# Class: 10th

# Subject: Biology

# Chapter 18: Pharmacology

## Important MCQs:

**1. Which of the following is a synthetic drug?**

(a) Morphine

(b) Digitalis

(c) Penicillin

(**d**) Aspirin ✅

**2. Penicillin is obtained from:**

(a) Animal

(b) Plant

(c) Bacteria

(**d**) Fungus ✅

**3. Which drug is used to stimulate the heart?**

(a) Paracetamol

(b) Digitalis ✅

(c) Diazepam

(d) Streptomycin

**4. Morphine is obtained from:**

(a) Iodine mineral

(b) Beeswax

(c) Opium poppy plant ✅

(d) Foxglove

**5. What is the use of silver nitrate powder?**

(a) Kill bacteria inside the body

(b) Stop bleeding and prevent infection ✅

(c) Relieve pain

(d) Develop immunity

**6. Which of the following is obtained from bacteria?**

(a) Paracetamol

(b) Streptomycin ✅

(c) Morphine

(d) Diazepam

**7. Drugs that reduce pain are called:**

(a) Antibiotics

(b) Vaccines

(c) Analgesics ✅

(d) Sedatives

**8. Diazepam is classified as a:**

(a) Disinfectant

(b) Sedative ✅

(c) Antibiotic

(d) Analgesic

**9. Disinfectants are used to:**

(a) Kill bacteria inside the body

(b) Reduce pain

(c) Destroy microorganisms on non-living objects ✅

(d) Develop immunity

**10. Vaccines are used to protect the body from:**

(a) Sleep disorders

(b) Pain

(c) Bacterial and viral infections ✅

(d) Heart problems

**11. Which type of drug depresses the activity of the central nervous system?**

(a) Narcotics

(b) Hallucinogens

(c) Stimulants

(d) Sedatives ✅

**12. Long-term use of sedative drugs may lead to:**

(a) Euphoria

(b) Increased memory

(c) Suicidal thoughts ✅

(d) Better sleep only

**13. Which of the following is a strong painkiller and often prescribed to cancer patients?**

(a) Marijuana

(b) Hallucinogen

(c) Narcotic ✅

(d) Sedative

**14. Morphine and codeine are classified as:**

(a) Hallucinogens

(b) Sedatives

(c) Narcotics ✅

(d) Antiseptics

**15. Heroin is a semi-synthetic drug derived from:**

(a) Psilocin

(b) Cannabis

(c) Mescaline

(d) Morphine ✅

**16. Which type of drug causes changes in perception, emotion, and consciousness?**

(a) Sedative

(b) Hallucinogen ✅

(c) Narcotic

(d) Antiviral

**17. Psilocin is a hallucinogen obtained from:**

(a) Cactus

(b) Mushroom ✅

(c) Marijuana

(d) Poppy

**18. Marijuana affects male fertility by:**

(a) Causing hallucinations

(b) Increasing aggression

(c) Weakening sperm production ✅

(d) Increasing sperm count

**19. Drug addiction is closely linked with:**

(a) Better communication

(b) Improved sleep

(c) Crime and social withdrawal ✅

(d) Improved mental health

**20. Mere possession of a narcotic drug is considered:**

(a) A minor offense

(b) Lawful under supervision

(c) A social norm

(**d**) A legal violation ✅

**21. What is the main function of antibiotics?**

(a) Increase immunity

(**b**) Kill or stop growth of bacteria ✅

(c) Destroy viruses

(d) Produce antibodies

**22. Bactericidal antibiotics:**

(a) Inhibit virus replication

(**b**) Kill bacteria ✅

(c) Stop fungal growth

(d) Produce antibodies

**23. Bacteriostatic antibiotics:**

(a) Kill bacteria

(b) Neutralize toxins

(**c**) Stop bacterial growth ✅

(d) Destroy viruses

**24. Cephalosporins act by interfering with:**

(a) DNA replication

(b) Protein synthesis

(c) Cell wall synthesis ✅

(d) Enzyme activity

**25. Tetracyclines are not recommended for:**

(a) Adults

(b) Diabetic patients

(c) Children under 8 ✅

(d) Cancer patients

**26. Sulpha drugs inhibit:**

(a) Protein synthesis

(b) DNA replication

(c) Folic acid synthesis ✅

(d) Cell wall synthesis

