

# *Basic Facts about Organs*

*Prepared by:*

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*Final year BHMS*

*GHMC Calicut*

# *Digestive organs @ a glance*

*Dr. Jarshina K P*

# MOUTH

## *Chewing*

*Saliva: salivary amylase*

*lingual lipase*

*electrolytes*

*mucin*

*water*

*antibacterial compounds*

*pH: 6.2-7.6*

*0.5-1.5L/day*

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*0.1ml/mt(sleep) --> 4-5ml/my(chewing)*

*chewing food for 32 times is ideal*

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# OESOPHAGUS

*Food pipe / gullet*

*25 cm long*

*3 parts: cervical*

*thoracic*

*abdominal*

*Funcn ; swallowing*

*Food passes down in 2-3 sec*

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# ***STOMACH***

***surface area: 500 cm<sup>2</sup>***

***size: 40x13 cm***

***capacity: 1.5-2.5 L***

***Chemical breakdown of food → Chyme***

***Gastric emptying: 4-5 hr***

***Gastric juice: pepsinogen, HCl, intrinsic factor, mucus,  
gastrin***

***3-4 L/day***

***BAO : 1-4mmol/hr to 6-30 mmol/hr***



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# SMALL INTESTINE

\* Length: 6-7m (NB: 120-362 cm)

\* Diameter: 2.5-3 cm (NB: 1.5 cm)

\* Absorptive surface area: 250 m<sup>2</sup> *Dr. Jarshina K P*

\* Wt: 2 kg

\* Absorption of nutrients & minerals

\* 3 parts;

1. Duodenum: 20-25 cm

Protein breakdown  
fat --> micelle

2. Jejunum: 2.5 m

absorbs sugar, a $\bar{a}$ , fatty  $\bar{a}$ , Fe, vit, water

3. Ileum: 3m

vit B12, bile acid & many nutrients

\* 50% emptied in 2.5-3 hr

\* **Intestinal secretion**  
1800 ml /day

mucus, peptidase, sucrase, maltase, lactase, lipase,  
enterokinase, cholecystokinin, secretin

# LARGE INTESTINE

**1.5 m (male) 1.6 m(f) [NB:66 cm]**

**7.5 cm diameter**

**1.8 Kg wt**

**2 m<sup>2</sup> surface area**

**capacity: 1.45L (upto4.5L)**

**constipated: 1.74 L**

**NB: 100 ml @20 dys**

**absorption of water & minerals**

**1.5 L water reaches/ day**

**need 36 hr for food to move through**

**entire colon**

**no digestive enzymes**

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# RECTUM

**Length: 10- 15 cm(NB:  $1.67 \pm 0.34$ )**

**Temporary storage site for feces**

**Urge when pressure > 18 mmHg**

**reflex expulsion @ 55 mmHg**

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**Bleeding & Pain** 

**Conditions;**

**hmds**

**abcess**

**incontinence**

**Ca**

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# LIVER

15 cm width (NB: 3.28-6.5 cm)

1.5 kg wt (NB: 4% body wt)

