INFLAMMATORY BOWEL DISEASE

- Inflammatory bowel disease represents a group of intestinal disorders that cause prolonged inflammation of the digestive tract.
- It is a chronic idiopathic inflammatory condition.
- Inflammation on any part of GIT may disturbed Digestion process.

➢ **Types**

1. **Ulcerative colitis –** This condition causes long lasting inflammation and sores (ulcers) in the innermost lining of large intestine (colon) and rectum.
    - Common in men
2. **Crohn's disease**- is chronic and may involve any portion of the GIT but affect most commonly 15-20 cm of the terminal ileum.
    - Common in women

➢ **Sign and symptoms**

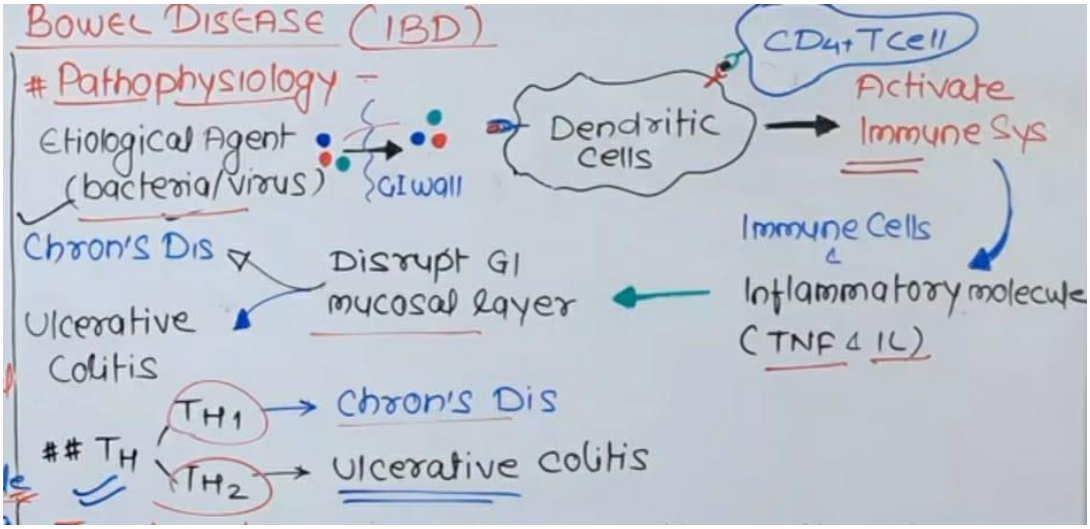
- Diarrhoea
- Abdominal pain
- GI bleeding
- Weight loss
- Fatigue
- Anemia
- Fever

➢ **Causes**

- **Immunological factors:** The exact cause of IBD is unknown, but IBD is the result of a defective immune system. In IBD, the immune system responds incorrectly to environmental triggers which causes inflammation of the GIT.
- **Genetic factors**
- **Exogenous factors:** Bacteria, virus, fungi, protozoa

- **Unhealthy life style:** Diet, smoking, alcohol

➢ **Pathophysiology**



➢ **Diagnosis**

- **Physical examination:** Checking symptoms such as skin rash, mouth ulcers, abdomen pain, etc.
- **Blood test:**

  RBCs are fewer or smaller than normal, a patient may have anemia.

  WBCs count is higher than normal in inflammatory condition or infection.
- Stool test
- **Colonoscopy:** used to examine the entire colon
- **Upper gastrointestinal series:** examine the upper part of the GIT
- **Upper gastrointestinal endoscopy:** It looks at the interior lining of the esophagus, stomach and duodenum.

➢ **Treatment**

- **Life style modification**
- **Antibiotics –** Ciprofloxacin, metronidazole
- **Anti-inflammatory drugs-** amino salicylate, corticosteroids
- **Surgery**

Jaundice

Jaundice is a condition in which person's skin and the whites of the eyes are discoloured yellow due to an abnormally increased level of bile pigments, bilirubin in the blood and body tissue resulting from liver diseases such as cirrhosis, hepatitis or gallstones.

- **Cause of jaundice**

The liver breaks down old, inefficient red blood cells in a process (hemolysis) and releases large amounts of bilirubin. The excess amount of bilirubin results in toxic and can cause jaundice.

- **Autoimmune Hepatitis:** In this condition, the body's immune system attacks its own liver cells.
- **Gilbert's syndrome:** Minor defects in the liver's metabolism of bilirubin cause jaundice to appear in times of stress, exercise, hunger or infection.
- **Gallstones:** Formed in the gallbladder, gallstones can block the bile ducts, preventing bile (and bilirubin) from reaching the intestine.
- **Cholestasis:** A condition in which the flow of bile from the liver is interrupted. The bile containing conjugated bilirubin remains in the liver instead of being excreted.

