIDNEY

**THE FUNCTIONS OF THE KIDNEYS ARE;
OSMORAGULATION, EXCRETION,
IONIC BALANCE AND pH REGULATION.**

**A MAMMAL HAS TWO KIDNEYS LOCATED
BETWEEN T12 - L3 VERTEBRAE IN THE
RETROPERITONEAL SPACE, ON
POSTERIOR ABDOMINAL WALL**

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THEY ARE **BEAN SHAPED** AND **RED** IN COLOR.
THE RIGHT KIDNEY IS **MORE INFERIOR** THAN
LEFT KIDNEY. THIS IS BECAUSE OF **THE**
LIVER LYING ON THE RIGHT SIDE.

ABOVE KIDNEYS IS THE ADRENAL GLAND
SECRETING HORMONES.

THE KIDNEY ALSO IS CONVEX ON THE OUTER
AND CONCAVE INTO THE INNER SIDE.

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THE CONCAVE SIDE HAS A DEPRESSION CALLED **HILUM WHERE THE **BLOOD VESSELS** ENTER AND LEAVE. **URETER** LEAVES TO THE **BLADDER**.**

THE URETER LINKS THE KIDNEY TO THE BLADDER.

THE BLADDER **TEMPORARILY STORES URINE FROM THE KIDNEY.**

WHEN IT IS FULL, IT RELEASES URINE VIA THE URETHRA AND EXCRETION IS ACHIEVED.

THE KIDNEY HAS THREE DISTINCT REGIONS;

CORTEX - DARK RED REGION

MEDULLA - RED IN COLOR LIES TOWARDS THE CENTER OF THE KIDNEY AND EXTENDS IN FORM OF CONICAL STRUCTURES CALLED PYRAMIDS.

THE PYRAMIDS OPEN UP IN SWOLLEN CAVITY CALLED PELVIS.

PELVIS - WHITISH IN COLOR FORMING URETER.

THE NEPHRON

THIS IS THE BASIC FUNCTIONAL UNIT OF A KIDNEY.

NEPHRON HAS TWO MAIN PARTS;

- ❖ **RENAL TUBULES**

- ❖ **GLOMERULUS**

THE RENAL TUBULE HAS 5 MAIN PARTS. THE GLOMERULUS, BOWMANS, PROXIMAL, LOOP OF HENLE, DISTAL AND COLLECTING TUBULE. ##-

ROLES OF THE NEPHRON

THE KIDNEY RECIEVES BLOOD FROM THE RENAL ARTERY. THIS BLOOD IS RICH IN NITROGENOUS WASTES E.G UREA. IT ALSO CONTAINS DISSOLVED FOOD, PLASMA PROTEINS, MINERALS, HORMONES AND OXYGEN.

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THE KIDNEY RECIEVES BLOOD FROM THE RENAL ARTERY IN HIGH PRESSURE. THIS BLOOD IS RICH IN NITROGENOUS WASTES E.G UREA.

IT ALSO CONTAINS DISSOLVED FOOD, PLASMA PROTEINS, MINERALS, HORMONES AND OXYGEN.

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THE HIGH PRESSURE FORCES UREA, GLUCOSE, SALTS AND AMINO ACIDS OUT OF THE GLOMERULUS INTO THE BOWMAN'S CAPSULE.

THE FILTRATE FORMED IS CALLED GLOMERULAR FILTRATE. THIS PROCESS IS CALLED ULTRA FILTRATION.

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**LARGE MOLECULES LIKE BLOOD CELLS
AND PROTEINS ARE NOT FILTERED OUT
DUE TO THE SMALL PORES OF THE
CAPILLARY WALLS.**

**THE FILTRATE FLOWS FROM BOWMAN'S
CAPSULE NOW TO THE PROXIMAL
CONVOLUTED TUBULE.**

**AS THIS HAPPENS, USEFUL SUBSTANCES
ARE BEING REABSORBED BACK TO THE
BLOOD.**

**IN THE PROXIMAL, GLUCOSE, AMINO ACIDS,
VITAMINS AND SOME MINERAL SALTS
ARE REABSORBED. THIS REQUIRES
ENERGY.**

HERE, WATER IS ABSORBED BY OSMOSIS.

