Inflammatory bowel diseases

Inflammatory bowel disease (IBD) is a broad term used to describe disorders that involve chronic inflammation of your digestive tract.

Many diseases are included in this IBD term. The two most common diseases are:

- **Ulcerative colitis:** This condition causes long-lasting inflammation and injury in the innermost lining of your large intestine (colon) and rectum.
- **Crohn's disease**: Injury occurs anywhere between the mouth and the anus and in all layer of digestive tract.

Cause

- Age
- Race
- Family history
- Cigarette smoking
- Alcohol drinking
- Nonsteroidal anti-inflammatory medications
- The immune system
- Spicy food

Symptoms

- Diarrhoea, which occurs when affected parts of the bowel can't reabsorb water
- Bleeding Ulcer, which may cause blood to show up in the stool.
- Stomach pain
- Cramping
- Bloating due to bowel obstruction
- Weight loss and anemia, which can cause delayed growth or development in children

Diagnosis

- Stool sample and blood test
- Barium enema
- Colonoscopy
- Endoscopy
- X-ray
- Ultra sound
- Computerized tomography (CT) scan
- Magnetic resonance imaging (MRI)

Treatment

- Anti-inflammatory drugs: Sulfasalazine, tofacitinib
- Immune system suppressors: Azathiprine, Cyclosporine
- Antibiotics: Amoxicillin
- Anti-diarrheal medications: Loperamide
- Pain relievers: Acetaminophen
- Iron supplements
- Life style modification: Quit smoking and alcohol use.
- Surgery

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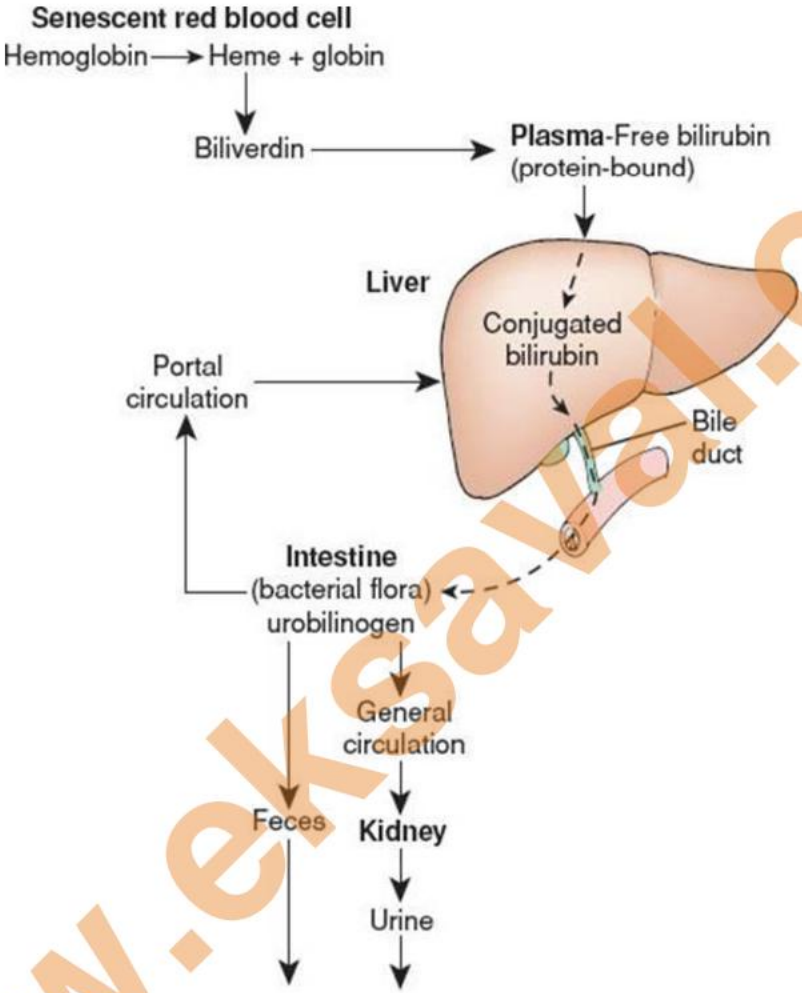
Jaundice

"Jaundice" is the medical term that describes yellowing of the skin and eyes. Jaundice itself is not a disease, but it is a symptom of many illnesses. It occurs when liver is not functioning properly and the level of bilirubin rises above normal level in the body.

