Daily Average Secretion of GI tract Juice

Digestive Juice	Daily Secretion	Source	pH
1. Saliva	1200 ml	Salivary gland	6.8
2. Gastric juice	2000 ml	Gastric gland	1.5 – 3.5
3. Bile Juice	800 ml	Liver	7.7
4. Pancreatic Juice	1500 ml	Pancreas	7.5 – 8.3
5. Intestinal Juice	1800 + 200 ml	Intestinal gland	7.5 – 8.0

- Total Secretion in Gastro & Intestinal tract in 24 hours is – 8000 ml (pH– 7.5–8.0)
- The amount of urine passed by a man in 24 hours is – 1700 ml
- Total Water loss by skin & Respiratory tract in 24 hour = – 600 – 800 ml
- The Normal amout of faeces is – 100–200 gm/day
- Acceptable range of pH of drinking water is in between – 6.5 – 8.5
- Saliva contain highest concentration of – K +
- Potassium content in colonic secretion is – 100 m Eq/L
- Bile salts are formed in – Liver & plays important role in digestion of fat

Sites of Absorption of different end product in GI Tract	
Stomach	Water, Alcohol, Aspirin, Copper, Iodine, Fluoride
Duodenum	Iron (Fe++), Calcium (ca++), Copper (Cu), Phosphorus, Megnesium
Jejunum	Glucose (monosaccharide), Protein (Amino acids), Fat (Cholesterol) & Vitamins = B_2, B_6, C, Zinc
Ileum	Bile salt, B_{12} absorption (Schilling test)
Ascending Colon	Water (Maximum absorption)

T S H		Bilirubin	
T S H	– 0.3 – 5.5 µg/dl	Total	– 0.3 to 1.2 mg/dl
Total T_3	– 60 – 200 ηg/dl	Direct	– 0.1 – 0.3 mg/dl
Total T_4	– 4.5 – 12 µIU/dl	Indirect	– 0.2 – 0.9 mg/dl

The Normal T_3 : T_4 concentration ratio in blood is about = 5 : 95

Conditional Calorie requirement	Calorie requirements according to age
1. Simple worker – 3000 /day	1. 1 – 6 years – 1000 – 1600 daily
2. Student – 2400 /day	2. 7 – 12 years – 1600 – 2500 daily
3. Hard worker – 4500 /day	3. 13 – 20 years – 2500 – 2800 daily

– Daily Energy requirement of a 70kg person –

- Lying on bed whole day (without taking any food) = 1650 calories.
- **Lying on bed whole day (with taking a reasonable diet) = 1850 calories.**
- Sit on a chair whole day (energy requirement) = 2250 calories.

NORMAL PATHOLOGICAL VALUE

1. Serum Amylase	60 – 180 unit/Litre
2. Serum Chloride	100 – 110 **mEq/L**
3. Serum Triglycerides	80 – 150 mg/100ml
4. Serum Cholesterol	150 – 250 mg/100ml
5. Serum Alkaline Phosphate	30 – 120 unit/Litre
6. Serum Na +	130 – 145 mg/100ml
7. Serum Fe ++	30 – 150 mg /100ml
8. Serum Ca ++	8.5 – 10.5 mEq/ 100ml
9. Serum K+	3 – 5 mEq/litre
10. Serum Mg ++	2 – 3 mg/100ml
11. Serum Creatinine & Ketone Bodies	0.6 - 1.5 mg/100ml
12. Serum Creatine	0.2 - 0.6 mg/100ml
13. Ammonium	40 - 80 mg/100ml
14. Uric acid	Male – 2.5 – 8 mg /100ml Female –1.5 – 6 mg/100ml
15. Blood Urea	15 – 40 mg %
16.Total Lipid	350 – 800 mg/100ml
17.Total Protein -- Albumin	5.5 – 8 gm/100ml Male – 3.5 – 5.5 gm/100ml Female – 2.0 – 3.5 gm/100ml
18. Serum Phospholipid	4 – 10 mg/100ml

plasma glucose is > 125mg/dl = Diabetes mellitus.	**Specific Gravity**
Blood sugar – fasting – 70 – 110 mg/dl PP – 110 – 160 mg/dl	S.G. C.S.F. – 1005 S.G. Urine – 1010
Plasma glucose – fasting – 75 – 115mg/dl PP = <125mg/dl	S.G. Blood – 1025 S.G. Milk – 1017 – 1034

SGPT (Serum Glutamic Pyruvate Transaminase) or ALT (Alanine transaminase) -10-60 IU/L
SGPT or Alanine aminotransferase (ALAT) is an enzyme present in hepatocytes (liver cells). When a cell is damaged, it leaks this enzyme into the blood, where it is measured. ALT rises dramatically in acute liver damage, such as viral hepatitis or paracetamol (acetaminophen) overdose.

SGOT (Serum Glutamic Oxaloacetic Transaminase)or AST(Aspartate transaminase)– 10-40 IU/L
SGOT or aspartate aminotransferase (ASAT) is similar to ALT in that it is another enzyme associated with liver parenchymal cells. It is raised in acute liver damage, but is also present in red blood cells, and cardiac and skeletal muscle and is therefore not specific to the liver.

Mean corpuscular volume (MCV) -- is a measure of the average size of your red blood cells. Abnormal MCV levels may be a sign of anemia or thalassemia. **MCV – 80 - 100** femtoliter

Mean corpuscular hemoglobin or "**mean cell hemoglobin**" (**MCH**), is a measure of the amount (weight) of hemoglobin in a red blood cell. **MCH –** 20-30 picograms/cell

B**lood urea nitrogen** (BUN) test is a measure of the amount of nitrogen in the blood in the form of urea, and a measurement of renal function. **BUN –** 10-20 milligrams per deciliter (mg/dl)

Hematocrit or Packed cell volume (PCV) a measure of the proportion of blood volume that is occupied by red blood cells. **PCV –** It is normally about 45% for men and 35% for women.

BMR (Basic Metabolism Rate) :: --

1. Male – 40 KCal/m^2/hr 2. Female – 37 KCal/m^2/hr

Nutrition	**Daily dose**	**Vitamin**	**Dose**
1.Carbohydrate	400 – 500 gm	Vit A	5000 I.U. (1500 µg)
2.protein	75 -100 gm	D	400 I.U. (10 µg)
3.fate	75 -100 gm	E	10–15 I.U. (22 mg)
4.water	2 -4 pints	K	3000 I.U. (80 µg)
I	– 150 um	Vit B_1	1.5 mg
Mg	– 0.4 gm	B_2	1.8 mg
K	– 1 gm	B_3	10 mg
Ca,P	– 1.5 gm	B_5	18 mg
Na	– 4 gm	B_6	2.0 mg
Cl	– 3.5 gm	B_7	0.4 mg
NaCl	– 10 – 15 mg	B_{12}	6 ug
Zn	– 15 mg		
Fe	– 18 mg	Vit C	40 – 80 mg
Cu	– 105 mg	Folate	- 400 ug

- :: Seminal fluid :: -

Speed of Human sperm in female genital tract is = 3 mm / minite.

Liquefacation/ Fibrinilysis – within 20 min.

Sperm Motility – > 60% pH – 7.7 – 8,

Count – 60–150 million/ml, Volume – 2 –5 ml

Hyaluronidase enzyme present in testes and semen.

In man the **spermatozoa** occupies about 10 % of the semen.

20 % of the volume of the semen is contributed by the secretion of the prostate gland.

The entire process of spermatogenesis, in man takes about – 74 days

After ovulation, the **secondary oocyte is viable** for -12 – 24 hours,

while sperm is **viable** for 24 – 48 hours.

- :: Cerebrospinal fluid (C.S.F.) :: -

Defination – Modified Serous fluid

Location – 1. Ventricles of the brain
2. Central canal of the spinal cord
3. Sub arachnoid space

Formation – Antirior & posterior **Choroid Plexus** of Lateral ventricle 3th & 4^{th}.

Absorption – CSF is absorbed through the **Arachnoid villi.**

CSF is produced in the brain by modified ependymal cells in the choroid plexus (approx. 50-70%) It circulates from the foramen of Monro, 3^{rd} ventricle, aqueduct of Sylvius, 4^{th} ventricle, foramen of Magendie & foramina of Luschka, subarachnoid space over brain and spinal cord.

Gross appearance – Normal CSF is clear and colorless.

Normal Value – 150 ml

Daily production – 550 ml

CSF Pressure = 50 –150 mm of water

S.G. of CSF = 1005

pH – **7.34**

Glucose in CSF – 40 – 80 mg/dl

Protein in CSF – 20 – 90 mg/dl

Albumin in CSF – 6.6 – 44 mg/dl

Chloride in CSF – 720 – 750 mg/dl

RBC cell in in CSF – Absent

Leukocytes (WBC) – 0 – 5/mm^3(adults /children), up to 30/ mm^3 (newborns).

CSF opening pressure – 50–180 mmH_2O.