- **Types of Jaundice**

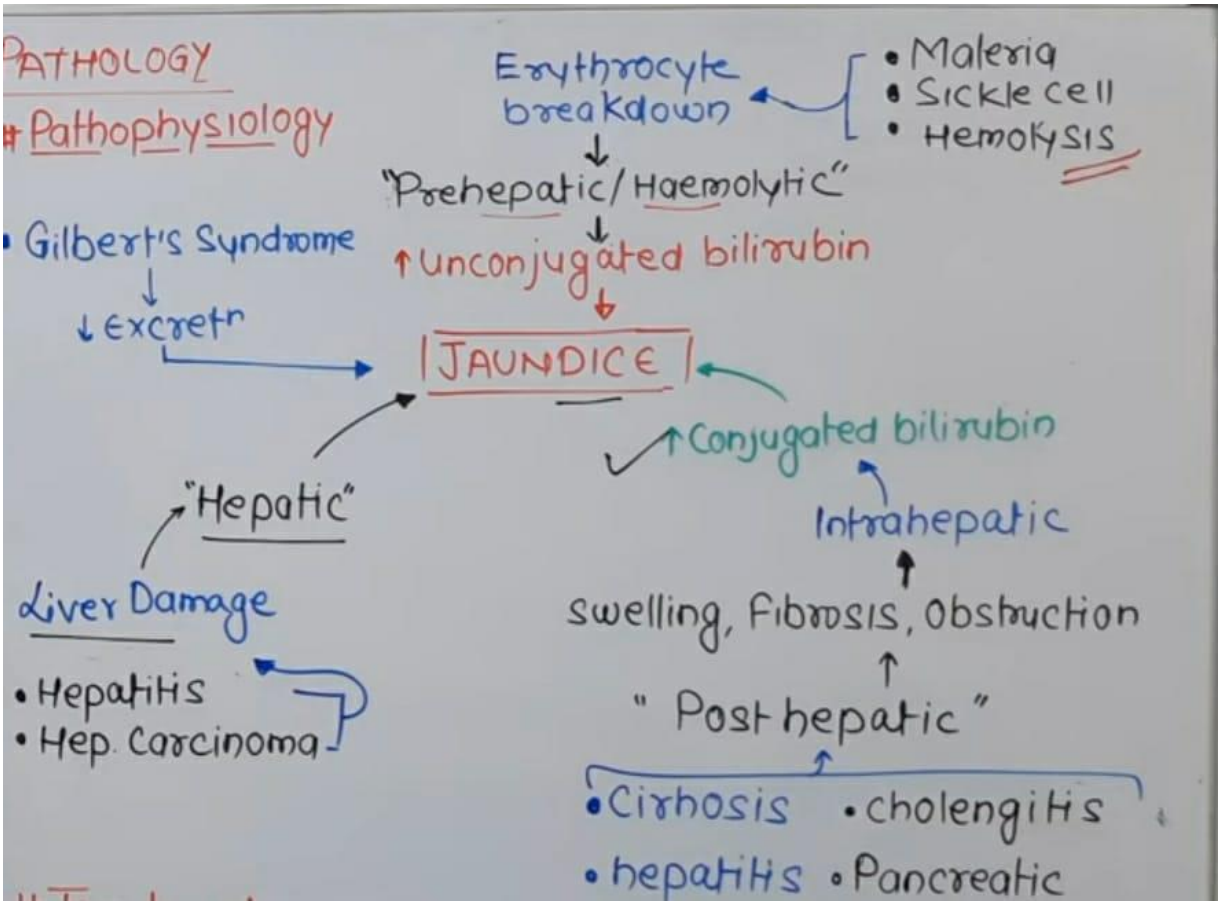
1. **Pre-hepatic jaundice:** If an infection or medical condition makes the red blood cells break down sooner than usual, bilirubin level rise. This is known as pre-hepatic jaundice. Conditions which may trigger this include malaria, sickle cell anaemia, etc.
2. **Intra-**hepatic jaundice: if the liver is damaged, it may be less able to process bilirubin and reduces the liver's ability to metabolize and excrete the bilirubin leading to a build-up of unconjugated bilirubin in the blood which causes hepatic jaundice. Causes- liver disease, hepatitis, paracetamol overdose, etc.
3. **Post-**hepatic jaundice: Due to obstruction of billary duct (carry the bile from liver to gallbladder and small intestine).

- **Symptoms**

- Yellowish discoloration of the skin and the whites of the eyes
- Dark colored urine
- Fever

- Itching
- Fatigue
- Weight loss

➢ **Pathophysiology**



➢ **Diagnosis**

- **Physical examination:** The physical examination should focus primarily on signs of liver disease other than jaundice, including bruising, spider angiomas, gynecomastia and the examination of liver size and tenderness is also important.
- **Urine test:** Urine can be tested for urobilinogen, which is produced when bilirubin is broken down.
- **Serum testing:** Includes CBC, determination of bilirubin, aspartate transaminase (AST)

- **Ultrasound:** It is very useful for detecting gallstones and dilated bile ducts and also detect abnormalities of the liver and pancreas.

- **MRI**: MRI is an imaging study that uses a magnetic field to examine the organs of the abdomen.

- **Endoscopic retrograde cholangiopancreatography (ERCP**): ERCP is a procedure that involves the introduction of an endoscope (a tube with a camera at the end) through the mouth and into the small intestine. A dye is then injected into the bile ducts while X-rays are taken.

- **Treatment**

- **Hepatitis induced**- antiviral drug and corticosteroids
- **Anemia induced**- Iron and nutrition supplement
- **Obstructive jaundice**- Surgery
- **Drug induced**- select alternate medicine

- **Complication**- Jaundice complications include sepsis, biliary cirrhosis, pancreatitis, renal and liver failure.

Hepatitis

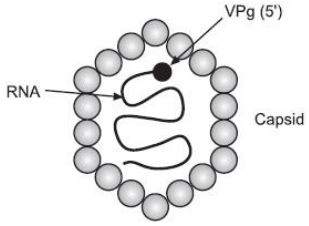
Hepatitis means injury to the liver with inflammation of the liver cells. Toxins, certain drugs, some diseases, heavy alcohol use, bacterial and viral infections can all cause hepatitis.

Hepatitis is also the name of a family of viral infections that affect the liver; the most common types in the India and Asian countries are hepatitis A, hepatitis B and hepatitis C.