**27. Which of the following is a synthetic antibiotic?**

(a) Tetracycline

(b) Penicillin

(c) Sulpha drugs ✅

(d) Cephalosporin

**28. Broad-spectrum antibiotics are effective against:**

(a) All viruses

(b) A wide range of bacteria ✅

(c) Only Gram-positive bacteria

(d) Fungi only

**29. Which antibiotic group is used to treat pneumonia and tonsillitis?**

(a) Cephalosporins ✅

(b) Sulpha drugs

(c) Tetracyclines

(d) Vaccines

**30. Antibiotic resistance occurs when:**

(a) Antibiotics expire

(b) Bacteria become unaffected by antibiotics ✅

(c) Antibiotics increase blood pressure

(d) Antibiotics are used correctly

**31. One major cause of antibiotic resistance is:**

(a) Overeating

(b) Use of antibiotics for viral infections ✅

(c) Use of vaccines

(d) Good hygiene

**32. A vaccine is made from:**

(a) Healthy cells

(b) Only antigens

(c) Weakened or killed pathogens ✅

(d) Antibiotics

**33. Who introduced the first vaccine?**

(a) Louis Pasteur

(b) Robert Koch

(c) Alexander Fleming

(d) Edward Jenner ✅

**34. Antigens in vaccines stimulate the production**

of:

(a) Antibiotics

(b) Memory cells

(c) Bacteria

(d) Antibodies ✅

**35. Which cells recognize pathogens and start antibody production?**

(a) Red blood cells

(b) Memory cells

(c) B-lymphocytes ✅

(d) T-lymphocytes



## Exercise Short Questions:

**1. Define pharmacology and distinguish it from pharmacy.**

**Answer:**

**Pharmacology** is the branch of biology that studies the effects, uses, and mechanisms of action of

drugs on living organisms.

**Pharmacy** is the science of preparing, dispensing, and reviewing drugs and providing additional clinical services.

**2. Differentiate between medicinal drug and addictive drug.**

**Answer:**

- Medicinal drugs are used to treat, prevent, or cure diseases.
- Addictive drugs are substances that cause dependence or addiction and may negatively affect mental or physical health.



**3. Differentiate between analgesic and antibiotic.**

**Answer:**

- Analgesics are drugs that relieve pain (e.g. aspirin, paracetamol).
- Antibiotics are drugs that kill or inhibit bacteria (e.g. tetracycline, penicillin).

**4. What is marijuana? To which category of**

**addictive drugs does it belong?**

**Answer:**

- **Marijuana** is a hallucinogenic drug obtained from the Cannabis plant. It is smoked and affects memory, heart rate, and sperm production.
- It belongs to the **hallucinogens** category of addictive drugs.

**5. Differentiate between narcotics and hallucinogens.**

**Answer:**

Narcotics are strong painkillers that act on the central nervous system (e.g. morphine, heroin).

Hallucinogens cause changes in perception, emotion, and consciousness (e.g. mescaline, psilocin).



## Important Short Questions:

**1. What are synthetic drugs?**

**Answer:**

Synthetic drugs are artificially prepared in laboratories and do not occur naturally.

**Example**: Aspirin.

**2. Name two drugs obtained from plants or fungi.**

**Answer:**

- Penicillin – obtained from fungus.
- Morphine – obtained from opium poppy plant.

**3. What is the function of antiseptics and disinfectants?**

**Answer:**

- Antiseptics reduce infection on the skin.
- Disinfectants destroy microorganisms on non-living objects.

**4. What are analgesics? Give examples.**

**Answer:**

Analgesics are pain-relieving drugs.

**Examples**: Aspirin, Paracetamol.

**5. Write two uses of antibiotics.**

**Answer:**

- Kill or stop the growth of bacteria.
- Treat bacterial infections like pneumonia and tonsillitis.