**FROM THE PROXIMAL TUBULE, THE FILTRATE
FLOWS INTO THE LOOP OF HENLE.**

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**THE LOOP OF HENLE IS A U-SHAPED
STRUCTURE COMPRISING
DESCENDING AND ASCENDING LIMB.
THE WALLS OF THE DESCENDING ARE
HIGHLY PERMIABLE TO WATER AND
SOLUTES ALLOWING FOR THEIR RE-
ABSORPTION.**

REABSORPTION IS ACCELERATED BY PUMPING OF SODIUM IONS FROM THE FILTRATE OF THE ASCENDING LIMB INTO THE INTERCELLULAR SPACE OF THE MEDULLA.

SODIUM IONS RAISES THE OSMOTIC PRESSURE OF THE TISSUE FLUID AROUND THE DESCENDING LIMB AS THIS CAUSES WATER TO BE DRAWN FROM THE TUBULE.

**THE WALLS OF THE ASCENDING LIMB IS
RELATIVELY IMPERMIABLE TO WATER.
FOR THIS REASON, WATER IS NOT
REABSORBED. HOWEVER, SALTS ARE
PUMPED OUT MAKING THE FILTRATE
LESS CONCENTRATED.**

**THE LOOP OF HENLE ENSURES
REABSORPTION OF WATER BY OSMOSIS
AT THE DESCENDING LIMB BRINGING
ABOUT WATER CONCENTRATION.**

THE FILTRATE REACHES THE DISTAL CONVOLUTED TUBULE, WHERE WATER IS REABSORBED BY OSMOSIS.

THIS PROCESS IS MADE POSSIBLE IN TWO WAYS;

- ❖ **SODIUM IONS WHICH INCREASES OSMOTIC POTENTIAL OF BLOOD**
- ❖ **THE PRESENCE OF ANTIDIURETIC HORMONE (ADH)**

**THE HORMONE IS SECRETED BY THE
PITUITARY GLANDS. IT INCREASES THE
PERMEABILITY OF THE TUBULE AND
BLOOD CAPILLARIES TO WATER.**

**WHEN THERE IS EXCESS WATER IN THE
BODY, THE OSMOTIC PRESSURE IN
BLOOD FALLS REDUCING ADH
SECRETION. THIS REDUCES WATER
REABSORPTION AND VICE VERSA.**

**THE HORMONE IS SECRETED BY THE
PITUITARY GLANDS. IT INCREASES THE
PERMEABILITY OF THE TUBULE AND
BLOOD CAPILLARIES TO WATER.**

**WHEN THERE IS EXCESS WATER IN THE
BODY, THE OSMOTIC PRESSURE IN
BLOOD FALLS REDUCING ADH
SECRETION. THIS REDUCES WATER
REABSORPTION AND VICE VERSA.**

THE **FILTRATE FROM THE NEPHRON**
COLLECTS AT THE COLLECTING TUBULE
AND FLOWS TO THE PELVIS AND THEN
TO THE URETER.

IT FLOWS TO THE BLADDER FOR STORAGE
AND EXCREATED VIA THE URETHRA.

FOR **EFFICIENT REABSORPTION, THE**
PROXIMAL AND THE DISTAL TUBULES
HAVE **ADAPTATIONS TO ENABLE THEM TO**
FUNCTION.

ADAPTATIONS OF THE PROXIMAL AND THE DISTAL CONVOLUTED TUBULES.

- ❖ **CELLS LINING THE TUBULES HAVE NUMEROUS MITOCHONDRIA, PROVIDING NECESSARY ENERGY FOR REABSORPTION.**
- ❖ **CELLS OF THE TUBULE HAVE MICRO-VILLI INCREASING S.A FOR REABSORPTION**
- ❖ **THEY ARE LONG AND HIGHLY COILED TO PROVIDE A LARGE SURFACE AREA FOR REABSORPTION.**

- ❖ **THE TUBULES ARE LONG FOR MAXIMUM RETENTION OF THE FILTRATE FOR REABSORPTION**
- ❖ **WELL SUPPLIED WITH BLOOD CAPILLARIES FOR TRANSPORT AND REABSORPTION OF MATERIALS.**

.URINE COMPOSITION FOR A HEALTHY PERSON MAY BE AS FOLLOWS;

- ❖ **WATER 95%**
- ❖ **UREA 2%**
- ❖ **URIC ACID 0.030%**
- ❖ **CREATININE 0.1%**
- ❖ **SALTS 1.4%**
- ❖ **AMMONIA 0.04%**