Pathophysiology

Bilirubin is a yellow pigment that is created by the breakdown of dead red blood cells in the liver. Normally, the liver removes bilirubin along with old red blood cells but sometime this bilirubin does not get excreted from the kidney and their level rises above the normal value, thus causing yellowing of skin and eyes.



Cause

- **Acute inflammation of the liver:** This may impair the ability of the liver to conjugate and secrete bilirubin, resulting in rise in level.
- **Inflammation of the bile duct:** This can prevent the secretion of bile and removal of bilirubin, causing jaundice.
- **Obstruction of the bile duct:** This prevents the liver from removing of bilirubin.
- **Hemolytic anemia:** The production of bilirubin increases when large quantities of red blood cells are broken down.
- **Gilbert's syndrome:** This is an inherited condition that impairs the ability of enzymes to process the excretion of bile.
- **Cholestasis:** This interrupts the flow of bile from the liver. The bile containing conjugated bilirubin remains in the liver instead of being excreted.

Symptoms

- A yellow tinge to the skin and the whites of the eyes, normally starting at the head and spreading down the body
- pale stools

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- dark urine
- itchiness
- fatigue
- abdominal pain
- weight loss
- vomiting
- fever

Diagnosis

- **Bilirubin tests:** A high level of unconjugated bilirubin compared to levels of conjugated bilirubin suggest hemolytic jaundice.
- **Full blood count (FBC), or complete blood count (CBC):** This measures levels of red blood cells, white blood cells, and platelets.
- **Hepatitis A, B, and C tests:** This test is to detect a range of liver infections.

Treatment

- If alcoholic beverages are the cause of the liver disease, stopping drinking alcohol.
- If anemia occurs, the treatment might include a blood transfusion.
- Removal of the gallstone.
- Chemotherapy- Antiviral medicines
- New-born's get some sunlight exposure to increase vitamin D production and clear the bilirubin.

Hepatitis

Hepatitis refers to an inflammatory condition of the liver. It's commonly caused by a viral infection, but there are other possible causes of hepatitis.

Types of hepatitis

- Hepatitis A
- Hepatitis B
- Hepatitis C
- Hepatitis D
- Hepatitis E

Hepatitis A

Hepatitis A is a highly contagious liver infection caused by the hepatitis A virus (HAV).

Cause

Hepatitis A is caused by a virus that infects liver cells and causes inflammation.

Hepatitis A virus can spread by:

- Eating food handled by someone with the virus who doesn't thoroughly wash his or her hands after using the toilet
- Drinking contaminated water
- Eating raw shellfish from water polluted with sewage containing hepatitis virus A.
- Being in close contact with a person who's infected — even if that person has no signs or symptoms
- Having sex with someone who has the virus

Symptoms

- Fatigue
- Sudden nausea and vomiting
- Abdominal pain or discomfort, especially on the upper right side beneath your lower ribs (by your liver)
- Clay-colored bowel movements
- Loss of appetite
- Low-grade fever

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- Dark urine
- Joint pain
- Yellowing of the skin and the whites of your eyes (jaundice)
- Intense itching

Diagnosis

Blood tests are used to look for signs of the hepatitis A virus in your body.
A liver biopsy: This can measure the extent of liver damage and the possibility of cancer.

Treatment

- No specific treatment exists for hepatitis A.
- Symptomatic treatment is done.
- Avoid alcohol use

Hepatitis B

It is the most common cause of hepatitis infection.

Causes

Hepatitis A is a highly fatal liver infection caused by the hepatitis B virus (HBV).