- **Etiology-** Most common cause of all viral hepatitis includes-
  - Use of infected needle and syringes
  - Intravenous drug users
  - Transfusion of infected blood and blood products
  - Unprotected sexual contact with infected partner.

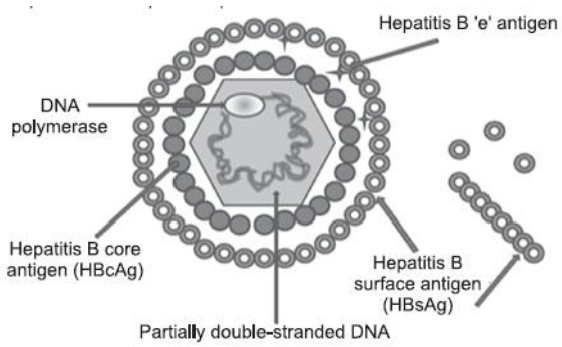
- **Types of Hepatitis**

Hepatitis A: Hepatitis A is a highly contagious liver infection caused by the hepatitis A virus. The hepatitis A virus is one of several types of hepatitis viruses that cause inflammation that affects liver's ability to perform normal function.



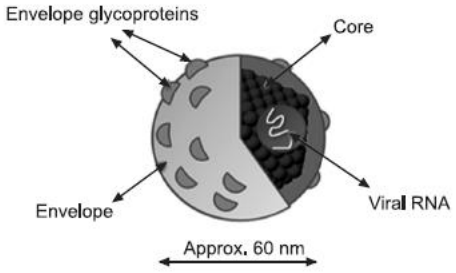
Structure of Hepatitis A virus

Hepatitis B: Hepatitis B is a serious liver infection caused by the hepatitis B virus (HBV), which infects the liver and causes an inflammation called hepatitis. Spread by contact of infected blood, semen and other body fluids. Chronic illness can lead to liver cancer or cirrhosis.



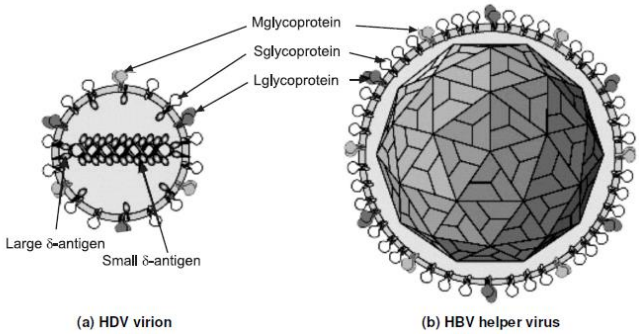
Structure of Hepatitis B virus

Hepatitis C: Hepatitis C is a liver disease caused by the hepatitis C virus (HCV). The virus can cause both acute and chronic hepatitis infection, ranging in severity from a mild illness lasting a few weeks to a serious, lifelong illness. Hepatitis C is usually spread through direct contact with the blood of infected person. The liver can swell and become damaged.

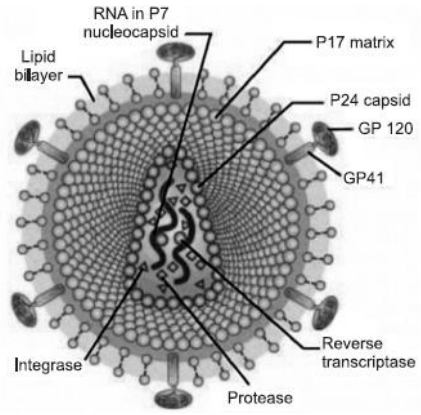


Structure of Hepatitis C virus

Hepatitis D: Hepatitis D is a serious liver disease caused by the hepatitis D virus (HDV) and relies on HBV to replicate. Hepatitis D virus (HDV) is an RNA virus and causes a unique infection that requires the assistance of viral particles from hepatitis B virus (HBV) to replicate and infect other hepatocytes.

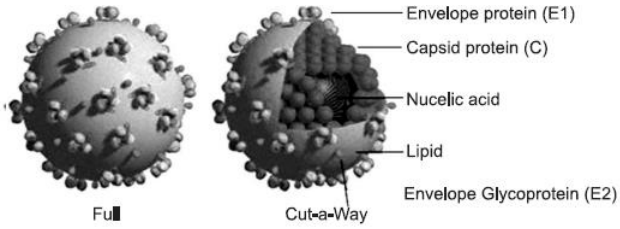


Hepatitis E: It is a serious liver disease caused by the hepatitis E virus (HEV), usually results in an acute infection. It does not lead to a chronic infection. Hepatitis E is an enterically transmitted infection typically self-limited. Hepatitis E has many similarities with hepatitis A.



Structure of Hepatitis E virus

Hepatitis G: A new virus recently identified in humans. GB virus C (GBV-C), formerly known as hepatitis G virus (HGV). It can spread through sexual contact, infected blood etc.



Structure of Hepatitis G virus

- **Symptoms-** Common symptoms of all viral hepatitis includes
- Nausea and vomiting
- Loss of appetite
- Weakness and fatigue
- Fever
- Dark urine
- Jaundice
- Abdomen pain

➢ **Pathophysiology**

➢ **Diagnosis**

- **Blood test:** Blood test used to detect antibodies made by the body in response to the virus that causes viral hepatitis.
- **Liver function tests:** When hepatocytes become damaged by Hepatic virus, regular blood tests are helpful to measure the levels of liver enzymes. These enzymes can become elevated and releases into the blood.
- **Liver Biopsy:** A procedure in which a small needle is inserted into the liver to collect a tissue sample and tissue is then analyzed to help diagnose a variety of disorders and diseases in the liver.