**THE XEROPHYTIC ANIMALS HAVE A
SMALL VERY LONG LOOP OF HENLE
AS COMPARED TO ANIMALS IN
AQUATIC REGIONS.**

**THIS ENABLES MAXIMUM ABSORPTION
OF WATER AS THEY PRODUCE VERY
CONCENTRATED URINE.**

KIDNEY DISEASES

1. NEPHRITIS

IT IS CAUSED BY A BACTERIA

SYMPTOMS;

- ❖ **HEADACHE,**
- ❖ **FEVER, VOMITING,**
- ❖ **OEDEMA, WEAKNESS**
- ❖ **COLORED URINE**

TREATMENT AND CONTROL

- ❖ **AVOID TAKING TOO MUCH SALTS**
- ❖ **AVOID TOO MUCH PROTEINS**
- ❖ **TREAT WITH ANTI-BIOTICS**

2. KIDNEY STONES

**IT IS CAUSED BY HIGH CONC OF SALTS IN
THE BODY**

ITS ALSO CAUSED BY IMPROPER DIET

SYMPTOPMS;

- ❖ **INCREASED FREQUENCY OF URINATING**
- ❖ **PAIN AND SORE IN UPPER BACK SIDE**
 - ❖ **PAIN, CHILLS AND FEVER**
- ❖ **CALCIUM DEPOSITS IN THE KIDNEY**

TREATMENT AND CONTROL

- ❖ **MEDICAL CHECKUPS**
- ❖ **EAT A BALANCED DIET**
- ❖ **MASSAGE YOUR BACK**
- ❖ **SURGICAL TREATMENT REMOVE STONES**
- ❖ **USING LASER BEAMS TO BREAK DOWN THE STONES.**

3. ALBIMINURIA

**BACTERIAL INFECTION WHERE
ALBUMIN MAY BE FOUND IN URINE.**

SYMPTOPMS;

- ❖ **ACCUMULATION OF FLUID IN TISSUE**
- ❖ **WHITISH FOAM IN URINE**
- ❖ **SWELLING ANKLES, HANDS, BELLY
OR FACE**

TREATMENT AND CONTROL

- ❖ **EAT A BALANCED DIET**
- ❖ **USE APPROPRIATE ANTIBIOTICS**
- ❖ **PATIENTS SHOULD AVOID FOOD
HAVING PROTEIN AND SALTS**

4. GOUT

EXCESS CONSUMPTION OF ORGANIC MEAT LEADING TO ACCUMULATION OF URIC ACID IN THE JOINTS.

SYMPTOMS;

- ❖ **PAIN IN WALKING AND MOVEMENTS**
- ❖ **JOINT SWELLING**
- ❖ **TENDER JOINTS**

TREATMENT AND CONTROL

- ❖ **TAKING APPROPRIATE MEDICATION**
 - ❖ **EAT DIET WITH LOW PROTEIN**
 - ❖ **AVOID RED MEAT**
 - ❖ **DRINK PLENTY WATER**
 - ❖ **AVOID TAKING DRUGS**
 - ❖ **LIVE HEALTHY**
 - ❖ **REGULAR EXERCISE**
 - ❖ **MEDICAL CHECKUPS**

5. RENAL FAILURE

**CAUSED BY DRUG ABUSE, LOW BLOOD FLOW
IN KIDNEY, URINARY TRACT PROBLEM,
HEART ATTACK**

SYMPTOMS;

- ❖ **LOW URINE FORMED**
- ❖ **SWELLING FACE, ARMS, LEGS, ANKLES**
- ❖ **SHORTNESS OF BREATH AND CHEST PAINS**
- ❖ **FATIGUE, CONFUSION, SEIZURES**

TREATMENT AND CONTROL

❖ **AVOID TAKING DRUGS**

❖ **LIVE HEALTHY**

❖ **REGULAR EXERCISE**

❖ **MEDICAL CHECKUPS**

6. UREMIA

IT'S A DISEASE WHERE THERE IS EXCESS UREA IN THE BLOOD. CAUSED BY HBP, DIABETES, KIDNEY INFLAMMATION ETC

SYMPTOMS;

- ❖ **CONVULSIONS, BREATHING DIFFICULTY**
 - ❖ **COMA**
 - ❖ **VOMITING**
 - ❖ **DIRRRHOEA**

TREATMENT AND CONTROL

**#CAUTION; UREMIA SEVERLY DAMAGES
KIDNEYS**

- ❖ **DIALYSIS IS THE ONLY TREATMENT**
- ❖ **AVOID TAKING DRUGS**
- ❖ **LIVE HEALTHY**
- ❖ **REGULAR EXERCISE**
- ❖ **MEDICAL CHECKUPS**