Lactate dehyrogenase – 1/10 of serum level

Lactate – less than 35 mg/dl

Differential – 60–70% lymphocytes, up to 30-50 % monocytes , Neutrophils absent & macrophages, other cells 2% or less

For CSF Examination – Lumbar puncture is done in between L_3 and L_4 vertibra.

Typical Lumbar CSF Findings in Meningitis

Test	Bacterial	Viral	Fungal	Tuberculous
Opening pressure	Elevated	Usually normal	Variable	Variable
Leukocyte count	≥ 1000/µL	< 100/µL	Variable	Variable
Cell differential	Mainly neutrophils	Mainly lymphocytes	Mainly lymphocytes	Mainly lymphocytes
Protein	Mild–marked increase	Normal–mild increase	Increased	Increased
Glucose	Usually ≤ 40 mg/dL	Normal	Decreased	Decreased: may be < 45 mg/dL
CSF-to-serum glucose ratio	Normal–marked decrease	Usually normal	Low	Low
Lactic acid	Mild–marked increase	Normal–mild increase	Mild–moderate increase	Mild–moderate increase

---: Blood :---

Blood – Fluid connective Tissue.

Total Blood volume – 5 - 6 litre
90 ml/Kg body weight.
9 % of Total body weight.
1/11 of body weight.
3.3 litre/m^2 Body Surface area

pH of Blood – 7.4
7.35 (in Vein) & 7.45 (in Artery)

- ✓ Death occurs usually when the pH of blood falls to 6.9

Viscocity – 4.7
Osmotic pressure – 32 mm of Hg.
Specific gravity – 1025

Myeloid tissues are – Red bone marrow
Lymphoid tissues are – Lymph node, thyums & spleen.

- ✓ Ratio between Fat cells : Blood cells in red bone marrow = 1 : 1
- ✓ Ratio between Myeloid : Erythroid tissues in red bone marrow = 3 : 1
- ✓ Ratio between Blood cell : Plasma = 45 : 55
- ✓ Ratio between Albumin : Globulin = 1.7 : 1

Blood contants 45 % Cells & 55 % Plasma. (Haematocrit value)
SERUM = Plasma – fibrin

RBCs are destroyed in spleen and also in liver and bone marrow
10 – 20 mg Iron is consumed per day by an average individual
In Blood smear Burr cells are seen in uraemia and
Spur cells are seen in cirrhosis

Cells (Erythrocyte)

1. RBC - – Female – 4 – 5 million /mm^3
2. Male – 5 – 6 million/ mm^3
3. Infant – 6 – 7 million/ mm^3
4. Sape - Biconcave
5. Size -7.5 μ (12.5 μ in seciameter)

Plasma

92% Water , 1% Non Carbonic
7% Carbonic – Albumin 4.4%
Globulin 2.3%
Fibrogen 0.3%
SERUM = Plasma – fibrin

Haemoglobin count

Male – 14-16 gm/100ml
Female – 12-14 gm/100ml
Neonate – 18-20 gm/100ml

1. HB is rich in Histidine and Histamine is formed from Histidine.
2. Hb = 4 Hb + 1 globulin.
3. The Sahil's method is used for estimating – Hb

Platlets Count

1.5 – 4.5 Lac/ mm^3

Creatical Value – less than 40000/ mm^3

In Aplastic anemia platelets maximum affected while pernicious anemia platetes remain normal

WBC Count

T.L.C (Leukocyte) – 6000 – 8000/mm^3 (6000 – 11000/$mm^{3)}$

WBC

1. **Granulocytes** – Neutrophils (Polymorph) , Eosinophils, Basophiles.
2. **Agranulocyte** – Monocyte, Lymphocyte.

1. Granulocytes				
WBC	%	Count	Type	Increase
1. Neutrophils	60-70%	3000-6000/mm^3	Phagocytic	Rise in Pus forming infection
2. Eosinophils	1-4%	150-400 mm^3/	Non phagocytic	**R**ise in Allergies, parasitic infec.
3. Basophiles	0.5 -1%	100/mm^3	Non phagocytic	Increase in chicken pox Secreation of histamine, heparin

2. Agranulocyte				
4. Monocyte	5 -10 %	350-800/ mm^3	Phagocytic	**R**ise in TB, Kala azar, Malaria
5. Lymphocyte	20 -30%	1500-2700/mm^3	Non phagocytic	**R**ise in Cronic infection

Non phagocyte cells → (BEL) ↔ Baso, Eosino, and Lymphocyte				
Neutro ---------	Lympho ----------	Mono ---------	Eosino ----------	Baso
70 %	20%	5%	4%	1%

Blood cells	**Size**	**Life span**
RBC	7.2 micron	120 days
Platlets		9-11 days
WBC -		***1 - 15 days***
Basophils	9 – 10 micron **(Samllest WBC)**	12-15 days
Eosinophils	10 – 15 micron	8-12 days
Neutrophils	10 – 15 micron	2-4 days
Lymphocytes	12 – 15 micron	1-3 days
Monocytes	25 – 30 micron **(Largest WBC)**	2-8 days

Term	**Definition**	**Disease**
1. Leukopenia	Decrease of total WBC	Typhoid, Miliary T.B., Paratyphoid, Influenza Measles, infective hepatitis, Malaria, kala azar
2. Lymphocytosis	Increase in Lymphocyte	Diphtheria, Pertusis, Mumps, Measles, Rickets, Malnutrition, Chiken pox, Syphilis, Leukemia, T.B., infective hepatitis, Thyrotoxicosis
3. Lymphopenia	Decrease in Lymphocyte	Stress, Cushing's syndrome
4. Monocytosis	Increase in Monocyte	Typhoid, T.B., Malaria, kala azar, Amaebiasis, Hodgkin disease
5. Eosinophilia	Increase in Eosinophil	Urtecaria, Asthma, Drug allergy, intestinal worms, Hydatid cyst, Eczema
6. Thromocytopenia	Decrease in Platelet	Leukemia, Apalstic anemia
7. Thrombocytosis	Increase in Platelet	After spenectomy, After Partrution, After severe injury, Major surgical operation

- **In Polycythemia vera - There is increase count of RBC, platelets and leukocytes.**

Blood formation -

- Start from 3rd week of intra uterine life

Age	Phase	RBC form in
3rd week - 3rd month of intra uterine life	Intra vascular erythropoesis	Mesoderm of yolk sac
3rd - 5th month	Hepatic Phase	Liver & spleen
5th month onward of intra uterine life	Myeloid Phase	Red bone marrow
Post natal erythropoisis		Red bone marrow

- **Over the age of 20 years Red bone marrow** can be found in only Flat bones (cranial bones, ribs, sternum, vertebrae, Pelvic bone) &in the upper end of long bones (humerus and femur)

Blood clotting -

Bleeding Time (BT) — 2 – 5 min,
Coagulation Time (CT) — 5 – 8 min,
Prothrombin Time (PT) — 11–15 sec

Disease	Bleeding Time	Coagulation Time	Prothrombin Time
Haemophilia	Normal	↑↑	Normal
Christmas disease		↑	Normal
Purpura	↑	Normal	

Blood clotting factors -13 — Discovered by Mark land,Macferlance in 1954.

1. I. Fibrinogen
2. II. Prothrombin
3. III. Tissues Thoromoplastin
4. IV. Calcium - Ca^{++}
5. V. Proaccelerin
6. VI. Accelerin
7. VII. Proconvertin
8. VIII. Anti heamophilic factor — Due to defifciency = Hemophylia A occurs.
9. IX. Christmas factor — Due to defifciency = Hemophylia B occurs.
10. X. Stuart factor — Due to defifciency = Hemophylia C occurs.
11. XI. Plasma thromboplastin antecedent(PTA)
12. XII. Hageman factor (Glass contact factor)
13. XIII. Fibrin Stabilizing factor

- ✓ **1, 2, 5, 7, 9, 10 Blood coagulation factor produced in liver.**
- ✓ **Vit. K require for formation of 2, 7, 9, 10 Blood coagulation factor**
- ✓ **Prothrombin Activator –** Conversion factors of Prothrombin to Trombin.
  (i) X_{active} **(ii)** V_{active} **(iii) Phospholipids (from platelets)** **(iv)** Ca^{++}
- ✓ **Anticoagulent Agents –** Facters opposing coagulation
  - Antitrombin IIIrd , Heparin, Heparan, Protein c, Citrates,
  - Oxalate compound, EDTA (Ethylene diamine tetra aceticacid),
  - Other substances – Ex. Some snake venom, Peptone, Hirudin
- ✓ **Factor causing lysis of exisiting clot –** Plasminogen Activator
- ✓ **Opposing platelate aggregation factor –** Endoperoxidase and prostacyclines

Landsteiner law is regarding Blood group

Blood group	Agglutinogen/antigen (on the cell membrane of erythrocyte)	Agglutinin/antibody (found in plasma content serum globulin)
A	A	Anti B
B	B	Anti A
AB	A and B	Nil
O	Nil	Anti A & B

- ✓ Commonest blood group in India ─ O - 40 % (A – 20 %, B – 35 %, AB – 5 %)
- ✓ Commonest blood group in World ─ A
- ✓ Blood group O^{-ve} is universal donor,
- ✓ Blood group AB^{+ve} is universal recipient.
- ✓ For an AB individual if AB blood group is not available A is better than B
- ✓ Blood group O is more prone to –
  Duodenal & gastric ulcer
  Laprosy
  Hemolytic tendency
  Rheumatic heart disease
- ✓ Blood group A is more prone to –
  Carcinoma of stomach & cervix,
  Pernecious anemia,
  Thrombosis.
- ❖ In mismatched blood transfution only the donor's erythrocytes are destroyed but the recipient erythrocytes are not harmed.
- ❖ RBC are suitable for transfusion for 3 weeks after collection.
- ❖ After transfution in the body RBC becomes active after 3 days
- ❖ **In transfution 1 unit blood = 350 ml .**

Erythroblastosis foetalis occurs in - Rh + male + Rh - female

It is also known by the name of HDN (hemolytic disease of new born) /icterus gravis neonatorum

Prevention – By giving antibody mediated immmunosuppression

Cure – By Exchange transfution through umbilicus.

