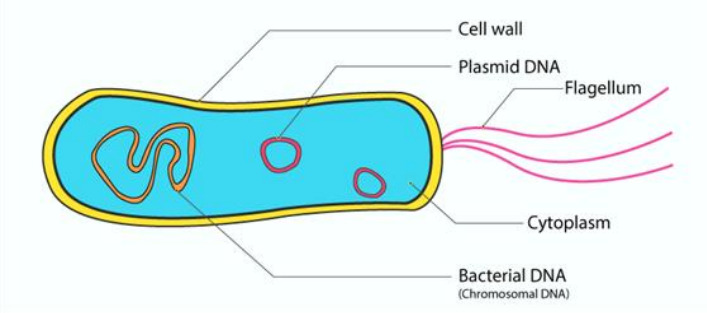
Disease - 01

Diseases & its Type Factors

Disease, any harmful deviation from the normal structural or functional state of an organism, generally associated with certain signs and symptoms and differing in nature from physical injury. A diseased organism commonly exhibits signs or symptoms indicative of its abnormal state.The study of disease is called pathology.

Bacteria

Bacteria are unicellular organisms belonging to the prokaryotic group where the organisms lack a few organelles and a true nucleus.



Classification of Bacteria

Bacteria can be classified into various categories based on their features and characteristics. The classification of bacteria is mainly based on the following:

- Shape

- Composition of the cell wall
- Mode of respiration
- Mode of nutrition

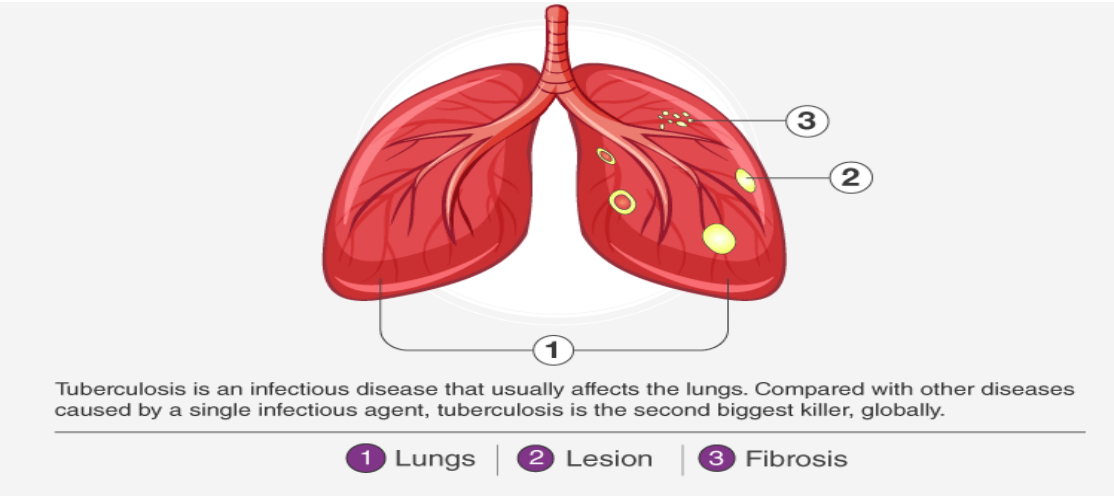
Classification of bacteria based on Shape

Type of Classification	Examples
Bacillus (Rod-shaped)	Escherichia coli (E. coli)
Spirilla or spirochete (Spiral)	Spirillumvolutans
Coccus (Sphere)	Streptococcus pneumoniae
Vibrio (Comma-shaped)	Vibrio cholerae

They are responsible for many of the infectious diseases like pneumonia, tuberculosis, diphtheria, syphilis, tooth decay. Their effects can be rectified by taking antibiotics and prescribed medication.

TB(Tuberculosis)

Tuberculosis (TB) is a dangerous and highly contagious bacterial disease caused by Mycobacterium tuberculosis. It primarily affects the lungs, but if left untreated, it might spread to different parts of the body.



Types of Tuberculosis (TB)

There are two different types of tuberculosis:

- Pulmonary Tuberculosis.

- Extra pulmonary Tuberculosis.

Pulmonary Tuberculosis

It is an endemic infection affecting the lungs. It is further classified into:

- **Primary Tuberculosis Pneumonia**: Associated symptoms include coughing and high fever. It can also arise in patients with HIV/AIDS.
- **Miliary Tuberculosis**: This form of TB is named so because of a distinctive pattern seen on a chest radiograph, where many small spots are distributed throughout the lung fields, bearing an appearance similar to millet seeds. The infection can eventually spread to the extra pulmonary organs, such as the spleen, liver, and kidneys.
- **Latent Tuberculosis Infection**: This infection is mainly seen in those patients having the bacteria within their body, but does not display any of the symptoms of the disease. This infection is primarily detected through the tuberculin skin test.

Extra pulmonary Tuberculosis

It is usually seen in immune compromised patients. There are several types:

- Tuberculosis Meningitis
- Osteal Tuberculosis
- Lymph Node Disease
- Renal Tuberculosis
- Adrenal Tuberculosis.

Symptoms of Tuberculosis

TB bacteria or Mycobacterium tuberculosis multiply once it gets into the lungs. It can cause severe symptoms such as:

- Coughing up blood and mucus from deep inside the lungs
- A bad cough that lasts three weeks or longer.
- Weakness or fatigue.
- Sweating at night.
- Pain in the chest.
- Weight loss.
- No appetite.
- Chills and Fever.