- Sexual contact.
- Sharing of needles.
- Accidental needle sticks.
- Mother to child.
- contact with infectious body fluids, such as blood, vaginal secretions, or semen

Symptoms

Same as that of Hepatitis A

Diagnosis

Same as that of Hepatitis A

Treatment

- **Antiviral medications-** tenofovir, lamivudine
- **Interferon injections.** Interferon alfa-2b (Intron A) is a man-made version of a substance produced by the body to fight infection.
- **Liver transplant.** If your liver has been severely damaged, a liver transplant may be an option.

Hepatitis C

Hepatitis C is a viral infection that causes liver inflammation, sometimes leading to serious liver damage.

Causes

Hepatitis C infection is caused by the hepatitis C virus.
It is spread by:

- Sharing injection drugs and needles
- Having sex, especially if you have an STD, an HIV infection, several partners, or have rough sex
- Being stuck by infected needles
- Birth -- a mother can pass it to a child
- Sharing personal care items like toothbrushes, razor blades, and nail clippers
- Getting a tattoo or piercing with unclean equipment

Symptoms

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Same as that of Hepatitis A

Diagnosis
Same as that of Hepatitis A

Treatment

- **Antiviral medications-** tenofovir, lamivudine
- **Interferon injections.** Interferon alfa-2b (Intron A) is a man-made version of a substance produced by the body to fight infection.
- **Liver transplant.** If your liver has been severely damaged, a liver transplant may be an option.

Hepatitis D

Hepatitis D, also known as the hepatitis delta virus, is an infection that causes the liver to become inflamed. This swelling can impair liver function and cause long-term liver problems, including liver scarring and cancer.

Cause
It was caused by a small spherical enveloped *hepatitis D virus* (*HDV*). HDV is considered to be a subviral satellite because it can propagate only in the presence of the **hepatitis** B virus (HBV) It means first patient get sick with hepatitis B first, then later come down with *hepatitis D virus.*
It can be transmitted through:

- urine
- vaginal fluids
- semen
- blood
- birth (from mother to her newborn)

Symptoms
Same as that of Hepatitis A

Diagnosis
Same as that of Hepatitis A

Treatment

- There is currently no specific treatment for hepatitis D infection. Antivirals used to treat hepatitis B have little effect on hepatitis D.
- Practice safer sex
- Injecting drug users should never share injecting equipment.

Hepatitis E

Hepatitis E is a potentially serious acute disease.

Cause
It is caused by the hepatitis E virus (HEV). It is spread by:

- It is spreads through faeces
- Poor handwashing habits after using toilet.
- Dirty water containing faeces.
- undercooked meat from infected animals, such as pigs
- Raw sea foods.

Symptoms

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Same as that of Hepatitis A

Diagnosis

Same as that of Hepatitis A

Treatment

- No specific treatment exists for hepatitis E.
- Symptomatic treatment is done.
- Avoid alcohol use
- Wash your hand after using toilet
- Drink clean water

Alcoholic liver disease

These diseases are caused by the excessive use of alcohol by individual.

Types

- Fatty liver
- Alcoholic hepatitis
- Fibrosis
- Cirrhosis of liver

Fatty Liver

Drinking a large volume of alcohol can cause fatty acids to deposit in the liver. There are normally no symptoms, and this is a reversible process in which the fatty acid deposition is reduced if patient stops heavy alcohol drinking.

Alcoholic hepatitis

Continued alcohol use will lead to ongoing liver inflammation. This can occur after many years of heavy drinking.

Fibrosis

Fibrosis is a formation of certain types of protein in the liver, including collagen. Mild-to-moderate forms of fibrosis may be reversible. Continuous fibrosis and inflammation can lead to liver cancer.

Cirrhosis of liver

Cirrhosis occurs when the liver has been inflamed for a long time. It occurs by the replacement of the normal hepatic parenchyma with extensive thick bands of fibrous tissue and regenerative nodules leading to scarring and loss of function. This can be a life-threatening condition. Cirrhosis damage is irreversible, but the patient can prevent further damage by continuing to avoid alcohol.