Anti Rh – is called immune antibody -There is no naturally occurring antibody against Rh antigen

- E.S.R. = Erythrocyte Sedimentation Rate -

By Wintrob's method - Male ─ 0-9 mm/hr Female ─ 0-20 mm/hr

By Westergren's method - Male ─ 3-7 mm/hr Female ─ 5-9 mm/hr

E.S.R. decrease	E.S.R. increase	E.S.R. Very rapid increase
Polycythemia	Pregnancy from 4th month	Kala Azar
Congastive Cardiac Failure	Anaemia (Except- Sickle Cell)	Leukaemia
Whooping Cough	Tuberclosis	Sacoidosis
Dehydration	Acute Gout	Chronic renal disease
	Burns & tissue damage	
	Acute infection	
	After fracture & operation	

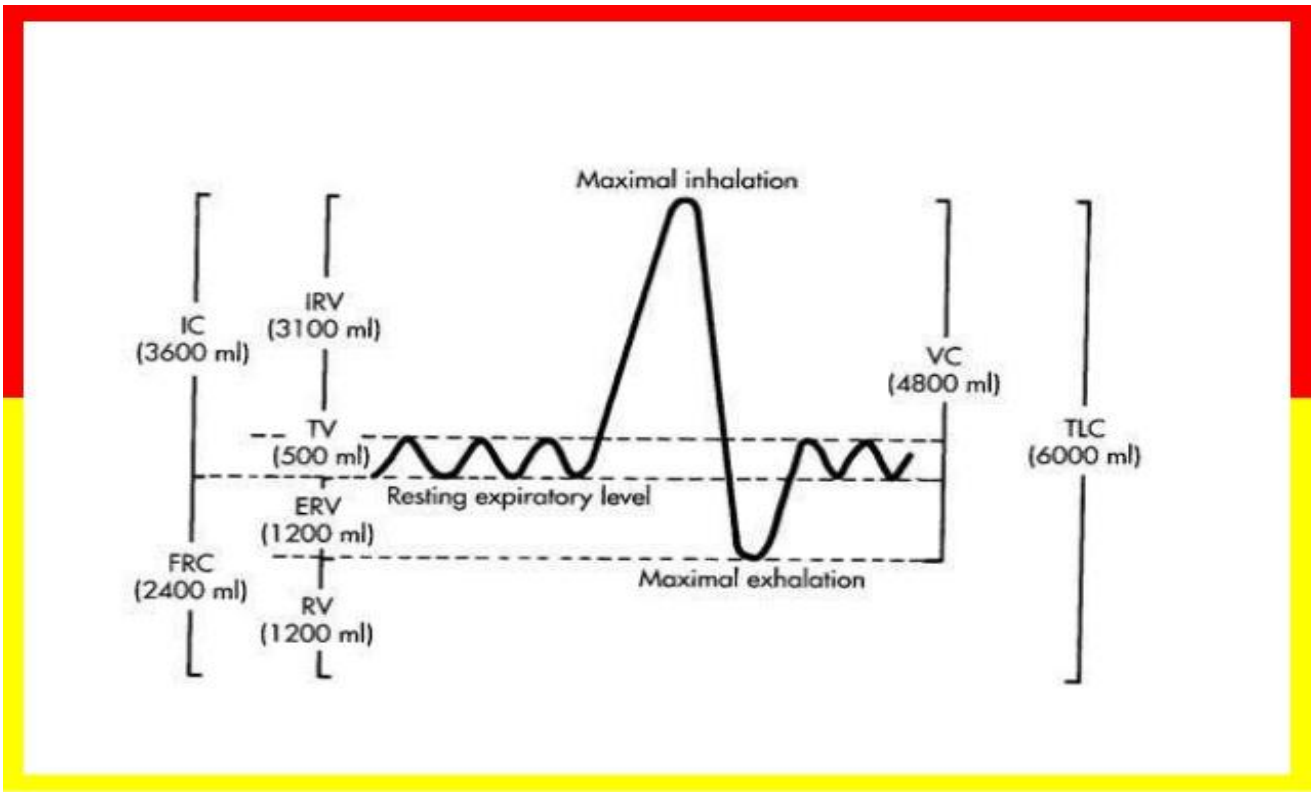
-- MAIN VOLUMES --

Spirometry (meaning *the measuring of breath*) is a test that can help diagnose various lung conditions, most commonly chronic obstructive pulmonary disease (COPD).
Spirometry is the name of the test, whilst a *spirometer* is the device that is used to make the measurements.

Spirogram

Palmonary Volumes	Value	Defination
1. Tidal volume (V_T)	**500 ml**	The amount of air inhaled and exhaled normally at rest
2. Inspiratory Reserve volume (IRV)	**3100 ml**	Inspiratory reserve volume: the maximal volume that can be inhaled from the end-inspiratory level
3. Inspiratory capacity IC = IRV + V_T	**3600 ml**	Inspiratory capacity: the sum of IRV and TV

4. Residual volume (RV)	**1200 ml**	Residual volume: the volume of air remaining in the lungs after a maximal exhalation
5. Expiratory Reserve volume (ERV)	**1200 ml**	Expiratory reserve volume: the maximal volume of air that can be exhaled from the end-expiratory position
6. Functional residual capacity FRC = ERV + RV	**2400 ml**	Functional residual capacity: the volume in the lungs at the end-expiratory position



7. Vital Capacity (VC) VC = IC + ERV	**4800 ml**	Vital capacity: the volume of air breathed out after the deepest inhalation
8. Total lung Capacity (TLC) TLC = VC + RV	**6000 ml**	Total lung capacity: the volume in the lungs at maximal inflation, the sum of VC and RV

Number of alveoli in 2 lungs = 3000 million

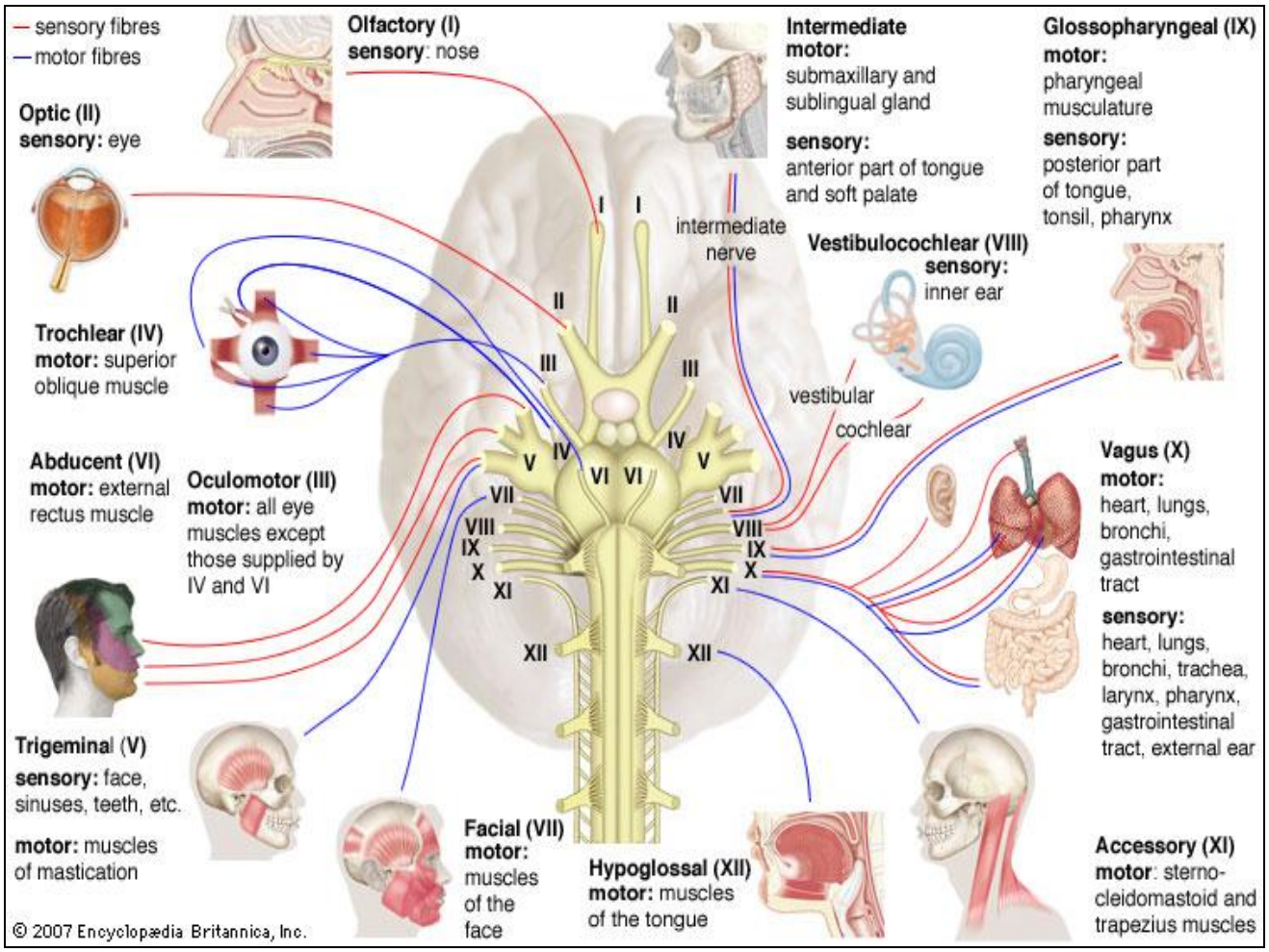
Percentage of oxygen in expired air is approximately – 16.4