Treatment for Tuberculosis

Drug treatment is one of the most efficient ways to treat this infectious disease. For patients with Latent TB infections, doctors generally prescribe an antibiotic called isoniazid for preventing the latent infection from becoming active.

Active TB Diseases will be deadly if left untreated. The procedure involved is taking a combination of ethambutol, INH, priftin and pyrazinamide for a term of three months, followed by a mix of INH and pyrazinamide for 12 months.

Cholera

Cholera is a bacterial disease caused by the bacterium 'Vibrio Cholerae'. This type of bacteria is usually present in contaminated foods. It is also found in places where there is a lack of sanitation facilities.
If this disease is left untreated, it might cause severe diarrhoea and would lead to dehydration in the body. Sometimes it might lead to a fatal condition.

Causes of Cholera

- It is caused due to factors like contaminated water supply.
- It arises due to the consumption of contaminated foods and drinks which are sold by the street sellers.
- The vegetables that are grown with the use of water with human wastes.
- The contaminated sea-foods, which are polluted with sewage.
- Caused by the consumption of foods that affect the digestive system.

Symptoms of Cholera

Some of the symptoms of Cholera are listed below-

- High fever.
- Weight loss.
- Increased thirst.
- Feeling of Nausea.
- Vomiting sensation.
- A kind bloating in the belly.
- Blood pressure becomes low.
- The elasticity of the skin is lost.
- Develop cramps in the muscles.
- A rapid increase in the heart rate.
- Dryness in the mouth, nose, and eyelids.
- Formation of blood or mucus or sometimes undigested materials in the stool.

The treatment for cholera includes replacement of lost fluid and electrolytes. Drinking plenty of ORS (Oral rehydration solution) is advised to prevent dehydration. If the condition worsens, intravenous fluid replacement may be required. Doctors may prescribe antibiotics and Zinc supplements to check diarrhea.

The most important thing that one could do to avoid the disease is to prevent it. Cholera could be prevented by:

- Drink water which is boiled.
- Avoid consumption of raw foods.
- Avoid dairy products as much as possible.
- Wash fruits and vegetables before you eat.
- Washing your hands before you eat is a good way to keep the disease away.
- Drink plenty of water and it is recommended to drink about 8 ounces of water every day

Typhoid

Typhoid is an infectious bacterial disease that mainly spreads through contaminated food or water. It can also spread due topoor hygienic conditions. The major symptoms of this disease are characterized by high fever, loss of appetite and diarrhoea. **Salmonella typhi** is the bacterium responsible for this disease and humans are the only carriers.

Causes Of Typhoid

Also called as "Salmonella enterica serotype Typhi", this microbe is the causative agent for this disease. It is a gram-negative bacteria characterized by a thin cell wall and an outer membrane. The cells are reddish in colour, with some having black stains in the centre.

It is rod-shaped and grows in the small intestine of the human body. Human beings are the main hosts of these bacteria. This type of species can survive in environments which are rich in oxygen and also, they are found in sewage, water bodies and some eventually make their own on to food.

The bacteria enter the human body through the contaminated foods and water, where it then enters into the intestinal cells of the human body. Later, it passes through the bloodstream and destroys the lymphatic system and spreads throughout the body. This bacterium is mainly carried by the white blood cells present in the liver and also the bone marrow. There, they multiply and re-enter the blood cells, which in turn, causes a number of symptoms to appear in the later stages.

Symptoms of Typhoid

- Weakness
- Loss of Appetite
- Abdominal Pain
- Diarrhea
- Ulcers
- Constipation
- Headaches
- High Fever
- Dehydration
- Skin rashes

Treatment for Typhoid

Sanitation is one of the most important things that one can do to prevent the infection of such diseases. The other way would be the use of antibiotics that can kill the disease-causing germs. Also by maintaining good and hygienic food habits, one can get rid of diseases easily.

Plague

It is an old infectious disease that prevailed from medieval times in the 13th century that took millions of lives in Europe. Hence It got the name as '**Black Death**'.Plague disease is a deadly contagious disease

which spreads from person to person through the air or by any other means of contact. This disease is still in existence in some of the countries like South America, Africa, and many other countries.

Causes of Plague

Plague is caused by various means of contacts resulting in widespread of the disease.

- It is caused by means of sneezing.
- Consumption of contaminated foods or water.
- By touching the soil or any surface that is contaminated.
- It is even caused by direct physical contact with the infected person.
- Bite from the insects which have previously fed on infected animals like a rat, squirrel, rodents, etc.

Symptoms of Plague

The signs and symptoms of Plague differ with the types and days of infection.
Listed below are the few serious symptoms of Plague.

- Fever
- Nausea
- Seizures
- Diarrhoea
- General weakness
- Vomiting sensation
- Frequent headaches
- Breathing problems
- Swelling in the joints
- Muscle and joint pains
- Pain in the abdomen region
- Severe cough with pain in the chest region.

Treatment for the Plague

As mentioned earlier, the plague is a life-threatening infection, which requires urgent care and treatment. The basic treatments for this disease require effective use of antibiotics regularly as this is a deadly kind of disease and good precautionary measures need to be applied to stop the spreading of this disease.

DPT

DPT vaccine is a combination of three vaccines that helps to protect against three infectious diseases: Diphtheria, Pertussis and Tetanus.