>500 functions; **metabolism**

**synthesis of bile, aā,**

**clotting factors, RBC,**

**triglycerides, insulin like GF,**

**lipoprotein, other proteins**

**detoxification**

**hormone breakdown**

**Damage**  **jaundice**

**abd pain & swelling**

**pedal oedema**

**itchy skin**

**dark urine**

**pale stool**

**fatigue**

**nausea vomiting**

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# LFT

## 1. Bile production & excretion

**a) S. bilirubin: 0.1–1.3 mg/dL**

**unconjugated: 0.2–0.4 mg/dL**

**↑ over pdctn (hematoma, tumor)  
reduced hepatic uptake**

**reduced conjugation**

**(Gilbert's dis**

**Crigler-Najjar syn)**

**conjugated: ↑ hepatitis, liver injury**

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**obstr. jaundice**

**Dubin-Johnson syn**

**b) In feces: absent/clay colour: obstr. jaundice**

**c) In urine: hepatitis**

**d) urobilinogen: ↑ hepatocellular & hemolytic dis  
absent – obstr. jaundice**

**e) Bile salts: cholestasis – ↑ in serum**

**detectable in urine**

## 2. Liver damage

a) ALT(SGPT): **7-56 IU/L**

↑ c/c hepatitis

alcoholic liver dis

non-alcoholic fatty liver

reduced insulin response

pregnancy

↓ eclampsia

b) AST(SGOT): **10-40 U/L**

↑ liver injury & myocardial injury

c) ALP: **41-133 U/L**

↑ biliary obstruction

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d) GGT: **9-85 U/L**

↑ cholestasis

hep.C

alcoholism

DM

a/c pancreatitis

Guillain-Barrie sun

e) Cholinesterase: ↓ hepatocellular dis  
malnutrition

### **3. Metabolic function**

**a) Albumin: 3.5–5.5 gm/dL**

↓ hepatocyte destruction

**b) Globulin: 2–3.5 gm/dL**

↑ cirrhosis

c/c hepatitis

**c) A/G ratio: 1.5–3:1**

**d) Prothrombin time:**

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↑ hepatocellular disease

**e) Plasma ammonia: 19–70 μg/dL**

↑ a/c fulminant hepatitis

cirrhosis

hepatic encephalopathy

**f) Aminoaciduria:**

fulminant hepatitis

**g) Blood lipids: ↑ cholestasis**

↓ liver diseases

malnutrition

**h) Blood glucose & GTT:**

↓ hepatic necrosis

## **4. Immunological Tests**

**a) Smooth muscle antibody:**

**hepatic necrosis**

**b) Mitochondrial antibody:**

**primary biliary cirrhosis**

**c) Anti-nuclear antibody:**

**c/c active hepatitis**

**d) HBsAg, HBc, HbeAg:**

**hepatitis B**

**e) Amoeba antibodies:**

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**amoebic liver abscess**

## **5. Other**

**a) Ultrasound examination**

**b) FNAC & percutaneous liver biopsy**

# GALL BLADDER

*7-10 cm long (NB: 2.5-3cm)*

*4 cm diameter*

*capacity: 30-80 ml*

*stores & concentrates bile*

*before meal - full*

*after meal- deflated*



*pain in rt upper abdomen*

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*pain below breastbone*

*pain b/w shoulder blades*

*nausea & vomiting*

*circulation of total bile pool*

*10-12 times/ day*

# BILE

*synthesised by liver ,stored in gb*

*Total bile flow: 400-800 ml/dy*

*contains bile ā, salt, phospholipids, cholesterol,  
pigment, water, electrolyte*

*pH: 7.8*

*function: fat absptn*

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*fat soluble vit absptn*

*excretion*

*↑ : bile acid malabsorption*

*watery stool*

*urgency*

*fecal incontinence*

*↓ : steatorrhoea*

*cholesterol gall stone*

*def of ess. fatty ā & fat sol vit*

# PANCREAS

**12-15 cm long (NB:2.2-5 cm)**

**60-100 g (NB: 5-10mg)**

**Exocrine → enzymes → trypsin**

**chymotrypsin**

**amylase**

**lipase**

**carboxypeptidase**

**nuclease**

**elastase**

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**Endocrine → hormones → insulin**