**6. What are sedative drugs?**

**Answer:**

Sedatives are drugs that depress the activity of the central nervous system, causing dizziness, lethargy, slow brain function, and depression.

**7. Name any two effects of long-term use of sedatives.**

**Answer:**

- Suicidal thoughts
- Depression

**8. What are narcotics?**

**Answer:**

Narcotics are strong painkillers used to relieve pain in chronic diseases and after surgery. They act on

the central nervous system.

**9. Write names of any two narcotic drugs.**

**Answer:**

- Morphine
- Codeine

**10. What is heroin and from which drug is it derived?**

**Answer:**

Heroin is a semi-synthetic narcotic drug derived from morphine. It causes drowsiness and addiction.

**11. What are hallucinogens?**

**Answer:**

Hallucinogens are drugs that cause changes in perception, thoughts, emotions, and consciousness.

**12. Give examples of hallucinogens and their sources.**

**Answer:**

- Mescaline – from cactus

- Psilocin – from mushroom

**13. What is marijuana and how does it affect the body?**

**Answer:**

Marijuana is a hallucinogen obtained from Cannabis plant. It increases heart rate, weakens memory, and reduces sperm production.

**14. What is meant by drug addiction?**

**Answer:**

Drug addiction is a condition where a person becomes physically or mentally dependent on drugs and cannot function normally without them.



**15. How is drug addiction related to crime?**

**Answer:**

Drug addicts often engage in crimes like theft, robbery, and violence due to psychological effects and legal compulsion to obtain drugs.

**16. What is an antibiotic?**

**Answer:**

An antibiotic is a drug that kills or stops the growth of bacteria. It is produced by or derived from microorganisms like bacteria and fungi.

**17. What is the difference between bactericidal and bacteriostatic antibiotics?**

**Answer:**

Bactericidal antibiotics kill bacteria.

Bacteriostatic antibiotics stop the growth of bacteria.

**18. What are broad-spectrum and narrow-spectrum antibiotics?**

**Answer:**

- Broad-spectrum antibiotics work against many types of bacteria.
- Narrow-spectrum antibiotics work against only a few specific bacteria.

**19. Name any one bactericidal antibiotic and its function.**

**Answer:**

Cephalosporins – They are bactericidal and kill bacteria by interfering with their cell wall synthesis.

**20. What are tetracyclines and when are they not used?**

**Answer:**

Tetracyclines are broad-spectrum bacteriostatic antibiotics. They are not used in children under 8 years or during tooth development.

**21. What are sulpha drugs and how do they work?**

**Answer:**

Sulpha drugs (sulfonamides) are synthetic bacteriostatic antibiotics. They inhibit folic acid synthesis in bacteria.



**22. What is antibiotic resistance?**

**Answer:**

Antibiotic resistance is the ability of bacteria to resist the effects of antibiotics, making infections harder to treat.

**23. How do bacteria develop resistance to**

**antibiotics?**

**Answer:**

- By altering internal mechanisms to stop antibiotic action
- By transferring resistance genes to other bacteria

**24. What is a vaccine?**

**Answer:**

A vaccine is a substance containing weakened or killed pathogens used to stimulate the immune system to produce antibodies and provide immunity.

**25. How do vaccines work in the body?**

**Answer:**

Vaccines trigger B-lymphocytes to produce antibodies. These antibodies and memory cells remain in blood and protect against future infections.

## Important Long Questions:

🌟 **Q1. What are medicinal drugs? Describe the major sources of medicinal drugs with examples.**

❖ **Definition of Medicinal Drugs:**

Medicinal drugs are chemical substances used to diagnose, prevent, or treat diseases in humans or animals. They help in reducing pain, curing infections, and restoring health.

**Example**: Painkillers like paracetamol, antibiotics like tetracycline, and vaccines like the hepatitis B vaccine are all medicinal drugs.

🔹 **Major Sources of Medicinal Drugs:**

Medicinal drugs come from different natural and artificial sources. These include:

✅ **1. Synthetic Drugs:**

These drugs are artificially made in laboratories and do not occur naturally.