- Diphtheria: Diphtheria is a disease with a high fatality chance. Symptoms including a formation of a greyish membrane covering the tonsils and upper part of the throat, making breathing a difficult task. India accounted for nearly 19%-84% of the global cases from 1998 to 2008. Although the numbers have come down in recent years, it is an uphill task to completely eradicate the disease due to shoddy immunization drives and unsanitary conditions in urban areas.

- Pertussis: This disease is commonly known as whooping cough, the name is derived from a typical cough which starts with a deep inhalation, followed by a series of quick, short coughs that continues until the air is expelled from the lungs, and ends with a long shrill, whooping inhalation. Being contagious, young children are the worst affected due to their still-developing immune systems.

- Tetanus: Also known as lockjaw, this disease affects the central nervous system making motor functions difficult and causing painful muscle contractions. The disease is often fatal. MNT – Maternal and Neonatal Tetanus – is a variant that commonly occurs in newborns. Lack of access to pre and post-natal services are a major cause for the prevalence of MNT in India.

Leprosy

Leprosy is a chronic infection that affects the skin, mucous membrane, and nerves, and causes discolouration, lumps, disfigurement and deformities in skin.
Leprosy is a disease that causes severe, scarring skin sores and nerve damage in the limbs. Leprosy disease has affected people on every continent. Leprosy is actually not that infectious but it spreads when a healthy person comes in regular and close contact with mouse droplets and leprosy patient.
The Leprosy disease mainly affects the peripheral nerves, skin, upper respiratory tract and the eyes. The most prevalent possibility of transmission is through the respiratory route. Leprosy is also transmitted through insects.

Types of Leprosy

There are six types of leprosy and are mainly classified based on the severity of symptoms, which include-

Intermediate Leprosy
Tuberculoid Leprosy
Borderline tuberculoid Leprosy
Mid-borderline Leprosy
Borderline Leprosy
Lepromatous Leprosy

Symptoms of Leprosy

Following are some of the symptoms of leprosy:

- Severe pain.
- Bleeding Nose.
- Growth on skin.
- Enlarged nerves.
- Stiff, dry, and thick skin.
- Ulcers on the soles of the feet.
- Paralysis or muscle weakness.
- Non-sensitive lesions on the body.
- Numbness in hands, arms, feet, and legs.
- Eye problems that might even cause blindness.

Treatment of Leprosy

Leprosy treatment fully depends on the type of leprosy the patient is suffering from. Antibiotics are used by doctors to treat the infection. Long-term treatment includes two or more antibiotics which will carry from 6 months to a year.

People suffering from severe leprosy may need to take antibiotics for a longer time period. But, these antibiotics are unable to treat the nerve damage. There are some anti-inflammatory drugs that are used to control nerve pain and severe damage caused by leprosy.

Disease – 02

Virus

Viruses are infectious agents that replicate inside the body of a host.
Viruses are non-cellular, microscopic infectious agents that can only replicate inside a host cell. From a biological perspective, viruses cannot be classified either a living organism or non-living. This is due to the fact that they possess certain defining characteristic features of living organisms and non-living entities.
In a nutshell, a virus is a non-cellular, infectious entity made up of genetic material and protein that can invade and reproduce only within the living cells of bacteria, plants and animals.
For instance, a virus cannot replicate itself outside the host cell. This is because viruses lack the required cellular machinery. Therefore, it enters and attaches itself to a specific host cell, injects its genetic material, reproduces by using the host genetic material and finally the host cell splits open, releasing the new viruses.
Viruses can also be crystallized, which no other living organisms can do. It is these factors that lead to viruses being classified in the grey area – between the living and non-living.

List the types of viruses

Animal viruses

These viruses infect by invading the cells of animals, including humans. Prominent examples of animal viruses include the influenza virus, mumps virus, rabies virus, poliovirus, Herpes virus, etc.

Plant viruses

These viruses infect plants by invading the **plantcells.** Well-known examples of plant virus include the potato virus, tobacco mosaic virus, beet yellow virus, and turnip yellow virus, cauliflower mosaic virus, etc.

Bacteriophage

The virus which infects bacterial cells is known as bacteriophage. There are many varieties of bacteriophages, such as DNA virus, MV-11, RNA virus, λ page, etc.

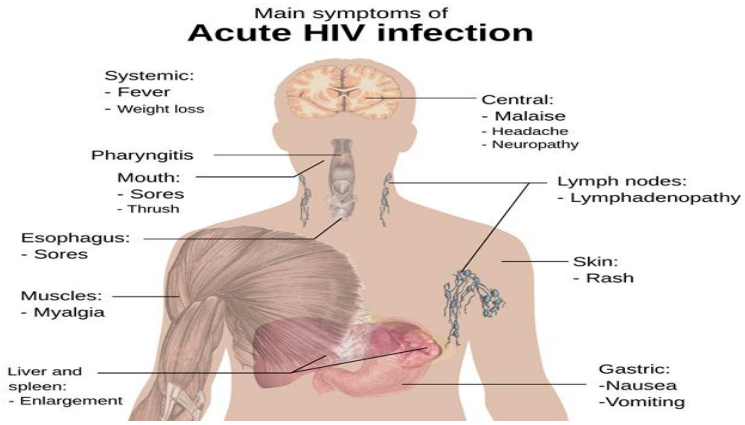
Classification based on the mode of transmission

1. Airborne infections – Transmission of the virus through the air into the respiratory tract. E.g. Swine flu, and Rhinovirus.
2. Fecal oral route – Transmission of the virus through the contaminated water or food.
   E.g. Hepatitis A virus, Poliovirus, Rotavirus.
3. Sexually transmitted diseases – Transmission of the virus through sexual contacts with the infected person. E.g. Retrovirus, human papillomavirus, etc.
4. Transfusion-transmitted infections- Transmission of the virus through the blood transfusion.
   E.g. Hepatitis B virus, Human Immunodeficiency Virus, etc.
5. Zoonoses -Transmission of the virus through the biting of infected animals, birds, and insects to human. E.g. Rabies virus, Alpha virus, Flavivirus, Ebola virus, etc.

