ST. MARY'S CO-ED SCHOOL, HARDA

CLASS-IX SUB-BIOLOGY
CHAPTER-13
WHY DO WE FALL ILL?

NOTES OF WHY DO WE FALL ILL

INTRODUCTION OF HEALTH

The activities performed inside our body by the internal organs are all interconnected. For instance, the heart always forms of the blood in the body, the brain always thinks, the kidney filters out waste from our body and so on. If anyone of these activities stops, this would affect the whole functionality of our body.

What is health?

It is a state of being well so that one can perform physical, social and mental functions properly. **For Example**, we say a person is healthy if they can perform their day to day tasks very well.

Figure 1: What is health?

Is health dependent on personal and social issues?

Yes, we cannot achieve health solely on our own. Every organism in this world depends upon another or the environment for their better health.

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Factors that determine better health:

- We always stress upon the fact that the environment surrounding us should be healthy otherwise it may lead to harmful diseases. Therefore, we can say that **public cleanliness** is an important factor for the better health of people in society.
- Another important factor for proper health is **food**. Now, we can have food only if we have the money to buy it and for that, we need to work. Therefore we can say that good economic conditions of society and employment are needed for better health.
- Lastly, we can stay healthy if we are living a tension free life. How can we expect a healthy environment around us if everyone keeps on ill-treating each other? Therefore, we can say that a **good social environment** is required for better health.

What do you mean by a disease?

- We can say that a disease is any abnormality or disturbance caused in our body.
- A disease is not caused by any external injury but can be caused by an external factor like germs.
- Sometimes internal dysfunctionality of our body may also lead to diseases.
- A disease generally has some Symptoms and Signs associated with it, **For Example**, Pain, Swelling and Fever are some common symptoms.

How is being disease-free different from being healthy?

Healthy	Disease free
It is a state of physical, mental and social well being.	It is a state of absence from diseases.
It refers to the individual, physical and social environment.	It refers only to the individual.
The individual has good health.	The individual may have good health or poor health.

Figure 2: Healthy and Disease-Free

How can we stay disease free?

We can stay disease-free by maintaining good health that is,

- by having proper food or a balanced diet
- by keeping the environment clean
- maintaining personal hygiene

How can we identify a disease?

- A disease is associated with symptoms. In other words, our body shows certain indications with which we can assume that we may be suffering from a disease.
- We know that different parts of our body perform different functions.
- Any of these functions are disturbed, we can say that something is wrong within our body or something has changed in it. This is a symptom of getting a disease.
- Symptoms just indicate that there is a disease. They do not indicate the exact type of disease.

- The doctors often look for the signs of a disease in order to find out the exact problem. These signs, unlike the symptoms, are more definite indication of a disease. Sometimes laboratory tests are also done in order to find a disease.

Types of Diseases: Acute Diseases and Chronic Diseases

Acute Disease	Chronic Disease
Acute diseases last for only a short period of time.	Chronic diseases last for a long period of time
It is caused randomly.	It is caused in due course of time.
It does not cause major effect on general health. **Example:** Cough, dysentry.	It causes major effect on general health. **Example:** Elephantiasis, heart disease, tuberculosis.

How chronic diseases affect our health?

- Chronic diseases take relatively a long period of time hence they are likely to affect our general health as well.
- They may hinder the growth in children or increase stress in adults.
- They can make us feel tired all the time.
- They can also lead to an increase or decrease in weight.
- They can also affect our day to day activities and the ability to learn new things.
- Hence, we can say that they have long-term effects on health than acute diseases.

What causes diseases?

We know that, diseases can be caused by two factors:

Internal factors in our body such as:

- Hormonal imbalance
- Allergic Reaction
- Genetic disorder
- Malfunctioning of body organs

External factors such as:

- Unhealthy diet
- Disease causing germs (bacteria, viruses, fungi)
- Pollution in the environment
- Unhealthy lifestyle

Based on the following there are two broad categories of causes of diseases –

1. Immediate Causes and Contributory Causes

2.

Immediate Causes	Contributory Causes
These are the actual causes that are responsible for a disease. These causes can be infectious as well as non-infectious.	These are not the direct causes but factors that contribute in causing a disease.
For Example, Bacteria, Fungi, Viruses, Germs etc.	**For Example** Poor diet, Unhealthy lifestyle, Polluted environment etc.