➢ **Treatment/ Management**

- Heptatitis A: No specific treatment exists. Vaccination may prevent the Hepatitis A
- Hepatitis B: Antiviral medications including lamivudine, adefovir can help fight the virus and slow its ability to damage liver. Liver transplant is also an option.

- Hepatitis C: Sofosbuvir and simeprevir, antiviral drugs and interferon
- Hepatitis D: Interferon alpha
- Hepatitis E: Interferon alpha and Ribavirin may improve liver enzymes and functions in hepatitis E.

- **Prevention**

Management should be predominantly preventive, relying on clean drinking water, good sanitation, and proper personal hygiene. Travelers to endemic areas should avoid drinking water or other beverages that may be contaminated and should avoid eating uncooked shellfish.

ALCOHOLIC LIVER DISEASE

- Alcoholic Liver Disease is a syndrome of progressive inflammatory liver injury caused by long-term heavy intake of alcohol.
- Alcoholic liver disease is most likely to occur in people who drink heavily over many years.
- Alcoholic liver disease usually persists and progresses to fatty liver, alcohol hepatitis and cirrhosis if heavy alcohol use continues.
- Significant amount of alcohol that may lead to liver damage
    - For men- >75-100ml/day for more than 20 years
    - For women - >25ml/day for more than 20 years

➢ **Epidemiology**

Alcohol abuse is the most common cause of serious liver disease in western societies. The true prevalence of alcoholic liver disease, especially of its milder forms, is unknown, because patients may be asymptomatic and never seek medical attention.

➢ **Symptoms**

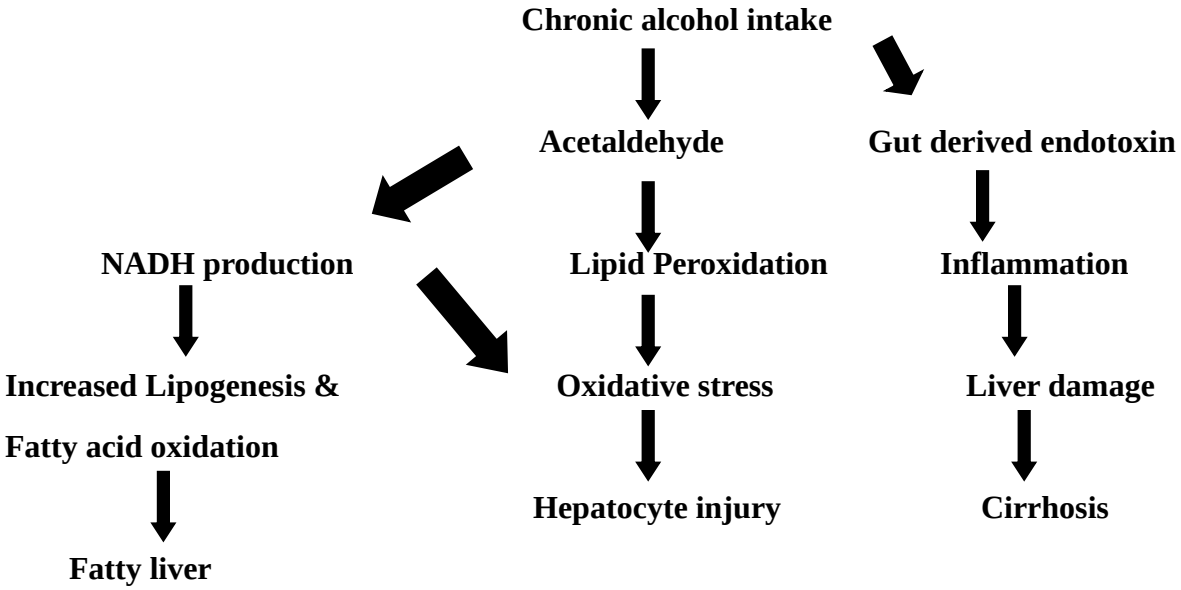
- Pain and swelling in the abdomen and tenderness
- Decreased appetite and weight loss
- Nausea and vomiting
- Fatigue
- Jaundice

➢ **Risks factors**

- Obesity
- Genetic factor

- Women
- Black races
- Binge Drinking

➢ **Pathophysiology**



➢ **Diagnosis**

- **CBC count -** Complete blood cell (CBC) count commonly reveals some degree of neutrophilic leukocytosis with bandemia.
- **Screening Blood test-** Screening blood tests to exclude other conditions may include the following – Hepatitis B surface antigen to detect hepatitis B
  - Anti-hepatitis C virus by Enzyme linked immunosorbent assay detects hepatitis C.
- **Liver function test:** In most patients, the aspartate aminotransferase (AST) level is moderately elevated, whereas the alanine aminotransferase (ALT) level is in the reference range or only mildly elevated.
- **Liver biopsy:** Useful in determining the presence or absence of cirrhosis.

- **Treatment:**

- **Cessation of alcohol intake:** Cessation of alcohol use is the mainstay of treatment of alcohol liver disease.
- **Liver Transplantation:** Orthotopic liver transplantation is widely used in patients with end-stage liver disease.
- **Hepatoprotective agents**
- **Antibiotics for other infection**

Rheumatoid Arthritis

- Rheumatoid arthritis (RA) is an autoimmune disease that results in a chronic, systemic inflammatory disorder that may affect many tissues and organs, but principally attacks flexible (synovial) joints.
- It can be a disabling and painful condition, which can lead to substantial loss of functioning and mobility if not adequately treated.