AIDS

AIDS or Acquired Immune Deficiency Syndrome is a disease caused by the HIV virus. In this condition, a person's immune system becomes too weak to fight any kind of infection or disease. AIDS is usually the last

stage of HIV infection; a stage where the body can no longer defend itself and thus spawns various diseases. AIDS, when untreated, leads to death.



AIDS is an advanced HIV infection or late-stage HIV. Someone with AIDS may develop a wide range of health conditions like – pneumonia, thrush, fungal infections, TB, toxoplasmosis.
There is also an increased risk of developing a medical illness like cancer and brain illnesses. CD4 count refers to the number of T-lymphocytes in a cubic millimetre of blood. A person may be referred to as “AIDS-affected” when the CD4 count drops below 200 cells per cubic millimetre of blood.

Symptoms of AIDS

As AIDS is a virus infection, the symptoms related to acute HIV infection can be similar to flu or other viral illnesses, like –

- Fever
- Muscle & Joint Pain
- Chilis
- Headaches
- Sore throat
- Night Sweats
- Red rashes
- Mouth sores
- Tiredness
- Swollen lymph glands
- Weakness
- Weight Loss
- Diarrhoea

Symptoms of late-stage HIV infection may include –

- Blurred vision
- Persistent or Chronic Diarrhea
- Dry cough
- Fever of above 37 degrees Centigrade (100 degrees Fahrenheit)
- Night Sweats
- Permanent tiredness
- Shortness of breath
- Swollen glands lasting for weeks

- Weight loss
- White spots on the tongue or mouth

Cure for AIDS

There is no specific or perfect cure for AIDS, but with proper diagnosis, treatment and support, one can fight it and live a relatively healthy and happy life. One needs to take treatment correctly and deal with any possible side-effects.
Medicines are used to stop the virus from multiplying. One major treatment for HIV/AIDS is called **antiretroviral therapy (ART)**.

HIV

HIV originated in non-human primates and eventually spread to humans over the aeons. Even though the disease had been around for a long time, it was clinically diagnosed in the 1980s.

Essentially, HIV is the virus that causes AIDS. It wreaks havoc on the body's immunity system until it is incapable of fending off infections on its own. It is a retrovirus and has RNA as the genetic material.
The HIV infection spreads through the following ways

- Unprotected sexual interaction with an already infected person.
- Reusing needles used by an infected person.
- From an infected mother to the baby through the placenta.
- Blood transfusion from an infected person.

This virus has a long incubation period before it starts to attack the immune system. The immune system is the human body's natural defensemechanism; hence HIV can make it harder for the patient to fight off infections and diseases.
HIV demolishes a particular type of WBC (White Blood Cells) and the T-helper cells. This virus also makes copies of itself inside these cells. T-helper cells are also known as CD4 cells.

Types of HIV

The two major types of HIV strains are –
HIV-1: The most common type of virus found worldwide.

- **Group M** – 'M' stands for 'Major', which implies that 90% of HIV AIDS all over the world are caused by this group of HIV. There are 11 sub-types (A to K) of viruses found in this group.
- **Group N –** 'N' stands for "non-M, non-O".
- **Group O –** 'O' implies 'Outlier' group of HIV. This virus is not usually seen outside of West-central Africa.
- **Group P** –.There's only one case of the group-P virus found till now. This is because the virus primarily affected only simians (apes and monkeys). But a strain of this virus was isolated from a Cameroonian woman.

HIV-2: This is found primarily in Western Africa, with some cases in India and Europe. There are 8 known HIV-2 groups (A to H). HIV-2 is closely related to simian immunodeficiency virus endemic in a monkey species (sooty mangabeys).

Causes or Mode of Infection

The HIV infects the macrophages in the blood. Once they infect, the viral RNA enters the host cell and produces DNA with the help of reverse transcription. This viral DNA, then integrates into the host genome and produces multiple RNA copies by the process of transcription. These RNAs then form multiple copies of the virus and continue the infection in the same way.
At the same time, HIV also enters the T lymphocytes and continues the same set of events as it does in macrophages. This leads to a decrease in the number of helper T lymphocytes. Thus, the immunity of the body is considerably compromised. The immunity is lowered to such an extent that the infected person suffers from even minor infections, which is one of AIDS' characteristic symptoms. Other symptoms include bouts of fever, diarrhoea and significant weight loss.

Encephalitis

Japanese encephalitis **(JE) is a potentially severe disease. JE is**caused**by a virus spread by infected mosquitoes in Asia and the western Pacific. JE virus is one of a group of mosquito-transmitted viruses that**can cause**inflammation of the brain (**encephalitis**).Surviving JE sufferers may be left permanently disabled both physically and mentally. JE is caused by bites from Culex mosquitoes which carry the JE virus.**

- There is currently no treatment for JE
- Vaccination and preventing mosquito bites are the only methods of protection
- Wear Proper Clothing to Reduce Mosquito Bites. When weather permits, wear long-sleeves, long pants and socks when outdoors. ...
- Reduce Exposure to Mosquitoes During Peak Biting Hours.