Sign and Symptoms

Fatty Liver

There is no clear sign and symptoms

- a poor appetite
- weight loss
- abdominal pain
- physical weakness
- fatigue
- confusion

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Alcoholic hepatitis

- Anorexia
- Weight loss
- Hepatic failure
- Jaundice
- Fever

Fibrosis

- Pain in the abdomen
- Nausea and vomiting
- Diarrhoea
- Decreased appetite

Cirrhosis of liver

- Jaundice, or a yellow tint of the whites of the eyes and the skin
- oedema, or swelling of the lower limbs
- A buildup of fluid in the abdomen, known as ascites
- Fever and shivering
- Extremely itchy skin
- Fingernails that curve excessively, known as clubbing
- Losing a significant amount of weight
- General weakness and wasting muscles
- Blood in vomit and stools
- Bleeding and bruising more easily

Diagnosis

- **Physical Examination-** Skin, Jaundice, Muscle wasting, Hepatomegaly, Splenomegaly
- **Laboratory Findings-** Hyperbilirubinemia, Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels elevated, usually < 300 U/L, Anemia, Elevated blood ammonia level

Treatment

- Medications: Corticosteroids, Calcium channel blockers, Insulin, Antioxidant supplements, and S-adenosyl-L-methionine (SAMe).
- Nutritional Counselling**:** Stop alcohol and start taking balanced-diet.
- Extra protein: Patients often require extra protein in certain forms to help reduce the likelihood for developing liver disease.
- Liver Transplant**:** The patient may stop taking alcohol for at least six months before they are considered as a candidate for liver transplant.

Rheumatoid Arthritis

Rheumatoid arthritis (RA) is an autoimmune disease that can cause joint pain and damage throughout your body. The joint damage that RA causes usually happens on both sides of your body. So if a joint is affected in one of your arms or legs, the same joint in the other arm or leg will probably be affected, too.

Cause

Rheumatoid arthritis occurs when immune system start producing antibodies which attacks the synovium — the lining of the membranes that surround your joints. This results in redness, pain and swelling of synovium, which can eventually destroy the cartilage and bone within the joint. The tendons and ligaments that hold the joint together weaken and stretch. Gradually, the joint loses its shape and alignment.

Pathophysiology

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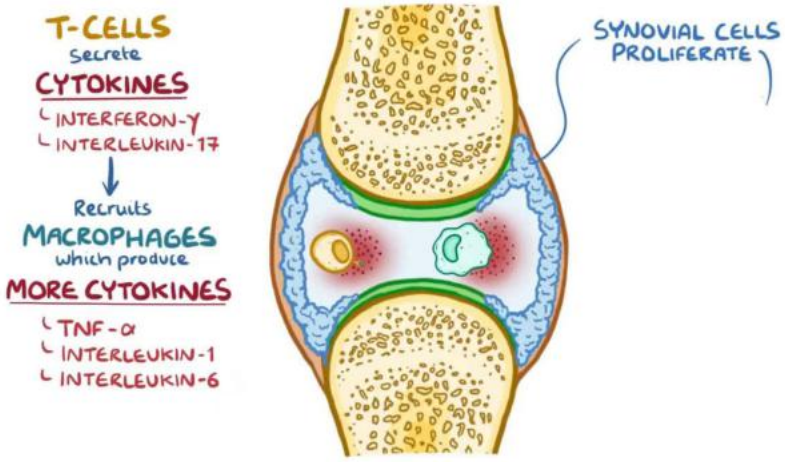
Thus the production of more cytokines may lead to damage of wall of synovial joints causing pain at joint



Symptoms

- Tender, warm, swollen joints
- Joint stiffness that is usually worse in the mornings and after inactivity
- Fatigue, fever and loss of appetite

Diagnosis

Rheumatoid factor test: This blood test checks for a protein called rheumatoid factor.
Antinuclear antibody test: This tests your immune system to see if it's producing antibodies.
Erythrocyte sedimentation rate: This test helps determine the degree of inflammation in your body.
C-reactive protein test: A severe infection or significant inflammation anywhere in your body can trigger your liver to make C-reactive protein.