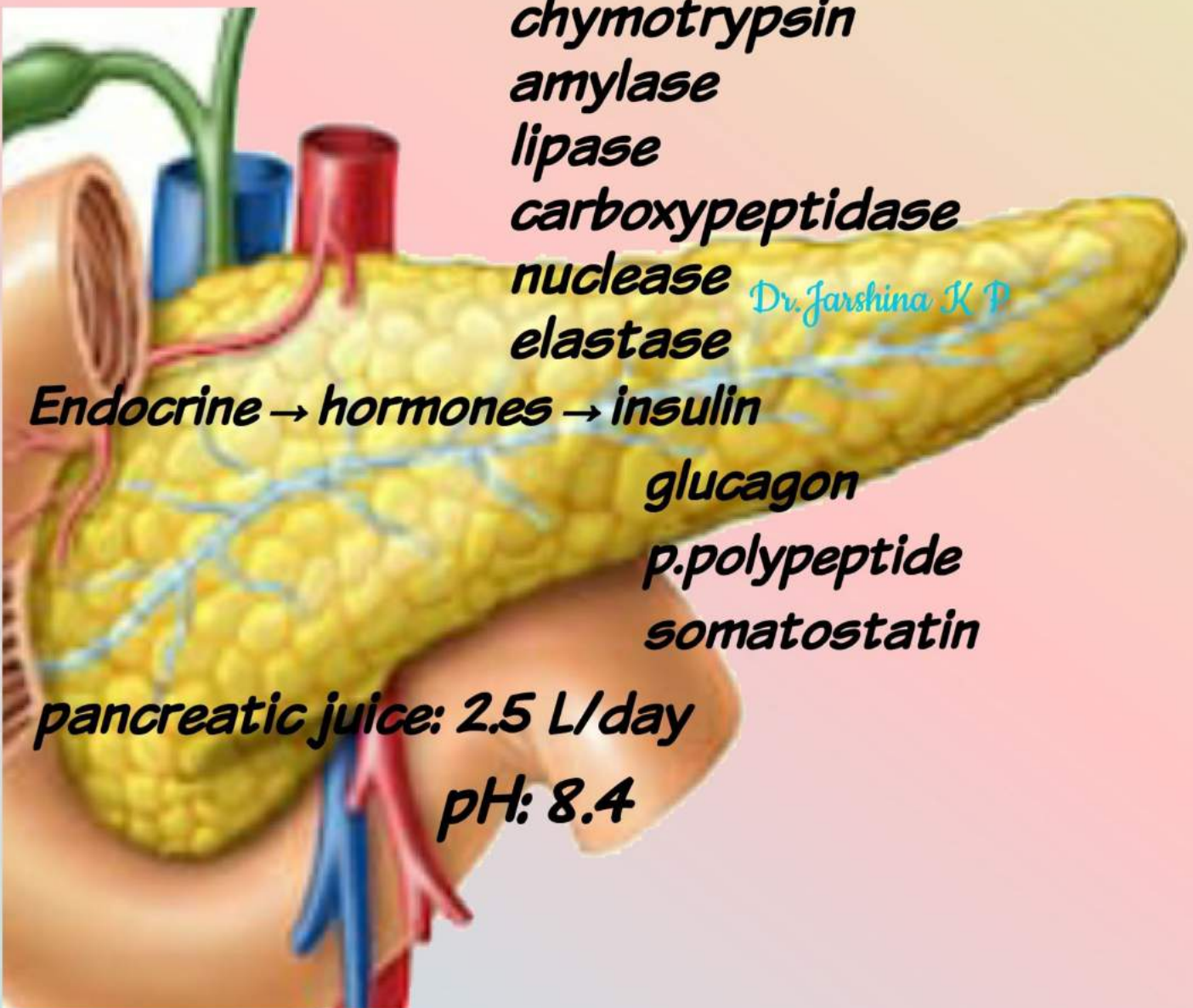
**glucagon**

**p.polypeptide**

**somatostatin**

**pancreatic juice: 2.5 L/day**

**pH: 8.4**





# PANCREATIC FUNCTION TESTS

**S.amylase:** 50-120 IU/L  
↑ in a/c pancreatitis

**S.lipase:** 50-175IU/L  
↑ in a/c pancreatitis

**Trypsinogen:** ↑ a/c pancreatitis  
↓ pancreatic insufficiency, cystic fibrosis

**sweat chloride:** ↑ cystic fibrosis

**Amylase/creatinine clearance ratio:**

N: 3.1

>5 → a/c pancreatitis

**Fecal fat:** N: ≤6g fat/day *Dr. Jarshina K P*

↑ pancreatitis, malabsorption  
>20% EPI

**Fecal enzymes:** ↑ EPI-(cystic fibrosis)

**Secretin stimulation test:**

(conc. of bicarbonate & enzymes)