Meningitis

Meningitis is inflammation of the membranes (meninges) that surround the brain and spinal cord.Meningitis may be caused by infectious or non-infectious conditions. Many different viruses, bacteria, fungi, and parasites can cause meningitis. Diseases that can trigger inflammation of tissues of the body without infection (such as systemic lupus erythematous and Behçet's disease) may cause aseptic (non-bacterial) meningitis.

Pharyngitis

Pharyngitis is inflammation of the pharynx, which is in the back of the throat. Its most often referred to simply as sore throat. Pharyngitis can also cause scratchiness in the throat and difficulty swallowing.

Causes of pharyngitis

There are numerous viral and bacterial agents that can cause pharyngitis. They include:

- measles
- adenovirus, which is one of the causes of the common cold
- chickenpox
- croup, which is a childhood illness distinguished by a barking cough

- whooping cough
- group A *streptococcus*

Common Cold

Cold or common cold is a disease diagnosed with a headache, runny nose, scratchy throat, fever and non-stop sneezing. It is a viral infectious disease of the upper respiratory tract, which primarily affects the nose and sometimes sinuses, ears, and bronchial tubes.

Causes of Common Cold

A common cold is caused by viruses. Some of them include –

- **Rhinovirus** – This one usually intrudes your system during early fall, spring, and summer. They are behind 10%-40% of colds. Even though these are the main common viruses which affect you, they would rarely make you seriously sick.
- **Coronavirus** – The virus affects the human system during winter and early spring. This virus is behind 20% of colds. There are more than 30 types of coronavirus, out of which only 3 or 4 ones are harmful.
- **RSV and Para influenza** – These tiny organisms are behind severe infections like pneumonia, in young children.

Eye Infection

Trachoma is an infectious disease caused by bacterium Chlamydia trachomatis. It is a chronic infectious disease of the eye and is the leading cause of infectious blindness globally. It is the outcome of inadequate access to water and sanitation and poor personal and environmental hygiene.

Trachoma directly affects conjunctiva under the eyelids. The inner surface of the eyelids is roughened due to infection. The infection causes inflamed granulation on the inner surface of the lids. Roughening could lead to pain in the eyes and breakdown of the outer surface of cornea of the eyes, eventually leading to blindness. Repeated trachoma infections could lead to permanent blindness, as the eyelids turn inward.

Trachoma Symptoms & Signs

The symptoms of trachoma include eye irritation with tearing, light sensitivity, pain, and vision loss. The signs include redness, presence of follicles, corneal opacity and scarring.

Pneumonia

Pneumonia is a serious infection of lungs caused by various bacteria, viruses and fungi. It can be mild and sometimes even prove fatal. It affects people with weakened immune systems, older people above 65 years of age, infants and young children. Pneumonia can be bacterial, viral or mycoplasmic. It is a serious health issue and requires proper treatment.

Pneumonia is a lung infection with symptoms of a cough, fever, and breathing problem. Some more symptoms would include –

- A cough viz. mucus (sputum) from your lungs, which could be rusty or green or tinged with blood.
- Diarrhea
- Fever
- Shaking and “teeth-chattering” chills
- Fast breathing and feeling short of breath
- Fast heartbeat
- Chest pain that often feels worse when you cough or breathe in
- Vomiting and Nausea
- Feeling very weak or tired

- **It can be diagnosed through physical examinations, blood tests and tests for sputum.**
- **It ranges from mild to fatal.**
- **Pneumonia can be characterized by fever, chills, and shortness of breath and chest pain.**
- **It can be treated by certain antibiotics.**

Rabies

Rabies is a viral disease that is spread through the animal bite such as the dog. It is caused by the infection of rabies virus. The infection caused by this leads to encephalomyelitis i.e the inflammation of the brain as well as the spinal cord. The transmission of the virus happens through the saliva and affects the CNS or Central nervous system. This virus belongs to a family called Rhabdoviridae. It takes the shape of a bullet.
Animals such as dogs, rabbits, cats, fox and etc. carry this virus and transmit the disease to human beings.

Symptoms Of Rabies

The symptoms caused by the dog bite or rabies are given below-

- Develop fear from water
- Swelling in the brain and the spinal cord
- Frequent headache
- Nausea
- Stomachache
- Muscle cramps
- Drowsiness
- Insomnia
- Severe fever
- Anxiety
- Hallucination
- Excess secretion of saliva
- Difficulty in swallowing

Coronavirus

Coronaviruses are a large family of viruses that are common in various species of animals, such as cattle, camels, bats, and cats. They cause diseases ranging from cold to SARS.

- In some cases, animal coronaviruses can infect humans, which can then spread from person to person.
- This happened in the case of the **SARS and MERS coronaviruses**. It is also suggested that this might be happening in the current China virus case.
- Coronaviruses cause respiratory infections in humans which are generally mild, but sometimes, can be fatal.
- Coronaviruses are physically large as far as viruses go (26 – 32 kilobases), having a surface of spike projections (which resembles a crown and hence the name 'corona').
- Like the influenza virus, the coronavirus spreads through both direct and indirect contact.
    - Direct contact happens through a physical transfer of the microorganism through close contact with oral secretions.
    - Indirect contact happens when a person infected with the virus sneezes or coughs, which spreads the virus droplets on surfaces.