Treatment

Treatments may include:

- Medications- Fish oil, Plant oils
- Alternative or home remedies-Exercise regularly, Apply heat or cold, Relax
- Dietary changes- vitamins A, C, and E as anti-oxidant.
- Specific types of exercise
- Surgery-Tendon repair, Joint fusion, Total joint replacement

Osteoporosis

Osteoporosis is a bone disease. Its name comes from Latin for "porous bones." Osteoporosis increases the size of pores in the bones, causing the bone to lose strength and density. In addition, the outside of the bone grows weaker and thinner.

Cause

- **Gender-** Risk of developing osteoporosis is more in female
- **Age-** The older you get, the greater your risk of osteoporosis.
- **Race-** White or Asian has greater chance of developing osteoporosis.
- **Family history-** parent or sibling with osteoporosis puts you at greater risk
- **Body frame size-** Small body frame size will develop rapid osteoporosis as there skeleton system is quit thin.
- **Sex hormones-** Lower level of hormone estrogen in female may cause greater risk of

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osteoporosis.

Pathophysiology

Osteoblasts are the cell which helps in building up of bones, while Osteoclasts are the cell which helps in removing calcium from bone. A balance is maintained between both these cells, as the age progress the level of osteoclast increases and the removal of calcium and minerals from the bone increases thus making the bone porous and brittle.

Symptoms

- Back pain, caused by a fractured or collapsed vertebra
- A stooped posture
- A bone fracture that occurs much more easily than expected

Diagnosis

Bone density can be measured by a machine that uses low levels of X-rays to determine the proportion of mineral in your bones.

Treatment

- **Bisphosphonates-** Bisphosphonates are used to prevent the loss of bone mass (alendronate, ibandronate)
- **Hormone replacement therapy-** Testosterone in males, estrogen in female.
- **Teriparatide:** This drug is also taken by injection and stimulates bone growth.
- Diet rich in calcium and vitamin D
- Don't smoke
- Avoid excessive alcohol
- Prevent falls
- Soy protein

Gout

Gout is a form of arthritis caused by excess uric acid in the bloodstream. This occurs due to problem in the joints. The symptoms of gout are due to the formation of uric acid crystals in the joints causing pain.

Cause

Gout occurs when uric acid crystals accumulate in your joint, causing the inflammation and intense pain of a gout attack.

Pathophysiology

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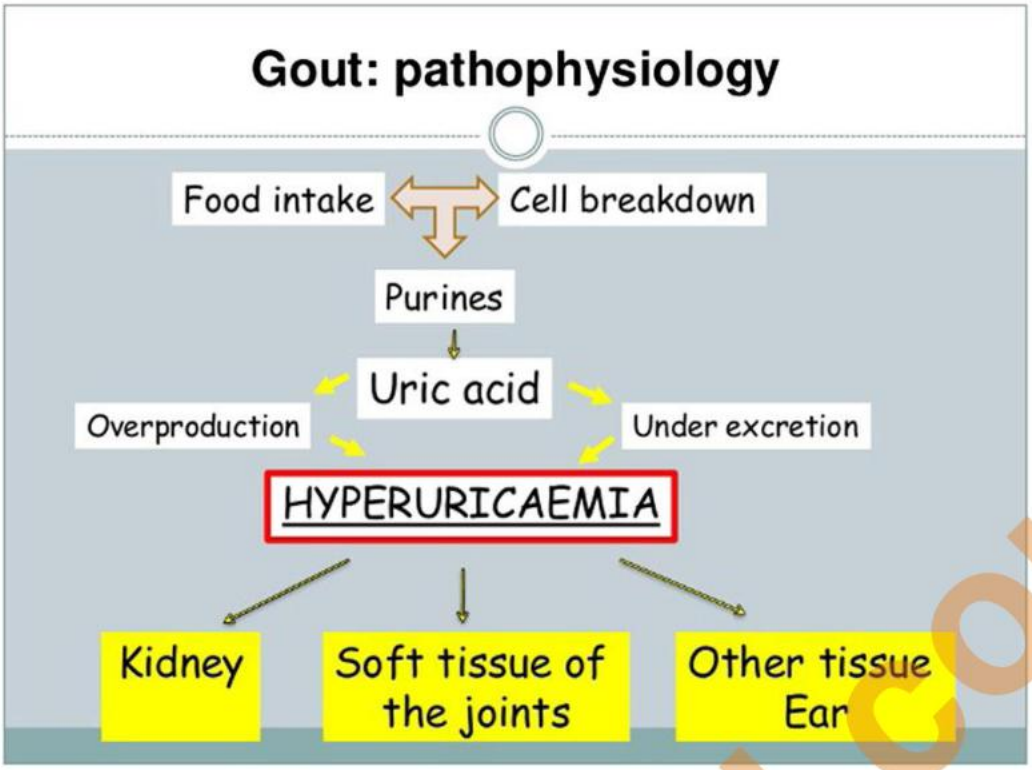