-:: 12 Cranial Nerves ::-

N	Name	Origin	Function	Distribution
1	Olfactory	Olfactory lobe	Smell	Nasal mucus membrane
2	Optic	Retina	Sight	Retina
3	Occulomotor	Floor of Aqueduct of sylvius	Motor	All occular muscles except LR & SO
4	Trochlear	Floor of Aqueduct of sylvius	Motor	SO
5	Trigeminal	Midbrain & pons	Mixed	Skin of face, tongue, teeth.
6	Abducent	Pons	Motor	LR
7	Facial	Pons	Mixed	Muscles of expression
8	Vestibul	Brain	Sensory	Internal auditory meatus
9	Glosso pharyngeal	Medulla oblongata	Mixed	Sensation of pharynx, Posterior third of tongue, Parotid Gland
10	Vagus	Medulla oblongata	Mixed	Pharynx, Sup. larynx, Cardiac, lungs Oesophagus, stomach, abdominal vire
11	Accessory	Medulla oblongata	Motor	Sternomastiod, Trapezius muscles
12	Hypoglossal	Medulla oblongata	Motor	Intrinsic muscles of tongue

Censory nerves = 1,2, 8 **Motor nerves** = 3,4,6,11,12 **Mixed nerves** = 5,7,9,10

Largest & Thickest cranial nerve – 5th Trigeminal.
Longest cranial nerve – 10th Vagus
Smallest cranial nerve – 6th Abducent
Thinnest cranial nerve – 4th Trochlear



----::: FUNCTION Of BRAIN :::----

(1) Cerebral hemisphere – Intelligence, Will power, Imagination, Knowledge, Reasoning, Weeping and Laughing + micturation, defecation.

(2) Limbic system ::-- Rage and panic, Emotions and sexual behaviour

(3) Hypothalamus ::-- Hunger , Thirst, Temperature, Fatigue, Satisfaction, Love, Hate, copulation + ANS ,endocrine gland secretion .

(4) Medulla Oblongata ::-- Heart rate , Respiratory center, Blood pressure, Peristalsis of the alimentary canal, Exocrine gland secretion, swallowing, sneezing, coughing and Vomiting

(5) Cerebellum : - Movement of the body and balance

Funtion	**Center**
Smell	Olfactory lobe
Speech	Broca's area of cerebrum
Vision	Anterior optic lobe of mid brain
Auditory	Posterior optic lobe of mid brain

MENSTRUAL CYCLE :- Unsafe period == 11^{th} to 18^{th} day.

1^{st} to 4^{th} day = Blooding phase

4^{th} to 14^{th} day = Proliferative / Follicular phase

On 14^{th} day = Ovulation occur

14^{th} to 28^{th} day = Secretary /Luteal phase

- ✓ In secretary Phase uterine glands become tortuous and filled with secretion. Some exudating of secretion may occur from the endometrium which escape from vigina and called **"uterine milk"**
- ✓ Arterial dilation + venous obstruction leads to retention of blood and cause **Erection of penis**
- ✓ The erection does not affect the corpus spongiosum through which the penile urethra runs.
- ✓ Spermatozoal motility at natural pH = 100 μm/sec.
- ✓ Semen contain buffers and the buffer maintain the viginal pH about 7 up to 1o hours.

-- ::: Cardio vascular system ::: --

Stroke volume – Amount of blood ejected ventricle per beat = 70 ml

Minute volume/ Cardiac out put = **Stroke volume × Heart Rate = 5 liters**

Cardiac index = $\frac{\text{Cardiac out put}}{\text{Surface of the body}}$ = 3.1 liters/sq. m./min

Stroke volume index = $\frac{\text{Cardiac out put}}{\text{Surface area of the body}}$ = 40 ml/sq. m./min

Distribution of cardiac output			
1. Liver & GIT	1500 ml/min	25%	
2. Kidney	1300 ml/min	22%	1/4 of cardiac output
3. Brain	1000 ml/min	20%	1/5 of cardiac output
4. Skeletal Muscles	800 ml/min	16%	
5. Heart	225 ml/min	5%	1/20 of cardiac output
6. Muscles	100 –200 ml/min	2-5 %	
7. Spleen	50 ml/min	1%	

CARDIAC – CYCLE

The cardiac cycle is the sequence of events that occur when the heart beats.

There are 2 phases of this cycle. Diastole - Ventricles are relaxed.
Systole - Ventricles contract.

During the diastole phase, the atria and ventricles are relaxed and the atrioventricularvalves are open. De-oxygenated blood from the superior and inferior vena cavae flows into the right atrium. The open atrioventricular valves allow blood to pass through to the ventricles. The SA node contracts triggering the atria to contract. The right atrium empties its contents into the right ventricle. The tricuspid valve prevents the blood from flowing back into the right atrium.

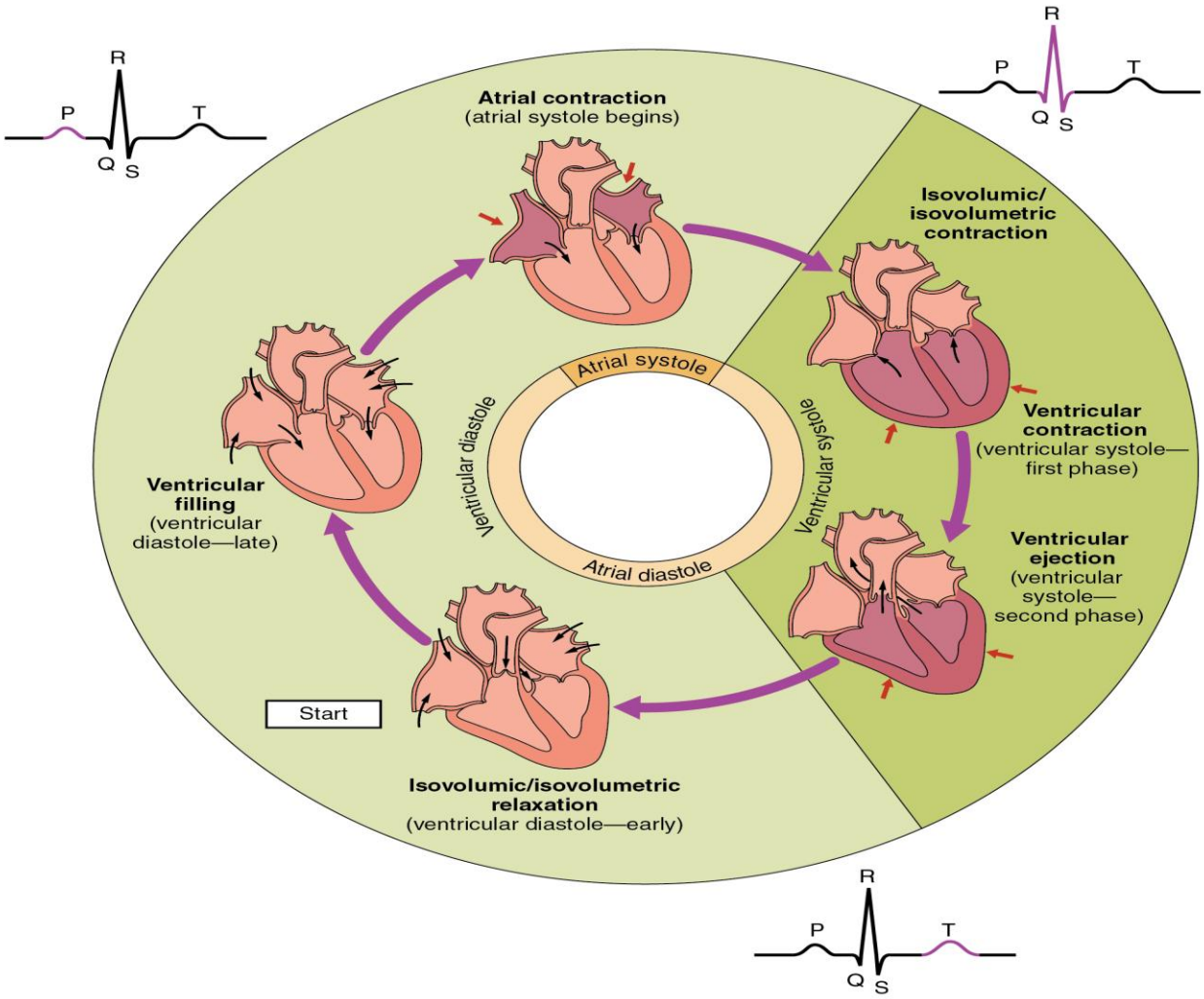
During the systole phase, the right ventricle receives impulses from the Purkinje fibers and contracts.The atrioventricular valves close and the semilunar valves open. The de-oxygenated blood is pumped into the pulmonary artery. The pulmonary valve prevents the blood from flowing back into the right ventricle.The pulmonary artery carries the blood to the lungs. There the blood picks up oxygen and is returned to the left atrium of the heart by the pulmonary veins.