Person-to-person spread occurred with MERS and SARS mainly via respiratory droplets produced when an infected person coughs or sneezes, quite like how influenza and other respiratory pathogens spread.

Human Coronaviruses

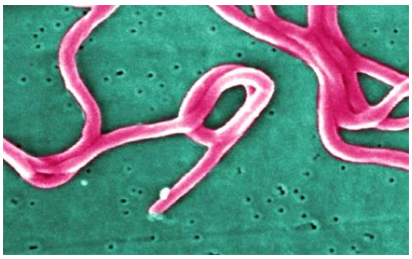
There are **seven strains of human coronaviruses**. They are:

1. Human coronavirus 229E (HCoV-229E)
2. Human coronavirus OC43 (HCoV-OC43)
3. SARS-CoV
4. Human coronavirus NL63 (HCoV-NL63, New Haven coronavirus)
5. Human coronavirus HKU1
6. Middle East respiratory syndrome coronavirus (MERS-CoV)
7. Novel coronavirus (2019-nCoV) – Wuhan pneumonia or Wuhan coronavirus, COVID-19

Coronaviruses are known to cause a significant percentage of all common colds in human beings (adults and children).
Given below is a comparison of three coronaviruses that hit the headlines:

Coronavirus name	**COVID-19**	**SARS**	**MERS**
Full form	Novel coronavirus	Severe acute respiratory syndrome	Middle East respiratory syndrome
Country of origin	China	China	Saudi Arabia
Primary host	Probably bats (unconfirmed)	Bats	Bats
Intermediate host	Not identified	Masked Palm Civets	Camels

Hepatitis



Hepatitis is an inflammatory condition of the liver. It disturbs various metabolic processes such as bile production, excretion, fat and protein metabolism, activation of enzymes and synthesis of proteins.

Hepatitis A

It is an infectious disease of the liver that is caused by Hepatitis A virus. It is acute and in most of the cases, symptoms could not be recognized in young people. Symptoms include vomiting, nausea, fever, severe abdominal pain, jaundice, weakness and these symptoms might last longer till eight weeks.
It is transmitted to others by contaminated food, water and by being in close contact with the infected person. It can be diagnosed with some simple blood tests. Hepatitis A vaccine helps in preventing disease.

Hepatitis B

It is an infectious disease caused by an infection with the Hepatitis B virus. It is contracted through flat tired wounds, contact with blood, saliva, fluids of an infectious body. Sharing personal belongings such as razors or toothbrush of an infected person can also cause Hepatitis B.
Hepatitis B symptoms include abdominal pain, fatigue, and jaundice. Symptoms do not come to limelight until one to six months. It could be diagnosed through a common blood test.
Hepatitis B Vaccine could be done for both adults and children. It comprises three intramuscular vaccines. Second and third vaccines are provided after one and six months of the first vaccine.

Hepatitis C

It is an infection that is caused by the Hepatitis C virus in the liver. This can be transferred from needles that have been infected, at the time of birth (i.e. transmitted from infected mother to child), through body fluids of an infected person, having sex with multiple partners specifically with HIV-infected persons. It does not spread through food or water.
Symptoms include loss of appetite, tiredness, frequently occurring fever, yellowing of your skin or eyes, joint pain, abnormalities in urine and abdominal pain. These signs occur after six or seven weeks of exposure to a virus. Signs might take even several years to appear in rare cases.

Hepatitis D

It is one of the severe liver diseases that are caused by a virus Hepatitis D. It spreads from infected blood or wound. Sometimes it might occur in conjunction with Hepatitis B.

Hepatitis E

This is a waterborne disease spread by the said virus. It might be circulated through food, water, and contaminated blood. It could be either acute or chronic.

Chicken Pox

Chickenpox is also known as varicella. It is a communicable, infectious, **viral disease** characterized by itchy red blisters that appear all over the body. It is a highly contagious infectious disease, mainly caused by the varicella zoster virus, which spreads in a similar way to cold and other flu. The incubation period is 10 to 21 days.

Symptoms of Chickenpox

Chickenpox often starts without the classic rash, with a fever (101°–102°F), headache, sore throat, and stomach-ache. These symptoms may last for a few days.

- Scabs.
- Fever.
- Nausea.
- Malaise.
- Tiredness.
- Headache.
- Itchy Skin.
- Dehydration.
- Muscle Aches.
- Mouth soreness.
- Loss of Appetite.
- Fluid-Filled Blisters.
- Difficulties in breathing.
- Painful and reddish Blisters.
- Hemorrhagic complications.

This viral infection can be easily prevented by vaccinating the newborn kids with the chickenpox vaccine. This vaccination is a 99% effective treatment that prevents **infectious diseases** in infants by strengthening their immune system.

Smallpox – An Extremely Contagious Disease

Smallpox is a contagious disease, which transmits from one person to another by infective droplets of an infected person. There is no treatment found for this contagious disease but could be prevented through the vaccinations.

Variola- The Smallpox Virus

The variola virus has two forms namely the Variola minor and Variola major. Variola virus, is a deadly virus, being a member of the orthopoxvirus family. The structure of this virus resembles that of brick ones and the core of the virus is made up of a genetic material DNA which resembles a dumbbell in shape. The DNA in the core comprises necessary proteins, which are required to replicate the host's cell. The incubation period for this disease is about 17 days, which later results in severe fever with the appearance of rashes on the face, legs, hands, arms, etc.