7. KIDNEY FAILURE

**OCCURS WHEN THE KIDNEY(S) FAIL TO
FUNCTION**

SYMPTOMS;

- ❖ **REDUCED URINE PRODUCTION**
- ❖ **SWELLING LEGS, ANKLES, FEET**
 - ❖ **SHORTNESS OF BREATH**
 - ❖ **FATIGUE**
 - ❖ **NAUSEA AND CONFUSIO**

TREATMENT AND CONTROL

- ❖ **KIDNEY TRANSPLANT**
- ❖ **AVOID TAKING DRUGS**
- ❖ **LIVE HEALTHY**
- ❖ **REGULAR EXERCISE**
- ❖ **MEDICAL CHECKUPS**

8. URINARY TRACT OBSTRUCTION

FORMATION OF TUMORS IN THE URINARY TRACT

SYMPTOMS;

- ❖ **ABDOMINAL PAIN**
- ❖ **CONTINUOUS FEELING OF FULL BLADDER**
 - ❖ **FREQUENT URINATION**
 - ❖ **PAIN IN URINATING (*DYSURIA*)**
 - ❖ **SLOW AND UNEVEN URINE FLOW**
 - ❖ **URINARY TRACT INFECTION**

TREATMENT AND CONTROL

❖ **SURGICAL REMOVAL OF OBSTRUCTION**

❖ **AVOID TAKING DRUGS**

❖ **LIVE HEALTHY**

❖ **REGULAR EXERCISE**

❖ **MEDICAL CHECKUPS**

THE LIVER

**THIS IS THE SECOND LARGEST ORGAN
AFTER THE SKIN.**

**IT IS LOCATED BENEATH THE
DIAPHRAM.**

**IT IS A SPECIAL EXCRETORY ORGAN
SINCE IT PRODUCES MOST OF
EXCRETORY PRODUCTS.**

**HEPATIC PORTAL BLOOD VESSELS
SUPPLY IT WITH BLOOD.**

**IT RECIEVES THE MOST BLOOD APART
FROM THE HEART.**

**IT CONSIST OF LOBES AND LOBULES.
EACH LOBULE IS MADE OF LIVER CELLS
CALLED HEPATOCYTES.**

**THESE CELLS ARE ARRANGED
RADIALY AND SUPPLIED BLOOD BY
THE H. P. ARTERY.**

**BETWEEN THE LIVER PLATE CELLS ARE
CHANNELS CALLED CANALICULI
RECEIVING BILE.**

**THIS BILE THEN COLLECTS IN THE
BILEDUCT AND STORED IN THE GALL-
BLADDER.**

FUNCTIONS THE LIVER

❖ **DEAMINATION** - THIS IS THE BREAK DOWN OF EXCESS AMINO ACIDS IN THE BODY. IN THIS PROCESS, AMINO GROUP (-NH_2) IS REMOVED AND USED TO FORM AMMONIA.

THIS AMMONIA IS TAKEN TO THE **ORTHININE CYCLE**. THIS IS A SERIES OF REACTIONS RESULTING IN THE FORMATION UREA, WHICH IS LESS TOXIC THAN AMMONIA. THE UREA IS THEN TRANSPORTED TO THE KIDNEY.

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**THE REMAINING ORGANIC COMPOUNDS
ARE CONVERTED TO GLUCOSE, OXIDISED
TO RELEASE ENERGY, OR STORED AS
GLYCOGEN.**

**WHEN THE TEMPERATURES ARE LOW, THE
HYPOTHALAMUS SENDS IMPULSE TO
THE LIVER TO INCREASE EXOTHERMIC
REACTIONS TO PRODUCE MORE HEAT.**



❖ **DETOXIFICATION** - THIS IS THE REMOVAL OF HARMFUL SUBSTANCES BY **RENDERING THEM HARMLESS**.
EXAMPLE ARE ALCOHOLS AND DRUGS WHICH MIGHT BE HARMFUL.