Pace maker of Heart = SA node

Alternate Pace makers of Heart = AV node, Bundle of His and the arborization network.

SA node is generating impulse regularly at interval of about = 0.8 sec.

Rate of impulse - SA node = 75/min, AV node = 50/min, Bundle of His = 30/min



Duration of the cardiac cycle = 0.8 sec

Atrial systole	0.1 Sec
Atrial Diastole	0.7 sec
Ventricular systole	0.3 sec
Ventricular Diastole	0.5 sec

Normal heart rate :--

In Adult = 60-75min
In Fetus = 140min
In new born = 120min
Heart beat = 60 /72 = 0.8 sec

Ventricular systole	Venticular Diastole
1. Isovolumetric contraction = 0.05 sec 2. Ejection phase == 0.25 sec 1- Rapid ejection == 0.10 sec 2- Reduced ejection == 0.15 sec	1. Proto diastolic phase = 0.04 sec 2. Isovolumetric relaxation = 0.06 sec 3. Filling phase = 0.4 sec First rapid filling phase = 0.10 sec Diastasis = 0.20 sec Last rapid filling phase = 0.10 sec.
Total == 0.3 sec	Total = 0.5 sec

1st Heart sound ::---

- Prolonged and loud like 'LUB' & Due to closure of mitral and tricuspid valves.
- It shows the beginning of the ventricular systole = Isovolumetric contractions
- Duration of sound = 0.09 – 0.16 sec
- It is more intense in the left ventricular Hypertrophy
- It is more be replaced by 'murmur' in mitral incompetence.

2nd Heart sound ::--

- Short and sharp like " DUPP" & Due to closure of semilunar valves.
- It indicate the clinical end of the systole & clinical beginning of the diastole
- duration = 0.10-0.12sec Means Proto diastolic phase
- In aortic incompetence second heart sound is replaced by "murmur"

3rd Heart sound ::--

- It produce due to vibration of the ventricullar.
- Due to Rush of the blood in to nearly empty vessels.

4th Heart sound ::--

- It is also called ***'atrial sound"*** because it produced due to atrial contraction.
- Due to Rush of the blood in to empty ventricle.

(Normally only First and Second heart sound are heard)

BLOOD PRESSURE

Blood pressure - **lateral pressure in the systemic arteries.**

Systolic B.P. (SBP) = Highest B.P. recorded during a cardiac cycle = 120 mm Hg
Diastolic B.P.(DBP) = Lowest B.P. recorded during a cardiac cycle = 80 mm Hg

Normal value of B.P. ::--

DBP< 85 mm Hg == Normal SBP < 140 mm Hg == Normal
DBP > 90 mm Hg == High SBP >160 mm Hg == High

According to age :: --

17 years adult == 120 / 80 mm Hg == Normal
At the Age of 70 year == 140/80 mm Hg == Normal

Normally the blood pressure at the arterial end of a capillary is about – 32 mm Hg
Normally the blood pressure at the venous end of a capillary is about – 19 mm Hg

The portal venous pressure is the blood pressure in the portal vein. Normal value = 5-10 ml Hg

Peripheral resistance is maximum in Arterioles
Lowest blood pressure is found in Capillaries
B.P. - Cardiac output × peripheral resistance = Arterial pressure.
Pulse Pressure – SBP — DBP = 40 mm of Hg
Mean blood Pressure = Diastolic BP + ⅓ pulse pressure = 80 + ⅓ × 40 = 93 mm of Hg

Marey's law = Heart rate α 1/ B.P. = If B.P. is high than Heart rate is low
But in Exercise Heart rate and B.P. both Increase.
In pregnancy Heart Rate is decreased.

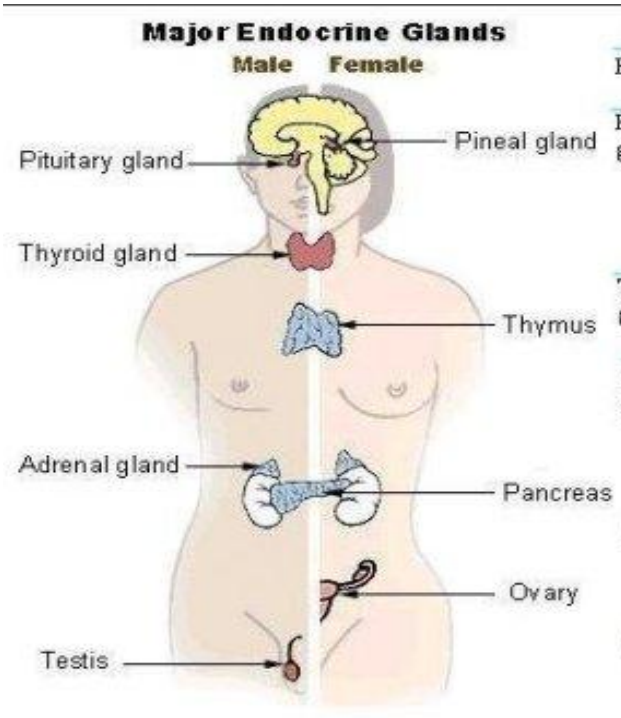
TABLE OF HARMONES

Hormones	Main effect	Hyposecretion	Hypersecretion
1. थाइरॉइड ग्रन्थि			
1. Thyroxine or T4- Tetra- iodothyronine T3/ Tri-iodothyronine Calorogenic hormone	1. कार्बोहाइड्रेट, प्रोटीन, वसा के उपापचय दर (BMR) को बढ़ाता है। 2. हृदस्पंदन दर, शरीर ताप का नियंत्रण। 3. लैगिंग हार्मोन परिपक्वन	1. बच्चों में (Cretinism) 2.वयस्क में(Myxoedema) 3. Simple goitre 4. Hoshimoto disease	1. Exophthalmic goitre 2. Grave's disease 3. Plummer's disease
2. Calcitonin or antiparathormone	मूत्र में Ca++ के स्रावण को बढ़ाकर रक्त में Ca ++ की मात्रा का नियमन करना	-	-
2. पैराथाइरॉइड ग्रन्थि			
Parathormone or collip's hormone	सीरम में Ca++ स्तर को बढ़ाता है, फॉस्फेट स्तर को घटाता है।	**1. Tetany** 2. Hypocalcemia	1. Osteoporosis 2. Hypercalcemia
	3. अधिवृक्क ग्रन्थि	**(A) मेड्मूला**	
1. Adrenaline 2. Noradrenaline or Neuro hormone	आपात परिस्थितियों में सहयोग प्रदान करने वाले life saving harmone हैं। इसे fight/flight हार्मोन भी कहते है।	Hypotension Heart rate B.P. Blood flow in organ	Hypertension Heart rate B.P. Blood flow in organ
		(B) कार्टेक्स	
1. (Aldosterone)	ECF में सोडियम व ca की मात्रा का नियमन करके रक्त दाब का नियंत्रण	1. Addison's disease 2. Conn's disease	1. cushing's disease 2. Adrenal virilism
2. (Corticosterone)	Rheumatism और Organ transplantution व Allergy उपचार में सहायक।	-	-
3 लिंग हॉरमोन्स	पेशियों और जननांगों के विकास में प्रेरक	-	लड़कियों में पुरूष लक्षण
4. पीयूष ग्रन्थि	**(a) ऐडिनोहाइपोफाइसिस**		
1. STH/ GH = growth hormone	शरीर की सामान्य वृद्धि, कोशिका विभाजन व अस्थियों की वृद्धि हेतु आवश्यक।	बचपन में – Dwarfism वयस्क में पीयूष मिक्सीडिमा	महाकायता / Giganstism Acromegaly
2.FSH or follicle stimulating hormone	नर के वृषण में शुक्रजनक नलिकाओं की वृद्धि व शुक्रजनन में प्रेरक।	-	-
3.LH or Leutinizing hormone या ICSH	नर में टेस्टोस्टीरोन स्रावण, मादा में अण्डोत्सर्ग हेतु प्रेरक।	-	-
4. PRL	स्तनों की वृद्धि और दुग्ध स्त्रावण का प्रेरक	-	-
5. ACTH	ऐड्रीनल कार्टेवस का प्रेरक हार्मोन्स।	-	-
6. TSH	थॉइराइड ग्रन्थि का प्रेरक।	-	-
7. MSH	त्वचा में कास्य वर्ण तथा तिलों व चकत्तो के निर्माण का प्रेरक, त्वचा का रंग गाढ़ा करना।	-	-
	(b) न्यूरोहाइपोइसिस		
1. Vasopression or ADH	वृक्क नलिकाओं में जल के पुनः अवशोषण को बढ़ाना तथा रक्त वाहिनियों का संकुचन	Diuresis (मूत्रलता) Diabetes insipidus	मूत्र गाढ़ा तथा रक्त तनु हो जाता है।
2.Oxytocin /pitocin	गर्भाशय को दिवार को सिकोडकर प्रसव पीड़ा का प्रेरक, दुग्ध निष्कासन।	-	-