2. Congenital and Acquired Diseases

Congenital diseases are present since birth. For eg hole in heart of an infant. Acquired Diseases occur after birth. Based on their ability to spread from one individual to another, acquired diseases are of two types:

Infectious and Non-infectious causes of Disease

Infectious Causes	Non-infectious Causes
These are the extrinsic or external disease causing factors.	These are the intrinsic or internal disease-causing factors.
They lead to infectious disease and can affect the whole community as they are transferable from one person to another.	They lead to non-infectious diseases and do not affect the whole community as they are non-transferable from one person to another.

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Difference between Infectious and Non-infectious Diseases:

Infectious or Communicable Diseases	Non-infectious or Non-Communicable Diseases
They are caused by attack of pathogens.	They are not caused by pathogens.
The diseases brought about by extrinsic or external factors.	The diseases are mostly brought by intrinsic or internal factors.
Infectious diseases can pass from diseased person to a healthy person.	Non-infectious diseases cannot pass from one person to another.
Transmission of infection occurs through direct contact or some medium (air, water, vectors).	Transmission is absent, however hereditary diseases are transmitted from parent to offspring.
Community hygiene can reduce the incidence of infectious diseases	Community hygiene is ineffective in reducing the incidence of non-infectious diseases.
Example: Cholera, Tuberculosis (TB), Pneumonia, Chickenpox.	**Example:** High blood pressure, Heart, disease, Cancer.

Infectious Agents

The pathogens or microbes that cause infectious diseases are also called as **Infectious Agents**.

Infectious agent	Disease
Virus	Common cold, influenza, dengue fever, AIDS
Bacteria	Typhoid fever, cholera, tuberculosis, anthrax
Fungi	Many common infectious disease
Protozoan	Malaria, kala azar
Worms	worm infections, elephantiasis

Figure 3: Infectious Agents

Why do we need to understand the characteristics of these infectious agents?

If we understand the characteristics, we can treat the diseases caused by them in a better way. We can find out which medicine would work on which infectious agent. Some common characteristics of infectious agents are:

- Viruses live inside the host body
- Bacteria do not generally live inside the host body
- Virus, bacteria and fungi multiply quickly
- Worms do not multiply quickly

How penicillin can help fight against bacteria?

Antibiotics are generally used to block the growth of bacteria. The bacteria cells grow by creating a cell wall that protects them. Penicillin is an antibiotic that prevents the growth of the cell wall and hence bacteria die easily. Penicillin is used for fighting against different kinds of bacteria.

Several types of diseases

Based on the means of spread of a disease, we can classify it into different categories:

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Type of Disease	Causing Factor	Examples
Airborne diseases	they are caused by germs, bacteria or virus in the air	Common cold, tuberculosis
Foodborne diseases	they are caused by germs (bacteria, toxins, viruses, fungi) present in the food	Food poisoning, Typhoid
Waterborne diseases	They are caused by drinking contaminated water	Cholera, Amoebiasis
Lifestyle diseases	they occur because of poor or unhealthy lifestyle	Heart disease, Diabetes
Vector-borne Diseases	they are caused due to animals that carry infectious agents from a sick person to another person	Malaria, Dengue Fever
	These animals that act as an intermediate between disease causing germs and people are called vectors.	
Sexually transmitted diseases	they are caused due to sexual contact from one person to another	AIDS, Syphilis

Where do the disease-causing germs live in our body?

- There are a number of tissues and organs in our body where these microbes can get attached to.
- Generally, the point of entry decides where they will go. For instance, any microbe that enters through the nose is likely to settle at the lungs.
- This can also be seen through the signs and symptoms of a disease as only those organs and tissues issues seem affected where these microbes enter.
- But there are some other common diseases also that are not tissue-specific.
- **Inflammation** – Our body has an immune system in which it creates the cells that can fight against the disease-causing germs. This process of recruiting cells to kill the infectious agents present in our body is called **Inflammation**. The inflammation process shows different effects on our body such as fever or swelling.

- Hence, we can say that the likelihood we are going to be affected by the disease is determined by the immune system of our body.

Principles of treatment

Figure 4: Principles of Treatment

We may treat an infectious disease in two ways:

- By killing the infectious agents
- By reducing the effects of the disease or reducing the symptoms

We can reduce the symptoms in the following ways:

- By taking rest to conserve our energy so that our immune system can fight against the disease
- By taking medicine to reduce the common symptoms such as fever or pain and hence reducing the disease

We can kill the infectious agents in our body in the following way:

- By taking medicines that can kill them such as antibiotics or antiviral medicines
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Antibiotics aren't effective against viruses?