THESE SUBSTANCES ARE BROUGHT TO THE LIVER WHERE THEY ARE DETOXIFIED. THE LIVER CELLS HAVE CATALASE ENZYMES CONVERTING PEROXIDES AND OTHER SUPEROXIDES TO **OXYGEN** AND **WATER**. AMONIA PRODUCED PASSES THROUGH ORTHININE CYCLE.

❖ **THERMOREGULATION** - WHEN THE BODY TEMPERATURES BECOME LOW, THE HYPOTHALAMUS SENDS IMPULSES TO THE LIVER TO INCREASE ITS EXOTHERMIC REACTIONS.

THIS RAISES THE BODY TEMPERATURES.

❖ **SUGAR REGULATION** - THE LIVERS STORES CARBOHYDRATES IN FORM OF GLYCOGEN. WHEN BLOOD SUGAR IS BELOW 90ML/100ML, GLYCOGEN IS CONVERTED TO GLUCOSE, BY GLUCAGON HORMONE.

WHEN BLOOD SUGAR IS ABOVE 140ML/ 100ML, GLUCOSE IS CONVERTED TO GLYCOGEN BY INSULIN HORMONE.

❖ **PLASMA PROTEIN REGULATION**- PP ARE SYNTHESIZED FROM AMINO ACIDS. E.G ALBUMIN, FIBRINOGEN, PROTHROMBIN AND ANTIBODIES WHICH FIGHT HARMFUL BACTERIA.

❖ **PRODUCTION OF BILE** - BILE IS PRODUCED BY THE LIVER CELLS WHICH ASSIST IN DIGESTION PROCESS

❖ **EXCRETION OF CHOLESTROL- TOO MUCH CHOLESTROL IN THE BODY IS HARMFUL AND CAN CAUSE DISEASE LIKE ATHERIOSCLEROSIS, GALL STONES, HEART ATTACK AND STROKE.**

❖ **REGULATION OF FAT METABOLISM - EXCESS FAT IS STORED IN THE ADIPOSE TISSUE. WHEN CARBOHYDRATES ARE IN SHORT SUPPLY, THE FAT IS BROUGHT TO THE LIVER WHEREBY IT IS OXIDIZED PRODUCING ENERGY.**

❖ **BREAKDOWN OF ALCOHOL- THE LIVER DOES THIS, TO MAINTAIN SALT-WATER BALANCE. ALCOHOL IS POISONOUS WHEREBY IT DRAWS WATER FROM CELLS BY OSMOSIS LEADING TO DEHYDRATION DUE AND DEATH.**

ALCOHOL ALSO BLOCKS RELEASE OF ADH AS KIDNEY FAILS TO REABSORB WATER.

OTHER LIVER FUNCTIONS ARE;

- ❖ ELIMINATE USED HAEMOGLOBIN, SEX HORMONE**
- ❖ STORAGE OF SOME VITAMINS; B,C,E,K**
- ❖ DESTRUCTION OF OLD AND WORN-OUT RED CELLS**
- ❖ FORMATION OF BLOOD CELLS**
- ❖ STORAGE OF BLOOD AND IRON**
- ❖ REMOVAL OF LIPIDS FROM BLOOD AND SENDING IT TO FAT DEPOSITS.**

DISEASES OF THE LIVER

1. CIRRHOSIS

**CAUSED BY INGESTION OF TOXIC
SUBSTANCES**

CAUSED BY CONSUMPTION OF ALCOHOL

SYMPTOMS

- ❖ **INDIGESTION AND LACK OF APPETITE**
- ❖ **WEAKNESS AND FATIGUE**
- ❖ **INCREASED SENSITIVITY TO DRUGS**
- ❖ **YELLOW SKIN AND ITCHING**

TREATMENT AND CONTROL

- ❖ **AVOID FATTY AND SALTY FOOD**
 - ❖ **AVOID ALCOHOL**
 - ❖ **MEDICAL CHECKUPS**
 - ❖ **LIVE HEALTHY**
- ❖ **EXERCISE REGULARLY**

2. JAUNDICE

**CAUSED BY THE BUILDUP OF
BILIRUBIN, IN THE BLOOD.**

SYMPTOMS

- ❖ **FATIGUE AND FEVER**
- ❖ **ABDOMINAL PAIN AND PALE STOOL**
- ❖ **WEIGHT LOSS AND ITCHING**
- ❖ **VOMITING AND DARK URINE**
- ❖ **YELLOW SKIN AND EYES**