The excess uric acid formed get deposit in joints in the form of crystals combines with sodium thus causing the recruitment of granulocytes that engulfs the uric acid crystals, which generates the free radicals, these free radical damages the joint and other soft tissue.

Symptoms

- Intense joint pain
- Lingering discomfort
- Inflammation and redness
- Limited range of motion
- Kidney stones

Diagnosis

- Joint fluid test.
- Blood test.
- X-ray imaging.
- Ultrasound.

Treatment

- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Colchicine
- Corticosteroids.
- Allopurinol- reduce uric acid production
- Diuretics.
- Reduce protein intake.

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Cancer

Cancer is a disease characterised by uncontrolled multiplication and spread of abnormal forms of the body's own cells.

Classification

There are hundreds of different cancers, which are grouped into six major categories:

- Carcinoma
- Sarcoma
- Myeloma
- Leukemia
- Lymphoma
- Mixed Types

Carcinoma

Carcinoma refers to a malignant neoplasm of epithelial cells which are found in the outer covering of skin, breast, pancreas, and other glands.

Sarcoma

Sarcoma refers to cancer that originates in supportive and connective tissues such as bones, tendons, cartilage, muscle, and fat. Example Osteosarcoma (bone), Leiomyosarcoma (smooth muscle) Rhabdomyosarcoma (skeletal muscle).

Myeloma

Myeloma is cancer that originates in the plasma cells of bone marrow. The plasma cells produce some of the proteins found in blood.

Leukaemia

Leukaemia's ("liquid cancers" or "blood cancers") are cancers of the bone marrow, the disease is often associated with the overproduction of immature white blood cells. These immature white blood cells do not perform as well as they should, therefore the patient is often prone to infection.

Lymphoma

Lymphomas develop in the glands or nodes of the lymphatic system (specifically the spleen, tonsils, and thymus). Lymphomas may also occur in specific organs such as the stomach, breast or brain. These lymphomas are referred to as extranodal lymphomas.

Mixed Types

The type components may be within one category or from different categories. Some examples are:

- adenosquamous carcinoma
- mixed mesodermal tumor
- carcinosarcoma
- teratocarcinoma

Pathogenesis of cancer cells

There four characteristics that distinguish them from normal cells. These are:

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- **Uncontrolled division-** thus due to problem in growth factors, intracellular signalling pathways, DNA polymerase cells starts dividing in uncontrolled manner.
- **Dedifferentiation and loss of function-** after the cell division cell matures and then again it divides in daughter cell but in cancer cells after the cell division the cell does not mature and starts dividing so large number of undeveloped cells are formed and they are unable to perform any function, thus the function is lost.
- **Invasiveness-** Normally every cell survive in his own environment example hepatocyte cells survive or form liver they will die if we transfer them to lungs but cancer cells develop another properties i.e they divide and enter in the neighbouring organs and they survive there also.
- **Metastasis-** Metastases are secondary tumours ('secondaries') formed by cancerous cells that have been released from the initial or primary tumour and reached other part/organ of the body through blood vessels.