Antibiotics commonly work by blocking the biochemical pathways that are important for bacteria. Thus these inhibit the growth of bacteria, hamper the metabolism and kill them. Antibiotics do not work on viruses because viruses do not use the biochemical path and use host cell machinery for making proteins.

However, the most effective way to treat viral infections and disease is vaccination as it can prevent a person from getting the disease in the first place.

The principles of prevention

Are there any limitations of treating infectious agents via medicines?

Yes, there are three limitations:

- Our body functions might not be able to recover easily
- This treatment takes time hence it can affect our daily activities
- An infectious disease may transfer from a person who is suffering the disease to another in the meanwhile of the treatment

Therefore, we should find out ways to prevent these diseases in the first place. There are two ways to prevent diseases:

1. **Preventing exposure to these infectious agents**

- Waterborne diseases can be prevented by always having safe and pure drinking water
- Airborne diseases can be prevented by avoiding overcrowded places in keeping the environment clean
- Vector-borne diseases can be prevented by keeping our surroundings clean and maintaining public hygiene

3. **Strengthening the immune system** so that if any infectious agents enter our body it can fight back. This can be made possible by having healthy food.

What is the Immune System?

- The immune system is a network of cells, tissues and organs that work together in order to protect our body from diseases. We may consider the immune system as a defence system of our body.
- The immune system looks out and destroys the disease-causing germs in our body with the help of special cells called white blood cells. These cells are present in the blood and hence circulate throughout the body and monitor it.

- The germs or any foreign substance that enter our body are called **Antigens**. As the immune system recognizes these antigens, it releases antibodies which lock the antigens and then destroy them with the help of other cells.
- The ability of a body to resist a disease with the help of antibodies is called **Immunity**.

Discovery of Helicobacter Pylori as a Reason for Ulcer

A peptic ulcer is a sore that occurs on the inner lining of the stomach. In 2005, Barry J. Marshall and J. Robin Warren received a Nobel Prize for discovering that Helicobacter Pylori bacteria are a cause of such ulcers. Before that, it was believed that stress and lifestyle are a major cause of such ulcers. The Helicobacter Pylori bacteria weakens the mucous lining of the stomach which lets the acid present inside the stomach to get through the inner sensitive lining. The acid and bacteria together irritate the lining and cause a sore or ulcer.

A Specific Method to Strengthen the Immune System

- The above methods were just general ways of preventing any disease. A specific method to strengthen the immune system and hence preventing disease is **vaccination**.
- Whenever our body is affected by a disease, our immune system not only fights against it but it also remembers how to respond when the same disease-causing microbes affect our body the next time.
- Similarly, vaccination contains an agent that is similar to the disease-causing agents (weak or killed microbes). As it enters our body, our immune system learns to fight against it and hence prevents us from actually getting infected when the actual disease-causing microbes enter our body.
- Today, vaccines are available for enhancing our immune system against various diseases such as polio, chicken pox and measles.

Diseases - Causes, Control and Prevention

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Disease	Causative Organism	Mode of Transmission	Control	Prevention
Malaria	Plasmodium	Bite of female Anopheles	Quinine	Breaking contact between female Anopheles and man, eliminating Anopheles
Diarrhea	Protozoan, bacteria, viruses	Contaminated food and water	ORS or salt-sugar solution	Proper sanitation, personal hygiene
Cholera	Vibrio cholerae	Contaminated food and water	Antibiotics, ORS or salt-sugar solution	Proper sanitation, vaccination
Typhoid	Salmonella typhi	Contaminated food and water	Use of antibiotics	Proper sewage system, using chlorinated or boiled water
Tuberculosis	Mycobacterium tuberculosis	Cough/sneeze droplets, contaminated milk	Use of antibiotics	Awareness to maintain cleanliness in public places and BCG vaccine for children
Hepatitis	Hepatitis viruses (A-G)	Contaminated food and water for some forms, through body fluids for others	Rest, antiviral injection, food rich in carbohydrates	Good sanitation, safe drinking water, use tested blood, disposables needles and syringes
Rabies	Rabies virus	Bite of infected animal	No cure after the diseases develops	Wash the wound antirabies serum, course of vaccine shots, pets should be vaccinated,
AIDS	Human immunodeficiency virus (HIV)	Infected blood, semen, breast milk, mother to fetus	No cure yet, a combination of drugs slows down progress of the diseases	Screening of blood and donors, use of disposable needles and syringes, not sharing blades and razors, safe sex practices.
Influenza	Myxovirus	Cough/sneeze droplets	No cure, bed rest, aspirin and fluids provide relief	Keeping away from infected person