↓ EPI; cystic fibrosis, calcification, obstruction

**Cytology of duodenal aspirate:** neoplasm

**Lundh test:** tryptic activity.

N:  $19.6 \pm 3.5$  mEq/mL per min

*Isotopic study by  $^{22}\text{Se}$*

*Radiography: pancreatic calculi & calcification*

*Ultrasound & CT*

*ERCP: ductal dilatation, obstruction, stone  
staging of c/c pancreatitis*

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*Assessment of endocrine function;*

*glucose homeostasis*

*S.isulin, glucagon, other hormones*

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*some other organs..*

# BRAIN

**Wt: 1.3–1.4 kg**

*50 g when floating in CSF*

**NB: 350–410 g**

**Length: 15–16.7 cm**

**Width: 14 cm**

**Height: 9.3 cm**

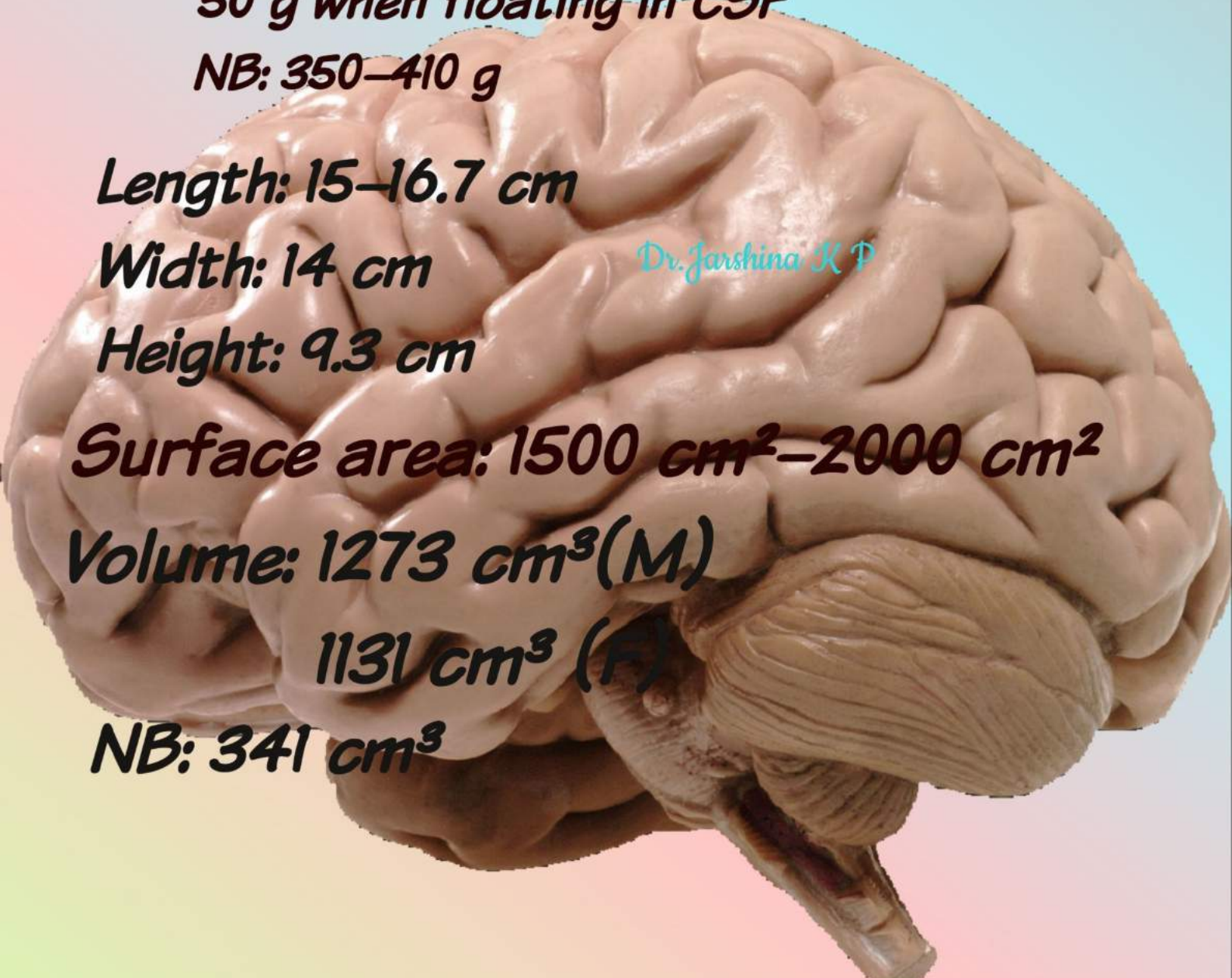
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**Surface area: 1500 cm<sup>2</sup>–2000 cm<sup>2</sup>**