TREATMENT AND CONTROL

- ❖ **AVOID ALCOHOL**
- ❖ **MEDICAL CHECKUPS**
- ❖ **LIVE HEALTHY**
- ❖ **EXERCISE REGULARLY**

3. HEPATITIS A

**CAUSED BY HEPATITIS VIRUS INFECTING
THE LIVER CELLS. CAN BE OBTAINED
FROM STOOL.**

SYMPTOMS

- ❖ **LACK OF APPETITE**
- ❖ **DARK URINE**
- ❖ **VOMITING AND WHITE FAECES**
- ❖ **WEAKNESS AND FATIGUE**
- ❖ **JOINT PAIN**

TREATMENT AND CONTROL

❖ **DRINK LIQUIDS**

❖ **AVOID ALCOHOL AND FATTY FOODS**

❖ **PROPER HYGIENE AND STOOL
DISPOSAL**

❖ **MEDICAL CHECKUPS**

❖ **LIVE HEALTHY**

❖ **EXERCISE REGULARLY**

4. HEPATITIS B

**CAUSED BY HEPATITIS B VIRUS FOUND IN
BLOOD AND BODY FLUIDS**

SYMPTOMS

- ❖ **JAUNDICE**
- ❖ **LIGHT COLORED STOOL**
- ❖ **FEVER**
- ❖ **FATIGUE**
- ❖ **LOSS OF APPETITE AND VOMITING**
- ❖ **BELLY PAIN**

TREATMENT AND CONTROL

- ❖ **PROPER SEWAGE DISPOSAL**
- ❖ **AVOID CHARING SHARP OBJECTS**
- ❖ **PROPER HYGIENE AND STOOL DISPOSAL**
- ❖ **MEDICAL CHECKUPS**
- ❖ **BLOOD SCREENING**
- ❖ **LIVE HEALTHY**
- ❖ **IT HAS NO CURE.**

5. LIVER CANCER

GENETIC OR EXPOSURE TO RADIATION
SYMPTOMS

- ❖ **LOSS OF WEIGHT AND APPETITE**
- ❖ **ABDOMINAL PAIN AND SWELLING**
 - ❖ **NAUSEA AND VOMITING**
 - ❖ **WEAKNESS AND FATIGUE**
- ❖ **JAUNDICE (YELLOW SKIN AND EYES)**
 - ❖ **WHITE CHALKY STOOL**

TREATMENT AND CONTROL

❖ **RADIOTHERAPY**

❖ **CHEMOTHERAPY**

❖ **SURGERY**

❖ **USE OF APPROPRIATE DRUGS**

HOMEOSTASIS

**THIS IS THE MAINTAINANCE OF A
CONSTANT INTERNAL ENVIRONMENT OF
THE BODY.**

**THIS INTERNAL ENVIRONMENT IS THE
IMMEDIATE SURROUNDING OF THE BODY
CELLS OR TISSUES.**

**THE INTERNAL ENVIRONMENT ENTAILS
THE INTERSTITIAL FLUIDS.**

**THE EXTERNAL ENVIRONMENT IS THE
SURROUNDING OF THE ORGANISM.**

PRINCIPLES OR FEEDBACK MECHANISMS IN HOMEOSTASIS

HOMEOSTASIS OPERATES IN TWO FORMS OF FEEDBACK MECHANISMS;

- 1. NEGATIVE FEEDBACK; RESTORATION
OF NORMAL CONDITION WHEREBY IT
CORRECTS THE EFFECT OF THE STIMULI**
- 2. POSITIVE FEEDBACK; THIS IS WHERE A
CHANGE EITHER POSITIVE OR NEGATIVE
IS NOT CORRECTED. IT FURTHER LEADS
TO THE SUPPORT OF THE UNDESIRE
ACTION. E.G TEMPS**

THE **HYPOTHALAMUS IS THE REGION
OF THE BRAIN BETWEEN **CEREBELLUM**
AND THE CEREBRUM, RESPONSIBLE
FOR CORRECTING THE;**

❖ THERMOREGULATION,

❖ IONIC BALANCE,

❖ SUGAR LEVEL

❖ OSMOTIC PRESSURE IN THE BODY.