Gland	Hormone	Functions
1. Thymus	Thymosine	लिम्फोसाइट्स का उत्पादन कर Antibodies के संश्लेषण की प्रेरणा देता है।
2. Pineal body	Melatonin	त्वचा का रंग हल्का करना।
3. Testes	Androgens Testosterone	नर में सहायक यौन जननांगों का विकास करना, नर में द्वितीयक लैगिंक लक्षणों को प्रेरित करना उदा.– भारी आवाज, दाड़ी, मूच्छों का विकास, मैथूननेच्छा।
4. Ovary	Oestrogen Progesterone Relaxin	मादा सहायक जननांगों तथा द्वितीय लैगिक लक्षणों के विकास को प्रेरित करना। Pregnany hormone - गर्भधारण के लिए आवश्यक दशाओं का प्रेरक। शिशु जन्म के समय श्रोणिमेखला के प्यूबिक सिमफाइसिस को शिथिल करना
5. Placenta	कोरियानिक गोनेडोनिट्रोपीन	कारपस ल्यूटियम की वृद्धि व स्रावण का नियमन, गर्भवती महिला के मूत्र में उत्सर्जित होता है।
6. Kidney	**Renin**	**Aldosteron hormone के स्रावण को प्रेरित करता है।** **Juxtaglomerular complex द्वारा स्रवित होता है।**

– अग्नाशय ग्रन्थि –

Hormone	Main effect	hyposecretion	Hypersecretion
1. Insulin From β cells	ग्लूकोज के उपापचय का नियमन, यकृत में गलाइकोजिनेसिस, प्रोटीन, संश्लेषण, वसा संश्लेषण।	1. Hyperglycemia 2. Diabetes mellitus	Hypoglycemia Insulin shock
2.Glucogon From α cell	रक्त में ग्लूकोज की घटी हुई मात्रा को बढ़ता है। अमीनों अम्ल व वसा से ग्लूकोज का संश्लेषण।	Hypoglycemia	Hyperglycemia
3. Somatostatin	भोजन पाचन, अवशोषण एंव स्वांगीकरण की अवधि को बढ़ाना	-	-



The Endocrine System

Gland	Hormones produced	Effect of Hormone
Pineal gland	Melatonin	Affects reproductive development and daily physiologic cycles.
Pituitary gland	Growth hormone	Controls growth of bones and muscles.
	Anti-diuretic hormone	Increases reabsorption of water in kidneys.
	Gonadotrophins	Controls development of ovaries and testes.
Thyroid gland	Thyroxine	Controls rate of metabolism and rate that glucose is used up in respiration, and promote growth.
Adrenal gland	Adrenaline	Prepares the body for emergencies increases heart rate and rate and depth of breathing, raises blood sugar level so more glucose is available for respiration, diverts blood from gut to limbs.
Pancreas	Insulin	Converts excess glucose into glycogen in liver.
	Glucagon	Converts glycogen back to glucose in liver.
Ovaries	Oestrogen	Controls ovulation and secondary sexual characteristics.
	Progesterone	Prepares the uterus lining for receiving an embryo.
Testes	Testosterone	Controls sperm production and secondary sexual characteristics.
Thymus	Thymosin	Promotes production and maturation of white blood cells.

(A) Water soluble vitamins

vitamins	Name	Sources	Deficiency disease
B_1 or Antineuritis factor	Thaimine	Pork, oatmeal, brown rice, vegetables, potatoes, liver, eggs	Beri-Beri, Polyneuritis,
B_2 or vitamin G	Riboflavine	Dairy products, bananas, popcorn, green beans, asparagus	Cheilosis, Angular Stomatitis
B_3 or antidermititis factor	Pantothenic acid	Meat, fish, eggs, many vegetables, mushrooms, tree nuts	3 D - Dermatitis, diarrhoea, & dementia
B_5 or r Pellagra Preventing factor	Nicotinic acid	Meat, broccoli, avocados	Pellagra &
B_6	Pyridoxine	Meat, vegetables, nuts, banana	Microlytic Anemia
B_7 or Vitamin H	Biotin	Raw egg yolk, liver, peanuts, leafy green vegetables	Dermititis
B_9 or vitamin M	Folic acid	Leafy vegetables, pasta, bread, cereal, liver	Megaloblastic Anemia
B_{12} or Erythrocyte maturation factore	Cynocobalamine	Meat and other animal products	Pernicious Anemia
Vit. C	Ascorbic acid	Amala, Guava, Capsicum, tomato, liver	Scurvy

(B) fat soluble vitamins -

vitamins	Name	Sources	Deficiency disease
Vit. A or Or anti xeropthelmic	Retinol Or Anti infective vit	Liver, orange, ripe yellow fruits, leafy vegetables, carrots, squash, pumpkin, spinach, fish, soya milk, milk	Keratomalacia, Xeropthalmia, Night blindness (Nyctalopia) Toad skin, Bitot spot
Vit. D Or sunshine vitamin	Calciferol Or Anti ricketic vit.	Fish, eggs, liver, mushrooms	Rickets, Osteomalacia, Tetany, Dental Carries
Vit. E	Tocoferol	Many fruits and vegetables, nuts and seeds	Sterility
Vit. K or Anti haemorrhagic vit.	Napthoqumone	Leafy green vegetables such as spinach, egg yolks, liver	Hypoprothrombinemia

Defination- any of a group of organic compounds which are essential for normal growth & nutrition and are required in small quantities in the diet because they cannot be synthesized by the body

- Lunin discovered the Vitamins.
- Vitamin Term used first by Funk. Vitamin is also called as Growth factor.
- Vitamin C is discoved first.
- Fat soluble Vitamin – A,D,E,K
- Water soluble Vitamin – B & C - vitamin excreted in urine
- Heat Stable & light sensitive Vitamin – B_2, & K
- Heat Labile Vitamin – B_9 & C
- Vit. are present in animal foods only – B_{12} & D
- Vitamins which are stored in Liver – B_{12} & A, K, D
- Vitamin that are synthesized in Gut – B_{12} , B_2, & K
- Vit. B_{17} is a Anti cancer Vitamin

Vitamin	Features	Dose
B_1 or Thaimine	Vit. B_1 is also called Antineuritis factor	2 mg/day
B_2 or Riboflavin	Magenta Red tongue is due to deficiency of Vit. B_2, (Riboflavin)	2-3 mg/day
B_3 or Pantothenic acid	Vit. B_3 is also called antidermititis factor & anticholestremic agent	3-4 mg/day
B_5 or Nicotenic acid	Raw beef tongue tongue is due to deficiency of Vit. B_5, (Niacin) Pellagra (4D Syndrome) is due to deficiency of Vit. B_5 (Niacin)	15-30 mg/day
B_6 or Pyridoxine	Vit. B_6 (Pyridoxine) control the metabolism of DOPA and GABA Vit. Vit. B_6 deficiency can cause the convulsions Vit. B_6 is essential in treatment of Bronchial Asthma	2 mg/day
B_9 or Folic acid	Vit. B_9 is also called Wills factor Folic acid is very useful in treatment of Topical sprue.	75 mg/day
B_{12} Cynocobalamine	Vit. B_{12} is also called erythrocyte maturation factor Vit. B_{12} **contain cobalt.**	1 mg/day
Vit. C or Ascorbic acid	Vit. C is also called L-ascorbic acid. Emblica officinalis powder is the richest source of Vit. A Vit. C deficiency can cause the Pseudo Paralysis Vit. C is very useful in treatment of Methamoglobinemia, Alcaptonuria	500 mg/day

Vit. A or Retinol	Vit. A is also called Anti infective vitamin & anti xeropthelmic vitamin Cod liver oil is the richest source of Vit. A Vit. A Prophylaxis dose = 2,00,000 IU Vit. A is very useful in treatment of Measles Earliest feature of vitamine A deficiency is keratomalacia	5000 IU/day
Vit. D or Calciferol	Vit. D is also called Anti ricketic vitamin & sunshine vitamin Halibut liver oil is the source of vit. D Vit. D deficiency can cause the Pseudo Paralysis Vitamin D does not cross placenta. Vitamins that are synthesized in Body = D Excessive dose of Vit. A and vit. D can cause Hypervitaminosis. Vit.D is very useful in treatment of Tuberclosis Vit. D is essential for Ca absorption	400 IU/day
Vit. E or Tocoferol	Vitamin which is an antioxidant ─ Vit. E Vit. E is very useful in treatment of Peripheral vascular disease Main source of Vit.E is Sunflower oil	15 IU/day
Vit. K or Napthoqumone	Dicoumarol is the anti vitamin of Vit. K. Vit. K deficiency can cause Haemolysis, Neonatal Jaundice	**None**

Renal Physiology

Body Fluid – Total body water (TBW) is 60 % of body weight.