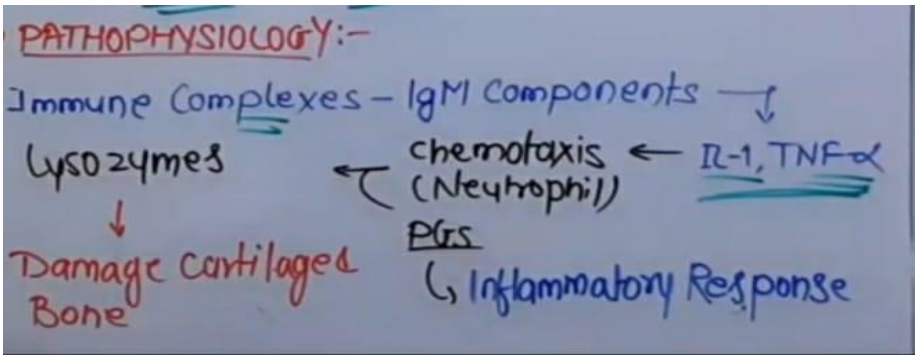
➢ **Etiology:**

- **Genetic factors:** Half of the risk of RA is believed to be genetic.
- **Infectious agents:** Numerous infectious agents have been suggested to cause the RA, including Mycoplasma organisms and rubella virus.
- **Other factors:** smoking is the most significant non-genetic risk with RA. RA is more common in smokers than non-smokers.
- **Immunological factors**: Rheumatoid arthritis occurs when immune system attacks the synovium, the lining of the membranes that surround joints.

➢ **Epidemiology**

It affects 1-3 % population world-wide. RA usually occurs between the age group 30-50 years old and women have high chances to develop RA as compare to men.

➢ **Pathophysiology**



➢ **Diagnosis**

- **Physical Exam:** To check joints for swelling, redness, warmth and also check reflexes and muscle strength.

- **Laboratory studies:**

  ESR

  C- Protein

  CBC

  RF factor Assay

- **Immunologic parameters:** Abnormal antibodies can be found in the blood of people with rheumatoid arthritis with simple blood testing.
- **X**-rays: X-rays of hand and feet are generally performed in people with a polyarthritis. It may be applicable to track the progression of Rheumatoid Arthritis.

➢ **Treatment**

- **NSAIDS:** NSAIDS can relieve pain and reduce inflammation. E.g. Aspirin, Fenoprofen, Piroxicam.
- **Steroids:** Corticosteroid medication such as prednisone, reduce inflammation and pain and slow joint damage.
- **TNF- inhibitors**: Tumor necrosis factor-alpha (TNF-a) is an inflammatory substance produced by body. TNF inhibitors can help to reduce pain, morning stiffness and tender or swollen joints. Examples include etanercept, infliximab.
- **Surgery**: If medication fail to prevent or slow joint damage, surgery requires repairing of damaged joints. Surgery may help restore ability to use joint.

Osteoporosis

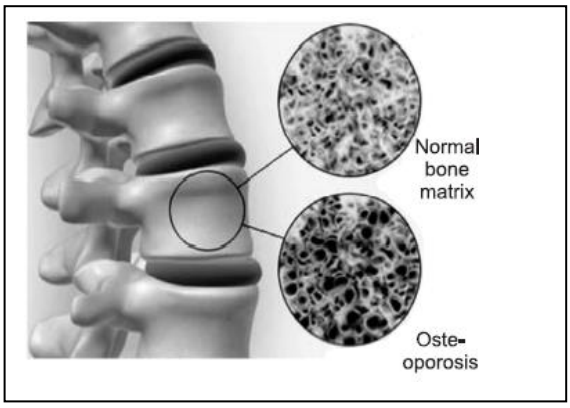
- Osteoporosis is a condition characterized by decreased in density of bone decrease in strength of bone and resulting in fragile bone.
- The inside of a healthy bone has small spaces, like a honeycomb. Osteoporosis increases the size of these spaces, causing the bone to lose strength and density.
- Osteoporosis can occur in people of any age, but it is more common in older adults, especially women.
- People with osteoporosis are at a high risk of fractures, or bone breaks, while doing routine activities such as standing or walking.

➢ **Causes**

- Long term use of high dose corticosteroids
- Family history of osteoporosis
- Poor nutrition
- Low body mass index (BMI)
- Physical inactivity
- Small boned frame

➢ **Risk factor**

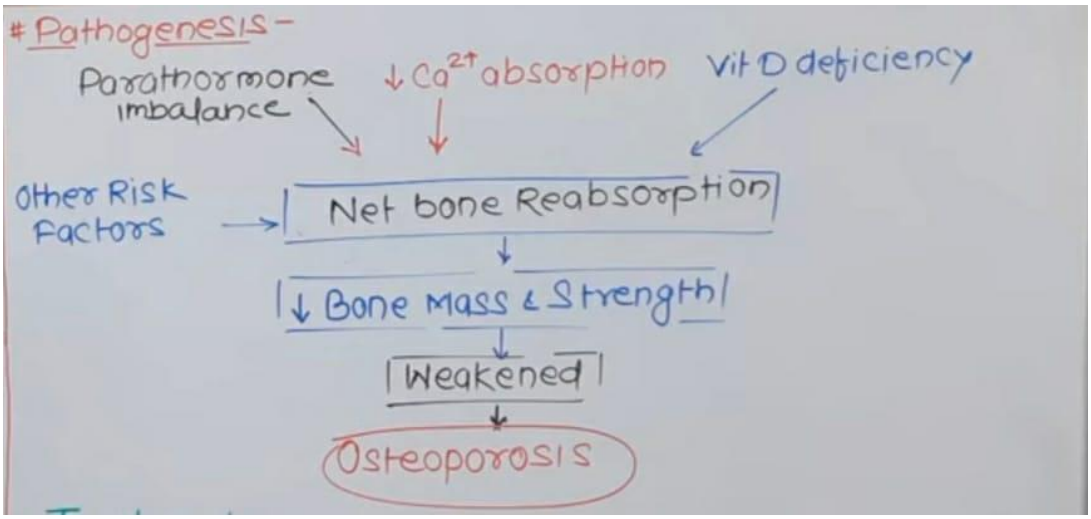
- Sex- Women >men
- Age- Older age> younger
- Race- White and Asian
- Family history
- Hormonal changes
- Dietary factors- Low calcium intake