THE SKIN IN THERMO- REGULATION

THE SKIN HAS THE FOLLOWING FOR THERMOREGULATION;

- ❖ **SWEAT GLANDS** - THEY PRODUCE SWEAT WHEN ITS HOT. THIS EVERPORATES ON THE SKIN CAUSING A COOLING EFFECT.
- ❖ **HAIR AND ERECTOR-PILI MUSCLES** -
MUSCLE CONTRACT HAIR STANDS.
MUSCLE RELAX HAIR LIES

❖ **BLOOD VESSELS -**
(COLD) VASOCONSTRICTION REDUCING
BLOOD FLOW TO THE SKIN.

(HOT) VASODILATION ENCOURAGING
BLOOD FLOW CLOSE TO THE SKIN

❖ **SUBCUTANEOUS FAT - THE FAT LAYER**
INSULATES THE BODY FROM HEAT LOSS.
DEPENDS WITH ORGANISM HABITAT.

❖ **NERVE ENDINGS** - THEY DETECT THE TEMPERATURE OF THE SURROUNDING AND SEND IMPULSES TO THE HYPOTHALAMUS WHICH THEN COMMUNICATES TO THE EFFECTOR ORGANS TO BRING IT BACK TO NORMAL THROUGH;

➤ **SHIVERING**

TEMPERATURE CLASSIFICATION OF LIVING ORGANISMS

LIVING ORGANISMS ARE CLASSIFIED AS;

❖ **THE ENDOTHERMS (HOMEOTHERMS)**

**ARE THE ORGANISMS WHICH HAVE A
SELF THERMOREGULATING MECHANISM.
E.G MAMMALS**

❖ **THE ECTOTHERMS (POIKILOOTHERMS)**

**ARE ORGANISMS WHOSE
TEMPERATURE VARIES DEPENDING ON
THE EXTERNAL ENVIRONMENT. THEY
REGULATE TEMP BY BEHAVIOURAL
MEANS I.E BASKING, BURROWING**

PHYSIOLOGICAL ADAPTATIONS TO REGULATE TEMPERATURE

- ❖ **POSSESSION OF HAIRS AND FURS**
- ❖ **SWEATING AND PANTING -**
- ❖ **SHIFTING METABOLIC RATE -**
INCREASING METABOLIC RATE TO
INCREASE BODY TEMPERATURES
AND VICE VERSER.
- ❖ **SHIVERING - THIS IS RAPID MUSCLE**
MOVEMENT TO GENERATE HEAT

BEHAVIOURAL ADAPTATIONS TO REGULATE TEMPERATURE

❖ **HIBERNATION AND AESTIVATION** -
HIBERNATION IS DEEP SLEEP BY
ORGANISMS IN ORDER TO HELP
THEM SURVIVE WINTER
CONDITIONS.

AESTIVATION IS WHERE ORGANISMS
REMAIN DORMANT DURING HOT
SEASONS

❖ **HUDDLING** - ORGANISMS COMING
TOGETHER.

❖ **NOCTURNAL BEHAVIOR** - THESE ORGANISMS HIDE DURING THE DAY BUT ARE ACTIVE DURING THE NIGHT. THIS WAY THEY AVOID HEAT FROM THE SUN. E.G **THE COALA**. ALSO THE HIPPO HAVE NO SWEAT GLANDS HENCE STAY UNDER WATER WHEN THE SUN IS OUT.

❖ **BASKING**- E.G THE REPTILES BASK TO GAIN HEAT BY CONDUCTION FROM ROCKS AND DIRECT RADIATION AND CONVECTION FROM RISING AIR.

WHEN VERY HOT, THEY STAY UNDER ROCKS TO AVOID DIRECT RADIATION.

❖ **FLAPPING OF THE EARS** - E.G ELEPHANT

OSMORAGULATION

1. REGULATION OF WATER

OSMOREGULATION IS THE CONTROL OF WATER AND SALT CONCENTRATION IN THE BODY. THE OSMOTIC BALANCE IS CARRIED OUT BY THE KIDNEY AND THE NEURO ENDOCRINE SYSTEM (HYPOTHALAMUS AND PITUITARY GLAND)

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**WHEN OSMOTIC PRESSURE RISES, THE
HYPOTHALAMUS IS STIMULATED AND
SENDS IMPULSE TO THE PITUITARY
GLAND WHICH RELEASES ADH
HORMONE OR VASSOPRESIN IN THE
BLOOD.**

**WHEN IT REACHES THE KIDNEY, THE
COLLECTING TUBULES BECOME MORE
PERMIABLE TO WATER, ABSORBING IT
IN THE BLOOD STREAM.**

THIS LEADS TO **A CONC URINE** PRODUCED.
THE OSMOTIC PRESSURE THEREFOR DROPS
AND RETURNED BACK TO NORMAL.