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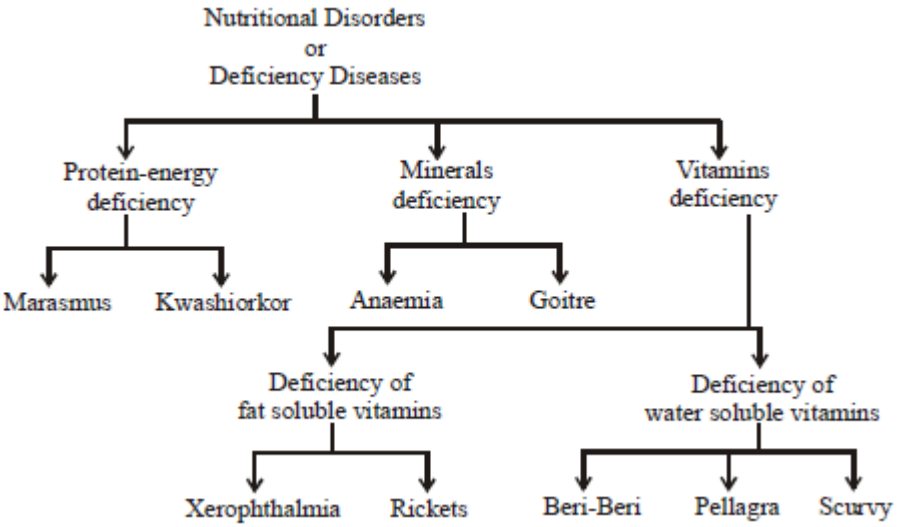
Disease	Causative Organisms	Mode of Transmission	Symptoms	Cure	Prevention
Virus 1.Hepatits A	Hepatitis A virus	Contaminated food And water	High temperature, Headache, joint Pains, dark yellow Urine, fatigue. It is Also called jaundice	Interferon injection, Adequate rest	Use boiled water and Fresh food, Hepatitis Vaccine
2. Hepatitis B	Hepatitis B virus	Infected blood, Inoculation, from Mothers to their Child, sexual route	Progressive liver Disease, chronic Active Hepatitis , Hepatocellular Carcinoma (cancer)	Interferon injection, Adequate rest	Hepatitis B vaccine, Avoiding risky sex Practices, injectable Drugs and direct or Indirect contact with Blood, semen etc. Of Infected person
3. Rabies	Rabies virus	Bite of Dog, Monkey, etc.	High fever, painful Contraction of Muscles of throat And chest. Patient Develops fear of Water so it is also Called hydrophobia.	A course of 5 anti Rabies vaccines at Regular intervals With in 30 days is Given	Pet animals should Be vaccinated with Anti rabies vaccine
4. Influenza	Influenza virus	It is spread from Person to person Contact, Droplet Infection.	Sneezing, fever, Headache, muscular Pains, coughing, Discharge from nose	Amanatadin and Rimantidine are Used	We should try to Keep away from flu Patients.

DEFICIENCY DISEASES



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Health

- A state of complete physical, mental and social well-being and not merely absence of disease.
- It includes health of an individual, community and environment.

Disease

- A condition of the body or some part of the body in which its functions are deranged.
- A disease is identified by its signs and symptoms.

Acute Disease	Chronic Disease
• Lasts for short period of time. • Eg. Typhoid	• Lasts for longer time. • Eg. Diabetes

Congenital Disease	Acquired Disease
• Present since birth. • Eg. Haemophilia	• Develops after birth. • Eg. Polio

Infectious Disease

- Can be transferred from one person to another.
- Eg. Tetanus

Non-infectious Disease

- Can not be transferred from one person to another.
- Eg. Goitre

Infectious Agents

- Virus
- Bacteria
- Fungi
- Protozoa
- Worms

Means of Spread

- Air
- Water
- Sexual contact
- Vector
- Physical contact

Principles of Treatment

- To reduce the effects of the disease.
- To kill the cause of the disease.

Principles of Prevention

General Ways	Specific Ways
• Sanitation • Vector eradication • Isolation of patient • Proper food • Education	• Natural Immunity • Acquired Immunity