Causes of Smallpox

Smallpox is an airborne disease that spreads at a faster rate and is mainly caused by an infection of a deadly type of virus variola.

1. It transmits through the droplets released from coughing, sneezing, and face to face contact with an infected person.
2. This infection is also transmitted by sharing drinks, exchange of body fluids like blood transfusion and etc.
3. Caused by even touching any contaminated area.
4. By using unclean syringes or the used ones.

Symptoms of Smallpox

Usually, after the infection of the variola virus, the symptoms occur after 17 days. Below Listed general symptoms are seen after the incubation period

1. High fever followed with chills.
2. Vomiting or nausea.
3. A severe headache, followed by other body pains.
4. Development of rashes, filled with pus or fluid on the face, legs, hands, arms, etc.

Treatment for Smallpox

Since it is a deadly disease, there is no such cure available for this syndrome. It could be still prevented by vaccinating with the smallpox vaccine. This vaccine helps in preventing the disease from illness and causing fatal conditions to humans. The antibodies present in this vaccine protects the body from invading and to destroy the virus.

POLIO

Poliomyelitis in nothing but the scientific term or synonym of the disease Polio. In very rare cases it causes muscle weakness resulting in an inability to move or paralysis. Poliovirus can spread from person to person or by food or water containing human faeces and less commonly from infected saliva.

Types Of Polio

There are three types of polio infections:
1) **Subclinical:** This type of polio do not experience any symptoms as this does not affect the central nervous system – the brain and spinal cord. 95 per cent of polio cases identified are usually subclinical.
2) **Non-paralytic:** This type of polio does affect the central nervous system, but does not result in paralysis.
3) **Paralytic:** This is the most serious and rarest form of polio as it results in full or partial paralysis in the patient. Three types of paralytic polio are –

1. Spinal Polio – As the name suggests, it affects the spine.
2. Bulbar Polio – It affects the brainstem.
3. Bulbospinal Polio – It affects the spine and brainstem.

Signs and Symptoms of Poliomyelitis

As we discussed, there are three different types of polio, so the symptoms also vary. If a person is infected with Sub-clinical Polio then he can face the following symptoms

- Headache.
- Slight fever.
- Sore and red throat.
- General discomfort.
- Vomiting.

The following are the symptoms of Non-paralytic Polio –

- Fever.
- A sore throat.
- Vomiting.
- Headache.
- Fatigue.
- Abnormal reflexes.
- Stiffness and pain in arm and leg pain.
- Problems with swallowing and breathing.
- Back pain, particularly neck stiffness.
- Muscle tenderness and spasms.

People with paralytic polio experience the symptoms of Non-paralytic Polio followed by these symptoms-

- Loss of reflexes.
- Severe spasms and muscle pain.
- Loose and floppy limbs.
- Sudden paralysis.
- Deformed limbs.

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Disease – 03

Protozoa

Protozoa are unicellular, eukaryotic, heterotrophic organisms. They are either free-living or parasites. There are around 65000 species of protozoans categorized in different groups. They lack a cell wall. There are many different cell organelles that perform various tasks performed by different organs in higher animals, e.g. mouth, anus, intestinal tract, etc. There are many protozoa that cause various diseases in animals and humans, e.g. *Plasmodium* (malarial parasite), *Trypanosoma* (sleeping sickness), *Trichomonas* (trichomoniasis), etc.

The protozoa have many stages in their life cycle. Some of the stages of the life cycle are infectious.

The cyst stage is dormant and resistant to environmental stress, the trophozoite stage is reproductive and causes disease.

Malaria/Dengue

Malaria is a mosquito-borne infectious disease caused by various species of the parasitic protozoan microorganisms called Plasmodium. Malaria is a disease that man has battled with for a long time.

Causes of Malaria

There are many factors that can cause malaria, such as –

- Bitten by a malarial vector (Anopheles stephensi)
- Use of shared and infected syringes.
- Organ transplantation.
- Transfusion.
- From an infected mother to her baby during birth.

Symptoms of malaria

Symptoms of malaria are exhibited within 7 to 18 days of being infected. Common symptoms include:

- Fever, fatigue, chills, vomiting, and headaches
- Diarrhea, anemia and muscle pain
- Profuse sweating and convulsions
- Bloody stools.
- In severe cases, malaria can be devastating; it can lead to seizures, coma and eventually, death.

Dengue

Dengue is a mosquito-borne viral disease caused by the Dengue virus. In this case, the dengue virus is transmitted by female mosquitoes – Aedesaegypti. These dengue mosquitos generally bite during the daytime and are found everywhere (Both inside and outside the house). Dengue fever is transmitted by mosquitos which carry the dengue virus, which has four varied serotypes to infect human beings. The serotypes mentioned above denotes a set of microorganisms that are exceptionally closely associated. These microorganisms can only be distinguished due to them having somewhat dissimilar antigens (the alien unit that affects the body and making us produce antibodies) which prompt the body to create some dissimilar antibodies.

Signs and Symptoms of Dengue Fever

- Loss of appetite.
- Diarrhea and vomiting.
- Gum and nose bleedings.
- Severe joint and muscle pain
- Fatigue, Nausea, and Vomiting.
- A sudden drop in blood pressure.
- Multiple rashes and wounds on the skin.
- Pain behind the eyes coupled with extreme headaches.
- The patient might feel week with high fever for 3-7 days.