➢ **Symptoms**

- Dull pain in the bones
- Loss of height over time
- Fracture at other sites, commonly the hip or bones of the wrist, usually result from a fall.

- **Pathophysiology**



- **Diagnosis**

- Diagnosis of osteoporosis begins with a careful family history of osteoporosis or a history of previous broken bones.
- Blood test are used to measure calcium, phosphorus, vitamin D, testosterone, and thyroid and kidney function.
- Bone mineral density test can measure bone density in various sites of the body.

- **Treatment**

- **Diet and Exercise:** Life style modification can reduce the chances of osteoporosis
- **Testosterone:** In men testosterone therapy may help to increase bone density.
- **Harmone therapy**: for women, estrogen can help to stop bone density loss.
- **Denosumab:** This drug reduces the bone loss
- **Teriparatide**: Stimulates bone growth

GOUT

- Gout is a metabolic disorder characterized by elevated serum uric acid levels and deposits of urate crystals in synovial fluids and surrounding tissues in joints.
- It is a type of arthritis that is characterized by sudden, severe attacks of joint pain with redness, warmth, and swelling in the affected area.

➢ **Epidemiology**

- Gout affects around 1–2% of the Western population at some point in their lifetimes, and is becoming more common.
- A number of factors have been found to influence rates of gout, including age, race, and the season of the year.

➢ **Causes**

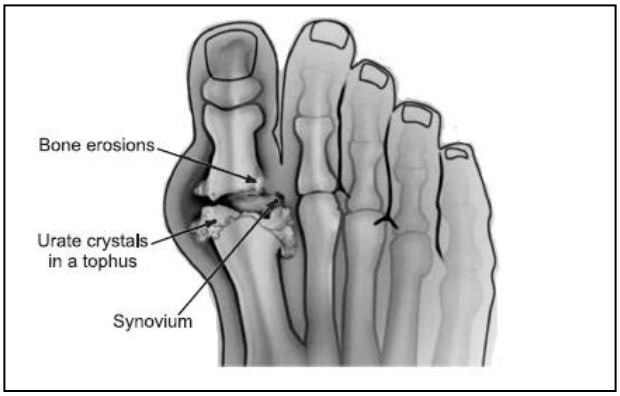
- Gout is caused initially by an excess of uric acid in the blood (hyperuricemia). Uric acid is produced in the body through the breakdown of purines specific chemical compounds that are found in certain foods such as meat, poultry and seafood.
- If too much uric acid is produced or not enough is excreted then it can build up and form the needle-like crystals that cause inflammation and pain in the joints and surrounding tissue.

➢ **Risk Factor**

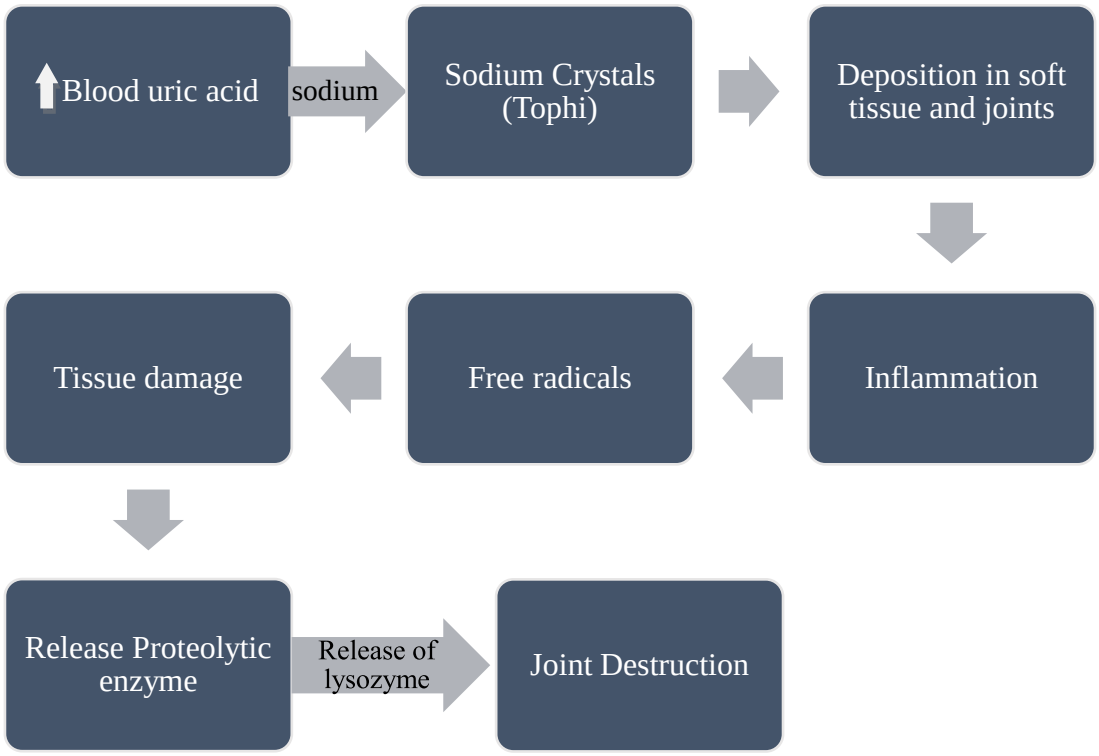
- **Age and gender:** Men produce more uric acid than women. But after menopause, the uric acid level in women is equal to men.
- **Genetics:** Family history of gout increases the chances of gout
- **Lifestyle factors:** Alcohol consumption interferes with the removal of uric acid form the body. Eating high purine diet also increases the amount of uric acid in the body.
- **Medication:** Certain drugs can increase the level of uric acid in the body.