Percentage of TBW is highest in – Newborn (78 %) & Adults males

Percentage of TBW is lowest in – Adult female

Weight	70 Kg	100 %
Body water	42 liter	60 %
Intracellular fluid	**28 liter**	**40 %**
Extracellular fluid	**14 liter**	**20 %**

Mean Concentrations of Important Body Fluid Solutes							
Fluid	**Na^+**	**K^+**	**Ca^{++}**	**Mg^{++}**	**Cl^-**	**HCO_3^-**	Amino acids
Extracellular	145	4	5	3	105	25	5
Intracellular	10	150	1	38	5	12	40

Na+, K+, Ca++, Mg+ = Cations

HCO-3, Cl-, PO-4 = Anions

Major Extracellular cation = Na^+ (Sodium)

Major Extracellular anion = Cl^- (Chloride)

Major Intracellular cation = K^+ (Potassium)

Major Intracellular anion = PO-4 (Phosphate)

Water-electrolyte imbalance and acid-base imbalance			
Volume status	Volume contraction (Dehydration/Hypovolemia)		Hypervolemia
Electrolyte	Na^+	Hyponatremia (Hypotonic, Isotonic)	Hypernatremia
	K^+	Hypokalemia	Hyperkalemia
	Cl^-	Hypochloremia	Hyperchloremia
	Ca^{++}	Hypocalcaemia	Hypercalcaemia
Acid-base	Acidosis (Ketoacidosis/Diabetic ketoacidosis)		Alkalosis

Renal control of acid of acid base balance.

- Important to maintain normal H+ concentration in the body fluids.
- Normal pH of arterial blood is 7.4
    a. Increase [H+] → decrease pH → acidosis
    b. Decrease [H+] → increase pH → alkalosis
- Urine pH is about 6
- H+ concentration is regulated by kidneys and lungs.

Na+ reabsorption along the nephron

Glomerular Fitration Rate (GFR) = Volume of fluid filtered from plasma per minute.

Normal GFR = 120 ml/min = 180 liters/day.

1700 litres of blood are filtered by human Kidney in one day.

Oligouria term will be used when the amount of urine will be - < 250 ml

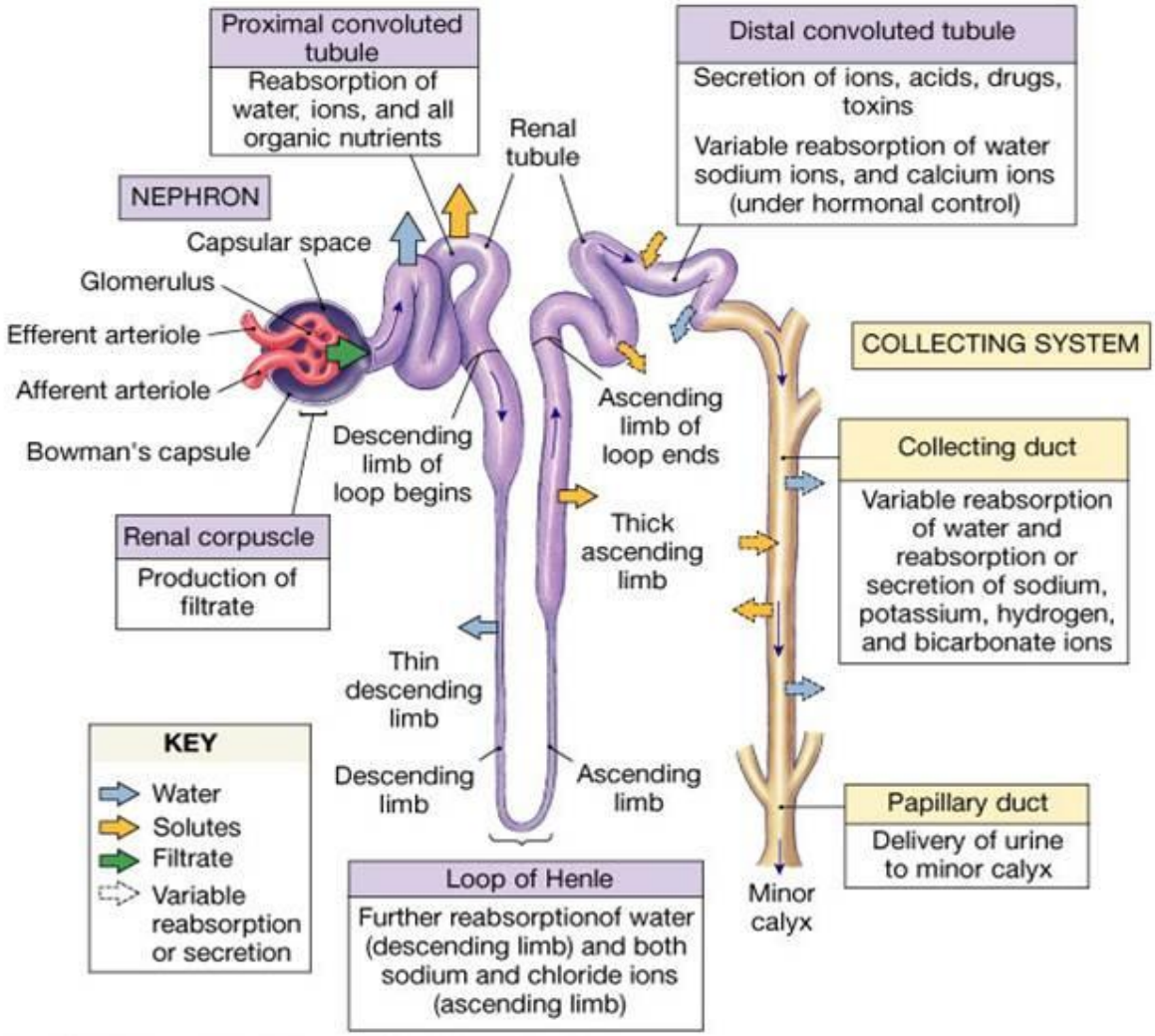
GFR measurement –

Insulin is a polysaccharide used for G.F.R. measurement

Disulphide bonds are seen in – Insulin, Immunoglobin, Cystine.

Insulin is filtered, but not reabsorbed or secreted by the renal tubules.

Amount filtered = Amount excreted



Glucose in blood	Glocose in GF	Glocose in Urine	Condition
1. 80 – 120 mg/dl	Present	Absent	Normal
2. 120 – 180 mg/dl	Present	Absent	Hyperglycemia
3. > 180 (Threshold value)	Present	Present	Glycosuria

Nephron – The Structural & functional unit of the kidney (one million nephrons in each kidney)

Secretion of hormones

- ✓ Secreation of erythropoietin, which regulates red blood cell production in the bone marrow,
- ✓ Secreation of rennin, which is a key part of the rennin –angiotensin – aldosterone system.
- ✓ Secreation of the active from of vitamin D (calcitriol) and prostaglandins.
- ✓ Urine is usually sterile
- ✓ Major source of ammonia in the kidney is – Glutamine

Bence Jones protein Test – Bence jones proteins are small proteins (light chains of immunoglobulin) found in the urine. Testing for these proteins is done to diagnose and monitor multiple myeloma and other similar diseases.

Some synonyms –

1. Urea cycle	Kreb's Henselet's cycle, Ornithine cycle
2. Cori's cycle	Lactic acid cycle
3. Krebs cycle	Citric Acid cycle or Tricarboxylic Acid
4. EMP pathway	Glycolysis

- ✓ Number if ATP from one krebs cycle is - 25

Neurophysiology

Neurons – Functional unit of the nervous system.

Neurotransmitter – Chemical messenger released by a neuron

Discovery of first Neurotransmitter – acetylcholine

Acetylcholine = is a parasympathetic neurotransmitter.