**Volume: 1273 cm<sup>3</sup> (M)**

**1131 cm<sup>3</sup> (F)**

**NB: 341 cm<sup>3</sup>**



# HEART

**280–340 g(M). 230–280 g(F)**

**NB: 20–25 g**

**12 cm × 8 cm × 6 cm size**

**EDV: 120 ml**

**ESV : 50 ml**

**SV : 70 ml**

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**Cardiac output: 5–6 L/min**

**Cardiac index: 2.8–4.2 L/min/m<sup>2</sup>**

**Rate: 60–100 bpm**

**Coronary arterial blood flow:**

**72–85 ml/ 100 g/ min**

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# LUNGS

**Wt: 1.3 kg (Rt: 155–720 g[M]**

**100–590 g[F]**

**Lt: 110–675 g[M]**

**105–515 g[F])**

**NB: 40–50 g**

**Ht: 24 cm → 27 cm @ TLC**

**Length of airway: 2400 km**

**Area: 75 m<sup>2</sup>**

**Blood perfusion: 5 L/min**

**6 L/min air enter & leave**

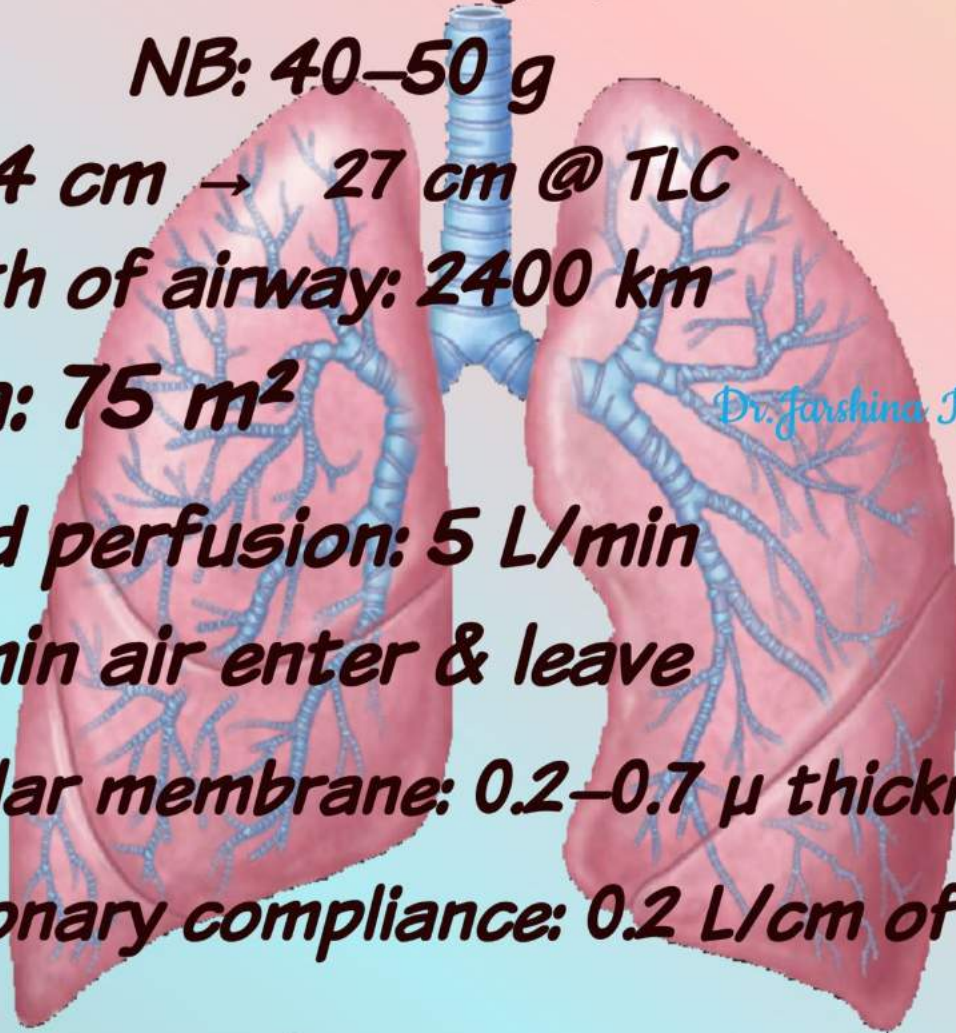
**Alveolar membrane: 0.2–0.7 μ thickness**