➢ **Symptoms**

- Sever pain
- Bone erosion
- Redness and swelling in joints



➢ **Pathophysiology**



➢ **Diagnosis**

- **Joint fluid test:** Joint fluid test (arthrocentesis) is useful to see whether uric acid crystals are present.
- **Blood test:** To measure the uric acid level in blood.
- **Urine test:** A test to measure levels of uric acid in urine.
- **X-rays**: X-rays of extremities (hands and feet) are sometimes useful in the late stages of the disease.

- **Treatment:**

- **NSAIDs:** NSAIDs may control inflammation and pain in people with gout. NSAIDs include indomethacin, ibuprofen, naproxen**.**
- **Colchicine:** A type of pain reliever that effectively reduces gout pain, especially when started soon after symptoms appears.
- **Corticosteroids:** corticosteroids such as prednisone, may control gout inflammation and pain.
- **Medication that block uric acid production:** Xanthine oxidase inhibitors, including allopurinol and febuxostat, limit the amount of uric acid that body makes.

- **Prevention**

- Drinking 2-4 litres of fluid every day.
- Eat moderate amount of protein
- Limit daily intake of meat, fish and poultry

CANCER

- Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body.
- When cells in some area of body duplicate without control, the excess of tissue that develops called tumor or neoplasm.
- Tumors may be cancerous and sometime fatal or they may be quite harmless.
- A cancerous growth is called as malignant tumor or malignancy and noncancerous growth is called as benign growth
- The study of tumor is called oncology.

➢ **Epidemiology**

Cancer maybe caused by inherited genetic defects and certain viruses. All types of cancers are common, in that the cancer cells are abnormal and multiply out of control.

According to the National Cancer Registry Programme of the India Council of Medical Research (ICMR), more than 1300 Indians die every day due to cancer. Between 2012 and 2014, the mortality rate due to cancer increased by approximately 6%.

➢ Etiology:

- Environmental and life style factor -Cigarette, nutrition and other factor
- Infection- Hepatitis B and Hepatitis C can increase the chances of liver cancer
- Radiation- Exposure to radioactive materials can increase the risk of leukemia
- Genetic factors- Gene mutation is inherited from parents
- Age- older persons have a greater tendency to develop neoplasm.

➢ **Risk Factor and associated cancer**

Risk factor	Associated cancer
Male	Prostate, bladder, liver, testicle
Female	Breast, cervix, ovary, endometrium
Infection (STD)	Cervix, bladder
Hepatitis B	Liver
HIV	Connective tissue

Drug and hormone therapy	Bladder, skin, endometrium, breast, vagina
Reproductive history	Breast, ovary, endometrium
Family history	Breast, colon, lung, testicle, skin
Diet	Breast, colon, prostate
Obesity	Colon, endometrium
Cigarette smoking	Lung, bladder, mouth
Alcohol abuse	Breast, mouth, liver
Occupational exposure to carcinogen	Bladder, liver, lung, skin
Air pollution	Lung
Radiation (sunlight)	Skin

- **Classification of Cancer**

1. Classification by site of Origin

- Breast cancer
- Lung cancer
- Prostate cancer
- Renal cell carcinoma (kidney cancer)
- Oral cancer
- Brain cancer

2. Classification by Tissue types

- **Carcinoma** - This type of cancer originates from the epithelial layer of cells that form the lining of external parts of the body or the internal linings of organs within the body.
- **Sarcoma**: These cancers originate in connective and supportive tissues including muscles, bones, cartilage and fat. Bone cancer is one of the sarcomas termed as osteosarcoma.
- **Myeloma**: These originate in the plasma cells of bone marrow. Plasma cells are capable of producing various antibodies in response to infections
- **Leukemia**: This group of cancers are grouped within blood cancers. These cancers affect the bone marrow which is the site for blood cell production. When cancerous, the bone marrow begins to produce excessive immature white blood cells that fail to perform their usual actions and the patient is often prone to infection

- **Lymphoma**: These are cancers of the lymphatic system. Unlike the leukemias, which affect the blood and are called “liquid cancers”, lymphomas are “solid cancers”. These may affect lymph nodes at specific sites like stomach, brain, intestines etc.
- **Mixed types**: These have two or more components of the cancer. Some of the examples include mixed mesodermal tumor, carcinosarcoma, adenosquamous carcinoma and teratocarcinoma