WHEN **OSMOTIC PRESSURE FALLS**, LESS OF
ADH IS RELEASED IN THE BLOOD. THE
KIDNEY TUBULES BECOME LESS
PERMIABLE AND LESS WATER IS
REABSORBED.

HERE **DILLUTE URINE** IS PRODUCED.

DIABETES #####

1. DIABETES INSPIDUS

**WHEN PITUITARY PRODUCES LITTLE OR
NO ADH HORMONE FOR REABSPRPTION**

SYMPTOMS

- ❖ **DILLUTE URINE**
- ❖ **FREQUENT URINATION AND BED
WETTING**
- ❖ **ALWAYS THIRSTY**
- ❖ **COLORLESS URINE**
- ❖ **DRY SKIN AND FRAGILLE**

TREATMENT AND CONTROL

- ❖ **DON'T STOP TAKING WATER**
- ❖ **TAKE DESMOPRESSIN (MAN-MADE HORMONE) EITHER BY INJECTION OR ORAL.**
- ❖ **ITS GENETIC SO,**
 - ❖ **NO CURE**

IMPORTANCE OF OSMORAGULATION

MAINTAINANCE OF A **CONSTANT
LEVEL OF WATER AND SALT
(OSMOTIC PRESSURE) INORDER TO
CREATE AN OPTIMUM CONDITION
FOR CELLULAR FUNCTION.**

2. REGULATION OF IONIC CONTENT

SALTS DISSOLVE IN WATER AND UNDERGO DISSOCIATION PROCESS FORMING IONS.

**EXAMPLE $\text{NaCl} \rightarrow \text{Na}^+$ AND Cl^-
THE IONS ARE IMPORTANT IN BODY PROCESSES.**

**THEIR BALANCE MUST BE
COORDINATED AND REGULATED FOR
THEIR EFFICIENT FUNCTIONING.**

ALDOSTERONE HORMONE PRODUCED BY THE ADRENAL GLANDS REGULATES THE **LEVEL OF SODIUM** IN THE BLOOD.

WHEN THE **Na⁺** LEVEL IS LOW, THE ADRENAL GLANDS **RELEASE ALDOSTERONE** INTO THE BLOOD.

THIS STIMULATES **THE LOOP OF HENLE** TO ABSORB **Na⁺** IN THE BLOOD.

THE MORE **SODIUM** IS BEING ABSORBED, THE MORE **CHLORIDE** IS ALSO ABSORBED.

2. REGULATION OF BLOOD SUGAR LEVEL

**BLOOD SUGAR LEVELS MUST BE KEPT
CONSTANT. INSULIN AND GLUCAGON
HORMONE HELP IN THIS REGULATION.**

**EXCESS GLUCOSE MUST BE BROKEN DOWN
SO AS NOT TO POISON CELLS. THE EXCESS
MUST ALSO BE CONVERTED TO GLYCOGEN
AND STORED.**

**INSULIN STIMULATES THE LIVER TO
CONVERT EXCESS GLUCOSE TO GLYCOGEN
OR FATS**

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GLUCAGON STIMULATES CONVERSION OF
GLYCOGEN TO GLUCOSE AS TO INCREASE
GLUCOSE IN THE BLOOD.

ADRENALIN INCREASES THE HYDROLYSIS
OF GLYCOGEN INTO GLUCOSE
RESULTING TO AN INCREASE IN BLOOD
SUGAR.

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2. DIABETES MELLITUS

CAUSED BY LACK OF INSULIN SECRETION FROM PANCREAS. THIS LEADS TO HIGH SUGAR LEVELS.

SYMPTOMS

- ❖ **FREQUENT URINATION**
- ❖ **LOSS OF BODY WEIGHT**
- ❖ **STARVATION AND DRY SKIN**
- ❖ **EXCESS THIRST AND WEAKNESS**
 - ❖ **GLUCOSE IN URINE**
- ❖ **SUDDEN VISION CHANGES**

2. TREATMENT

- ❖ **ADMINISTER INSULIN INJECTIONS**
- ❖ **AVOID SUGAR RICH FOODS**
- ❖ **AVOID ALCOHOL**
- ❖ **HAS NO CURE**
- ❖ **IT IS GENETIC**
- ❖ **LIVE HEALTHY**

#####END