**Pulmonary compliance: 0.2 L/cm of water**

**Pleural fluid: 10–20 ml**

**Pleural pressure: 5 cm of water**

**(at the end of quite expn)**



# SPLEEN

*7–14 cm long (NB: 6cm)*

*7–8 cm wide*

*3.5 cm thickness*

*Wt: 150–170gm*

*Functions:*

*removal of abnormal RBC*

*clearance of microorganisms*

*synthesis of IgG, properdin, tuftsin*

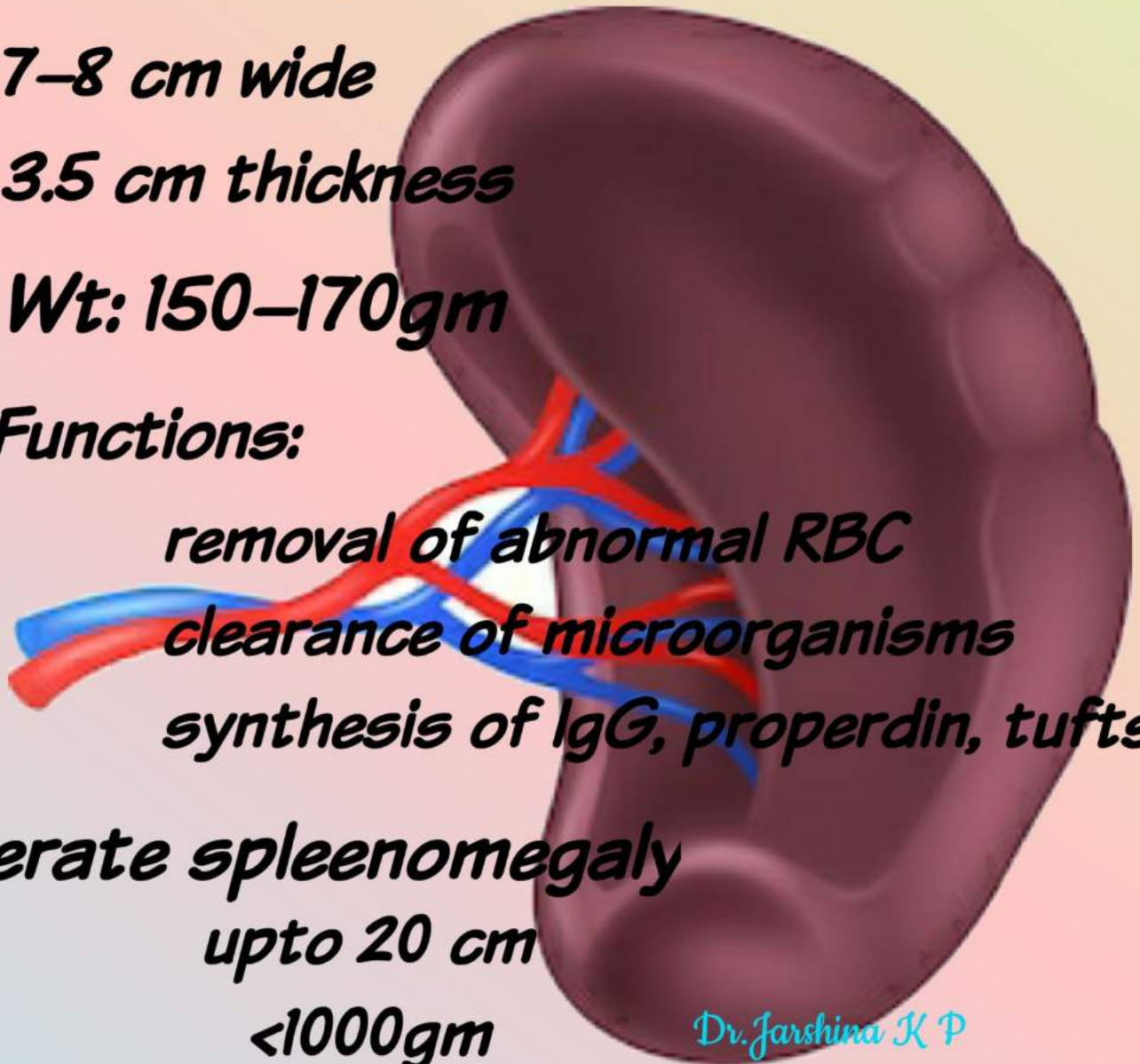
*Moderate splenomegaly*

*upto 20 cm*

*<1000gm*

*Severe splenomegaly*

*>1000 gm*



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# KIDNEY

**7–12 cm long (NB: 5–5.7 cm)**

**5–7 cm wide**

**2.5–3 cm thickness**

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**150 gm (M) 135 gm (F) NB: 29–34 gm**

**T12 – L3 level**

**Volume: 110–190 ml (Rt)**

**90–150 ml (Lt)**

**Surface area of glomerular capillaries: 6000 cm<sup>2</sup>**