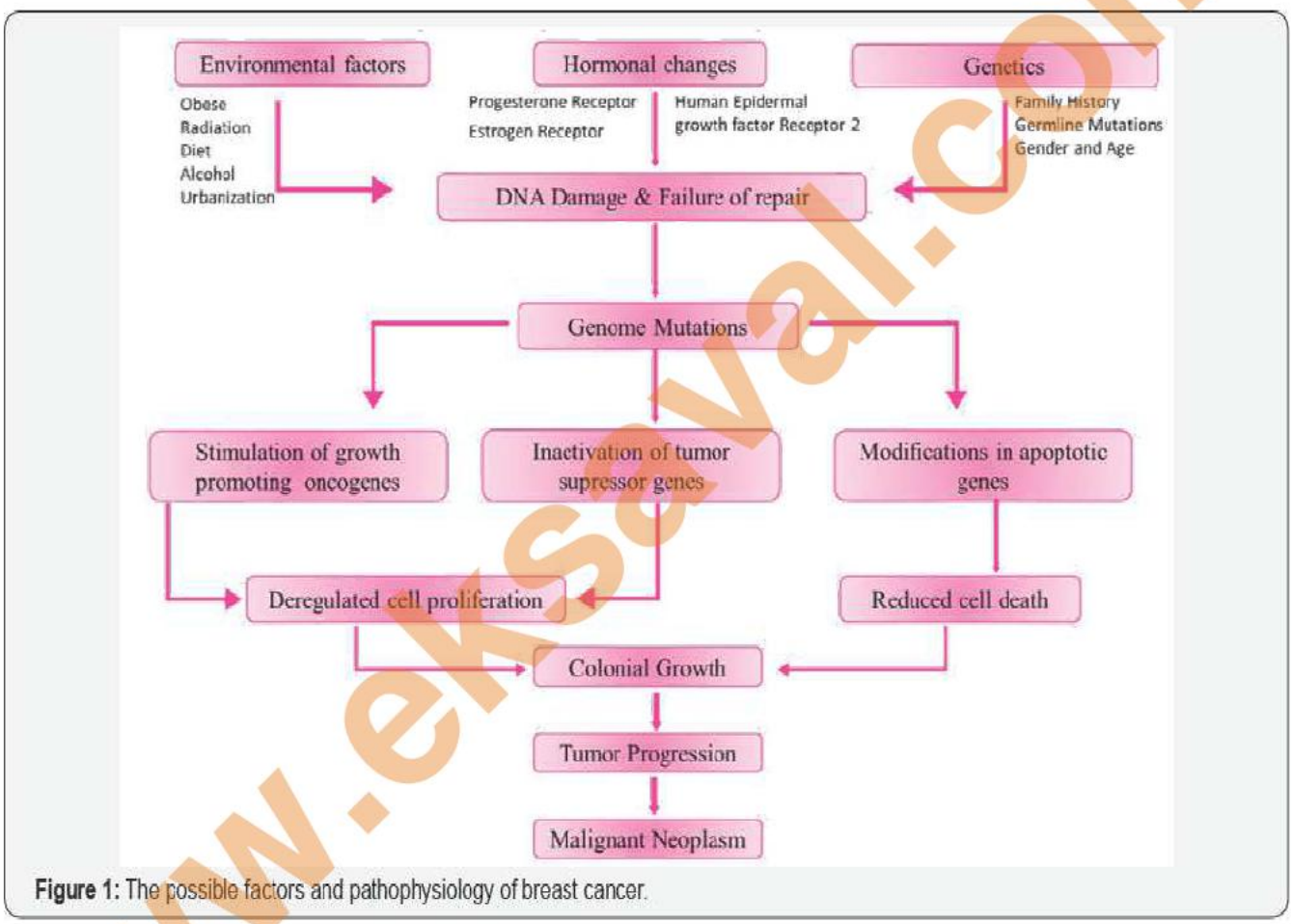

Figure 1: The possible factors and pathophysiology of breast cancer.