➢ **Classification by Grade**

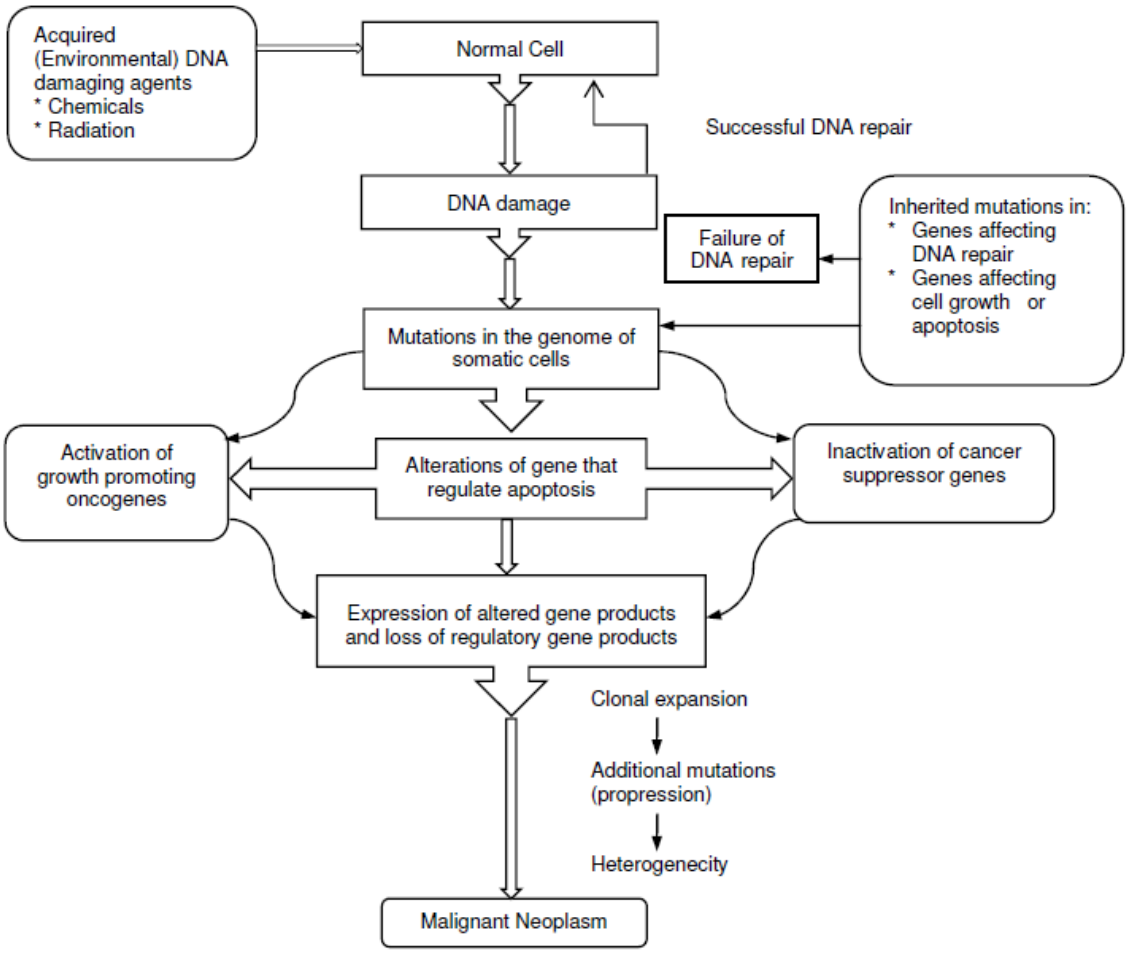
Cancers can also be classified according to grade. The abnormality of the cells with respect to surrounding normal tissues determines the grade of the cancer.

- Grade 1- Well differentiated cells with slight abnormality.
- Grade 2- Cells are moderately differentiated and slightly more abnormal.
- Grade 3- Cells are poorly differentiated and very abnormal
- Grade 4- Cells are immature and primitive and undifferentiated

➢ **Symptoms**- Symptoms depends on the type of cancer

- Coughing and chest pain due to lung cancer
- Weight loss
- Iron deficiency
- Anemia
- Pain due to nerve injury related to radiation of chemotherapy
- Bleeding
- Harmonal imbalances

➢ **Pathophysiology**



➢ **Diagnosis**

- **Physical exam**- Areas of body for lumps that may indicate a tumor Physical exam include looking for abnormalities, such as changes in skin colour or enlargement of an organ that may indicate the presence of cancer
- **Radiographic techniques:** X-rays, MRI and ultrasonography may be helpful to detect the tumor type, presence and location.
- **Laboratory analyses:** Urine test and blood test may help to identify abnormalities that can be caused by cancer. CBC, human chorionic gonadotropin (HCG)
- **Genetic testing:** Genetic markers include chromosomal alterations, specific gene defects may suggest and increased risk for some malignancies.
- **Tissue Biopsy and Surgery:** Methods that sample small pieces of tissue form a particular site is also helpful to determine the stage and grade of the neoplasm.

- **Treatment**

- **Surgery**: The goal of the surgery is to remove the cancer cells as much as possible.
- **Chemotherapy**: Chemotherapy uses drugs to kill cancer cells, The ideal chemotherapeutic agent would target cancer cells while sparing normal cells.
- **Radiation therapy**: Radiation therapy uses high-powered energy beams, such as X-rays to kill the cancer cells
- **Gene therapy**: synthetic nucleotide strands to bind defective segments of cellular DNA

- **Prevention**

- Eating healthy diet
- Exercising regularly
- Limiting alcohol
- Minimizing exposure to radiation and toxic chemicals
- Not smoking or chewing tobacco
- Reducing sun exposure