**Filtration surface area: 516 cm<sup>2</sup>**

**Renal blood flow: 1 L/min**

**Renal plasma flow: 600 ml/min**

**GFR: 90–120 ml/min/1.73 m<sup>2</sup>**

**(NB: 20 ml/min/1.73 m<sup>2</sup>)**



# URINARY BLADDER

*5–15 cm long*

*400–600 ml capacity*

*(NB: 30 ml)*

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*urge @ 240 ml*

*can hold upto 500–600 ml*

*1.5–2 L urine/day*

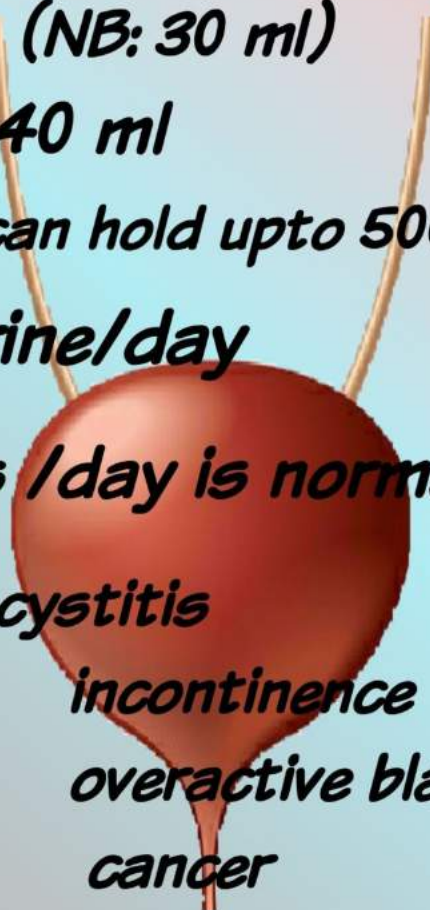
*6–8 times /day is normal*

*conditions: cystitis*

*incontinence*

*overactive bladder*

*cancer*



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***Reference:***

***Gyton-and-Hall Textbook of Medical Physiology***

***Textbook of Medicine by K V Krishna Das***

***Gray's Anatomy***

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***Livescience.com***

***medbroadcast.com***

***etc..***