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Cause/aetiology

1. Epidemiologic factors

a) Familial and genetic factors
   i. Risk of developing first degree relatives of cancer patient is 3 times higher as compare to control.
   ii. Genetic cancer comprise not greater than 5 % of all cancer.

b) Racial and geographic factors:-
   i. White Europeans and Americans have more Lungs, breast and colon cancer; Breast cancer common in Americans but uncommon in Japanese and Africans.
   ii. Skin, penis, cervix and liver cancer in Japanese is 5 times higher than that of the stomach cancer.

c) Environmental and cultural factors:-

i. Cigarette smoking: Risk of developing cancer in Lungs
ii. Cancer of cervix: age at first coitus, frequency of coitus, multiplicity of partners.
iii. Betel nut cancer: common in some part of India due to habitual of keeping the bolus of pann in particular place of mouth for a long time.

d) Age and gender
i. Age is most significant factor for cancer (two-third of all cancer occur above 65 yr of age).
ii. Breast cancer: throughout the world common for women.
iii. Lung cancer: common for men

2. **Hormonal factor**
   - Hormone sensitive tissues developing tumour are the breast, endometrium, myometrium, vagina, thyroid, liver, prostate and testis.
   - Oestrogen therapy increases the risk of developing endometrial carcinoma.
   - Oral contraceptives increase the risk of developing breast cancer.
   - Anabolic steroids increase the risk of developing benign and malignant tumours.
3. **Chemical factors**
   - Benzene, beryllium, asbestos, vinyl chloride, and arsenic are known as human carcinogens
4. **Physical factors**
   - Ionising radiation • X-rays, α-, β- and γ rays
   - Ultraviolet light UV light is sunlight, UV lamp and welder's arcs
   - Radiation-, radioactive isotopes, protons and neutrons can cause cancer
   - Asbestos: Mining and cutting of asbestos sheet leads to spreading of asbestos powder thus causing risk of cancer after long term exposure.
5. **Viral factor**
   - Viral infection is responsible for 20% of human cancer worldwide – RNA retrovirus HTLV-I
6. **Alcohol factor**
   - Cancer is induced by alcohol abuse eg. Mouth cancer, Pharyngeal cancer (upper throat), Oesophageal cancer (food pipe), and Laryngeal cancer (voice box).
7. **Obesity Factor**
   - 49 % of endometrial cancers are caused by excess body fat.
8. **Unprotected sex**
   - Cancer is induced by HIV virus that's transmitted through sexual contact -- genital or oral.

General Symptoms

1. Unexplained weight loss
2. Fever
3. Fatigue
4. Pain
5. Weakness

Specific symptoms

1. Skin changes and tumour formation (Skin Cancer)
2. Injury that do not heal (Skin Cancer)
3. White patches inside the mouth or white spots on the tongue (Mouth Cancer)

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4. Unusual bleeding or discharge or severe cough (Lung Cancer)
5. Thickening or lump in the breast or other parts of the body (Breast Cancer)
6. Indigestion or trouble swallowing/ Injury in stomach (Stomach or oesophagus cancer)

Diagnosis

- **Physical exam-** Doctor may feel areas of your body for lumps that may indicate a tumour. During a physical exam, he or she may look for abnormalities, such as changes in skin colour or enlargement of an organ, that may indicate the presence of cancer.
- **Laboratory tests.** Laboratory tests, such as urine and blood tests, may help your doctor identify abnormalities that can be caused by cancer. For instance, in people with leukaemia, a common blood test called complete blood count may reveal an unusual number or type of white blood cells.
- **Imaging tests.** Imaging tests allow doctor to examine your bones and internal organs in a non-invasive way. Imaging tests used in diagnosing cancer may include a computerized tomography (CT) scan, bone scan, magnetic resonance imaging (MRI), positron emission tomography (PET) scan, ultrasound and X-ray, among others.
- **Biopsy.** During a biopsy, doctor collects a sample of cells for testing in the laboratory. In the laboratory, doctors look at cell samples under the microscope. Normal cells look uniform, with similar sizes and orderly organization. Cancer cells look less orderly, with varying sizes and without apparent organization.

Treatment

1. **Anticancer Medicine-** Vincristine, Cisplatin, 5-fluorouracil
2. **Surgery**

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