Dysentery

It is the inflammation in the intestines that is caused by the bacteria Shigella that spreads due through contaminated food and water.

Symptoms can show up 1-3 days after you get infected. In some people, the symptoms take longer to appear. Others never get symptoms.
Each type of dysentery has slightly different symptoms.
Bacillary dysentery causes symptoms like:

- Diarrhea with belly cramps
- Fever
- Nausea and vomiting
- Blood or mucus in the diarrhea

Sleeping Sickness

Sleeping sickness is caused by two types of parasites Trypanosoma bruceirhodesiense and Trypanosomoabruceigambiense. T b rhodesiense **causes** the more severe form of the illness. Tsetse flies carry the infection. When an infected fly bites you, the infection spreads through your blood. Human African trypanosomiasis takes 2 forms, depending on the parasite involved: Trypanosoma bruceigambiense accounts for more than 98% of reported cases.

Symptoms*:*

- Fever
- severe headaches
- irritability
- extreme fatigue
- swollen lymph nodes
- aching muscles

Fungi

Fungi are eukaryotic organisms that include microorganisms such as yeasts, moulds and mushrooms. These organisms are classified under kingdom fungi.
The organisms found in Kingdom fungi contain a cell wall and are omnipresent. They are classified as heterotrophs among the living organisms.

The different types of fungi include-

1. **Zygomycetes** – These are formed by the fusion of two different cells. The sexual spores are known as zygospores while the asexual spores are known as sporangiospores. The hyphae are without the septa.
2. **Ascomycetes** – They are also called as sac fungi. They can be coprophilous, decomposers, parasitic or saprophytic. The sexual spores are called ascospores. Asexual reproduction occurs by conidiospores. Example – Saccharomyces
3. **Basidiomycetes** – Mushrooms are the most commonly found basidiomycetes and mostly live as parasites. Sexual reproduction occurs by basidiospores. Asexual reproduction occurs by conidia, budding or fragmentation. Example- Agaricus
4. **Deuteromycetes** – They are otherwise called imperfect fungi as they do not follow the regular reproduction cycle as the other fungi. They do not reproduce sexually. Asexual reproduction occurs by conidia. Example – Trichoderma.

Asthma

Asthma is a chronic condition, which alters the airways (bronchial tubes). The bronchial tubes function by permitting the entry and exit of air into the lungs. This syndrome is characterized by inflammation in airways, causing difficulty in breathing.

Asthma Symptoms

The symptoms of asthma are generally mild. However, it can quickly become severe to life-threatening if neglected. The most common symptoms of an asthma attack are:

- Wheezing
- Pressure on the chest/ tightness
- Rapid breathing
- Breathing problems
- Persistent coughing
- Difficulty in talking
- Blue fingernails or lips
- Sweaty, pale face

The various types of asthma are as follows:

- Allergic Asthma
- Bronchial asthma
- Nocturnal Asthma
- Occupational Asthma
- Exercise-Induced Asthma
- Steroid-Resistant Asthma

Ringworm

Ringworm, also known as dermatophytosis, is a fungal infection of the skin. It can affect both humans and animals. The infection initially appears as red patches on the affected areas that later spreads to different areas of the body. It majorly affects the scalp, nails, feet, groin and beard.

Types of Ringworm

Ringworm is classified based on the part of the body it affects.

1. ***Tinea capitis*:** This fungal infection affects the scalp. It is also known by the name of scalp ringworm. (Tinea: Technical term for ringworm.) (Capitis: Latin for "*of the head*")
2. ***Tineacorporis*:** This fungal infection might occur in any part of the body. Thus it is known as body ringworm. (Corporis: Latin for "*of the body*")
3. ***Tineacruris*:** This fungal infection affects the skin around the inner thighs, buttocks, and groin. It is also known as the Jock itch. (Cruris: Latin for "*of the leg*")
4. ***Tineapedis*:** This fungal infection affects both the foot, in between the fingernails and toenails. It is also known as Athlete's foot. (Pedis: Latin for "*of the foot*")

Causes of Ringworm

Ringworm can be caused by the following ways:

- It spreads by skin contact with an infected person.
- It spreads from pets and cows. One should wash hands properly after playing with the pets.
- The fungus causing ringworm might be found lingering on clothes, comb, towels and brushes.
- These fungi are mainly present in the spores of soil. Coming into contact with such soil will result in an infection.

Symptoms of Ringworm

Ringworm symptoms vary depending upon the site of infection. The following are the common characteristic symptoms of ringworm:

1. The skin of the feet becomes swollen and itchy between the toes. The soles and heels of the feet may also be affected.
2. Itchy, scaly red spots appear on the groin area.
3. Ringworm appears like an itchy, scaly, inflamed bald spot on the scalp.
4. Ringworm on nails appear to be thick and abnormal in colour and shape.
5. In the beard, itchy, red spots appear on the chin, cheeks, and the upper neck.

Baldness

Hair infection from fungal agents, also called trichomycoses, is one of the common concerns in humans. Fungi or fungus are single celled or multinucleate organisms that decay and absorb the organic material in which they grow (including yeasts, mushrooms, molds, smuts, rusts and mildews). There are three common agents causing hair infections:

- **Dermatophytes**
- **Malassezia infections**
- **Piedra**

Through a series of blog posts, we will take a deeper look at each type of fungal scalp infection, including the most common diseases impacting the hair follicle.