Examples of Neurotransmitter –

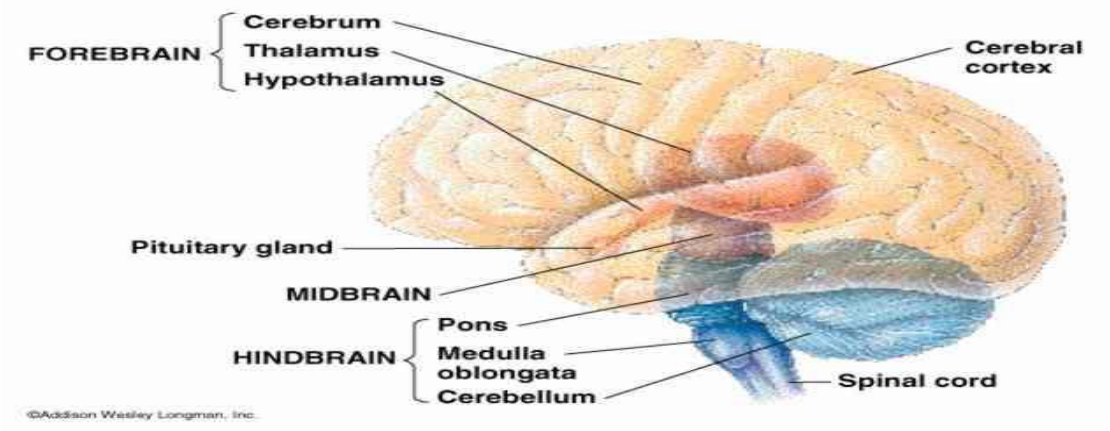
1. **Acetylcholine –** Destruction of Ach-containing neuron associated with Alzheimer disease.
2. **Norepinephrine –** Behavioral arousal
3. **Dopamine –** Coordination of movement. associated with Parkinson's disease
4. **Serotonin – a. Regulation of mood.**
   b. Levels may be too low in certain form of mental illness (i.g. depression)
5. **Amino acids – 1. Glutamate – excitatory and 2. Glycine – inhibitory**
6. **Nitric oxide -** a. Dilates blood vessels increases blood flow to organ.
   b. Viagra increase effectiveness of nitric oxide treatment of erectile dysfunction.

- ✓ Precursor of epinephrine and nor epinephrine is dopamine
- ✓ Precurssor of dopamine is Tyrosine
- ✓ Dopa, dopamine, thyroxine, epinephrine, norepipherine, melanin are the substances which are synthesized by the amino acid tyrosine.

Somatic neurons –

1. UMN (From cortex to anterior Horn cells)
   lesions - Spastic gut, Stroke, multiple sclerosis, traumatic brain injury and cerebral palsy
2. LMN (From anterior Horn cells to skeletal muscles)
   lesions –Bell's Palsy, Bulbar palsy, Poliomyelitis and Amyotrophic lateral sclerosis (ALS)

Features	UMN	LMN
Voluntary muscle power	**Lost**	**Lost**
Tone of muscle	↑ (Spastic paralysis) Increased muscle tone	Lost (Flacid paralysis) Decreased muscle tone
Babinski' sign	Positive	Negative
Tendon Jerk reflax	Exaggerated reflax response	Diminished reflax response
Muscle Atrophy	Nil	Marked wasting
Electrophysiology	Normal	Loss of conduction



- ✓ Hypothalamus is situated in - Fore brain & Hypothalamus has highest content of = GABA
- ✓ Lateral ventricles located in the cerebrum, 3rd ventricle in – Diencephalon of the forebrain
- ✓ Substantia nigra & Red nucleus is located in – Mid brain
- ✓ 4th ventricle is located upper half of the medulla oblongata of the hindbrain.
- ✓ Number of lobes in cerebellum - 3

Genetics

H2 Bonds are present inbetween two helices of DNA.
DNA is formed by Nucleus

TRANSCRIPTION – is the process of mRNA transformation & transformation into the site of protein synthesis

TRANSLOCATION– is the blueprint of RNA, DNA determining the Amino acid sequence of protein

Philodelfia chromosome = Translocation of long arm off 22^{nd} chromosome on 9^{th} chromosome

- ✓ X – Chromosome which can be seen in buccal smear
- ✓ Barr body is the genetically inactive
- ✓ Colchicine can stop cell division

Chromosomal disorders

Down's syndrome	=	Trisomy of 21^{st} chromosome
Edward syndrome	=	Trisomy of 18^{st} chromosome
Patau's syndrome	=	Trisomy of 13^{st} chromosome
Cri-du-chat syndrome	=	5P
Klinfelter syndrome	=	xxy (1 Barr body present)
Turner's syndrome	=	xo (No Barr body)
Super female	=	xxx (2 Barr body present)
Super male	=	xyy

- ➢ Hypotonia, Brachycephaly, single palmar crease (simian crease), crotal tougne and Light yellow spot on Iris (Bruish field's spots) can be seen in = Down's syndrome

- ➢ Polydactyly, cleft lip and Palate can be seen in = Patau's syndrome

- ➢ Short stature, marked cubitus valgus, widely spanced nipples and webbed neck can be seen in = Turner's syndrome

Important point

1. Human body contains 22 Amino acids and 24 minerals.
2. Definitely essential fatty acid is Linolenic acid.
3. Strongest acid in the body is heparin
4. Heparin is secreted by mast cells and cause defects of coagulation.
5. Amino acid excreted in urine during pregnancy is Histidine.
6. Protein which is not an antigen, is Gelatin.
7. Protein of the hair is Keratin.
8. Strongest acid in the body – HCL
9. Tryglyceride is the storage form of lipid
10. Rhodopsin and thromboplastin are lipoprotein
11. Protamine is the simplest protein
12. Glycine is the simplest amino acid

13. Energy from protein/ Carbohydrates

1 gm of Carbohydrates	=	4.1 Kcal/gm
1 gm of Protein	=	4.1 Kcal/gm
1 gm of Alcohal	=	7 Kcal/gm
1 gm of fats	=	9.3 Kcal/gm

14. Coconut oil is the vegetable source with out essential fatty acid
15. Fish and eggs have no carbohydrates
16. Poor man's meat = Pulses
17. Coconut water is rich in potassium
18. ¾ of the total body potassium is present in = skeletal muscle
19. Milk is also called best, complete & Safest Animal food
20. Egg Yolk is rich in cholesterol

21. End product of the starch metabolism is Maltose.
22. Glactose is the best absorbed sugar.
23. Glyeogen is also called animal sugar.
24. Entry of glucose in muscles is caused by - Insulin
25. Maltose = glucose + glucose
    Sucrose = glucose + fructose
    Lactose = glucose + galactose

26. BMI (Body Mass Index) = $\frac{\text{Weight (kg)}}{\text{Height}^2 \text{ (m)}}$

Categary	BMI range – Kg/m²
Starvation	Less than 14.9
Underweight	from 15 to 18.4
Normal	from 18.5 to 22.9
overweight.	from 25 to 30
Obese	30 & above

Important point

- 1. (GH/STH) = Secrete from Acidophils of adenohypophysis of pituitary gland.
- 2. TSH, ACTH & LH = Secrete from Basophils of pituitary gland
- "C" cells are found in – Parathyroid gland
- Diabetes insipdus is due to decreased ADH production
- Moon face is seen in Cushing's syndrome
- Hormones required for menstrual cycle is Estrogen, FSH & LH

- The largest gland in the body is – Liver
- Ceruloplasmin is produced by – Liver
- Kupffer's cells are found in – Liver
- Ligamentum teres is found in – Liver
- Bruners glands are present in – Duodenum
- Tyson's glands are found in – Penis
- Sertoli cells are found in – Testis.
- Calpo haematoma accumulation of blood in – Vagina
- Mucous secreting glands are absents in Vagina.
- Reticuloendothelial cells are absent in Kidney.

- Normal respiratory rate in an adult male is 18-25/ minute
- Respiratory rate : Heart rate = 1 : 4
- Site of the gaseous exchange in lungs is Alveoli
- Full form of CPR - Cardio pulmonary recuscitation
- Basic life support / BLS involves - 1. airways maintenance 2. breathing 3. circulation

- Saliva – Volume – 1200 ml secreted per day (1ml/min)
  pH – 6.50 (Slightly Acidic)
  At rest saliva – Hypotonic
  Composition – Water – 99.5 % & 0.5 % solids
  Protein – Mucin & albulin
  Enzymes – Pttylin, Maltase, Lipase, Lysozyme, carbonic anhydrase
- Saliva contain highest concentration of – K +
- K + is absent in gastric juice
- Excessive salivation is called ptyalism or sialorrhea.
- 70 % Absorption of fat is done by lymph and 22 % by blood
- Highest digestion done in Deodenum & highest Absorption is done in Jejunum.
- Bile salt are drived from cholesterol
- Serum Amylase is increased in – acute pancreatitis, gallstones, mumps infection

- The term "Cell" was introduced by Robert Hooke.
- Power house of cell is Mitochondria
- Resting membrane Potential is - 65 mv to 95 mv (around – 70 mv)