**Example**: Aspirin – used to reduce pain and inflammation.

## ✅ 2. Drugs from Plants and Fungi:

Many important medicines are obtained from plants and fungi.

**Examples**:

- Penicillin – an antibiotic obtained from fungus.
- Digitalis – a cardiotonic obtained from the foxglove plant.
- Morphine – a pain reliever made from opium (from the opium poppy plant).

## ✅ 3. Drugs from Animals:

These drugs are obtained from animal products, especially glands.

**Examples**:

- Fish liver oils – used as a source of vitamins.
- Hormones – such as insulin.
- Antitoxins – used to neutralize toxins in the body.

## ✅ 4. Drugs from Minerals:

Some drugs are made from naturally occurring

minerals.

**Examples:**

- Iodine – used in tincture of iodine to prevent infections.
- Silver nitrate – used to stop bleeding and prevent wound infection.

### ✅ 5. Drugs from Bacteria:

Some antibiotics are derived from bacteria.

**Example:**

Streptomycin – used to treat bacterial infections like tuberculosis.

### 🌟 Q2: What are addictive drugs? Describe the major categories of addictive drugs with examples.

**❖ Definition:**

Addictive drugs are chemical substances that affect the functioning of the central nervous system (CNS) and create a strong physical or psychological dependence in the user.

These drugs are habit-forming, and people who take

them regularly may find it very difficult to stop using them.

## 🔹 Major Categories of Addictive Drugs

**There are four main types of addictive drugs:**

### 1. Sedatives

**Definition**: Sedatives are drugs that depress the activity of the central nervous system.

**Effects**:

- Cause drowsiness, lethargy, and dizziness
- Slow down brain function
- Long-term use may lead to depression and even suicidal thoughts



**Examples**:

Diazepam (commonly used as a sleep-inducing drug)

### 2. Narcotics

**Definition**: Narcotics are strong painkillers used to relieve acute and chronic pain.

**Effects:**

- Act directly on the central nervous system
- Cause drowsiness and a feeling of pleasure
- Highly addictive and may lead to drug abuse

**Examples:**

**Morphine**: Extracted from the opium poppy, used medically but has a high risk of addiction

**Heroin**: A semi-synthetic narcotic made from morphine, often abused for its ecstatic effects

**Codeine**: Milder than morphine, used in cough syrups

### 3. Hallucinogens

**Definition**: Hallucinogens are drugs that alter perception, thoughts, and feelings. They can make a person see or hear things that are not real (hallucinations).

**Physiological Effects:**

- Dilated pupils
- Increased blood pressure
- Constriction of some arteries

**Examples:**

- **Mescaline**: Obtained from a cactus plant
- **Psilocin**: Obtained from a mushroom

## 4. Marijuana (Hashish)

**Definition**: Marijuana is a hallucinogen obtained from the Cannabis sativa or Cannabis indica plant.

How it is used: Usually smoked

**Effects:**

- Small doses give a feeling of well-being for a short period (2–3 hours)
- High doses can increase heart rate
- Affects short-term memory and sperm production in males



🌟 **Q3: What are antibiotics? Explain the major groups of antibiotics with examples.**

❖ **Definition:**

Antibiotics are medicinal substances that kill or inhibit the growth of bacteria. They are either naturally produced by microorganisms or are

synthetically prepared.

### 🔸 Bactericidal vs. Bacteriostatic:

- Bactericidal antibiotics kill bacteria directly.
- Bacteriostatic antibiotics stop the growth and reproduction of bacteria without killing them.

### 🔸 Broad-spectrum vs. Narrow-spectrum:

- Broad-spectrum antibiotics work against a wide variety of bacteria.
- Narrow-spectrum antibiotics are effective only against specific types of bacteria.

### 🔹 Major Groups of Antibiotics:

**1. Cephalosporins:**

- These antibiotics interfere with the synthesis of bacterial cell walls.
- They are bactericidal (kill bacteria).
- **Used for**: pneumonia, sore throat, bronchitis, and tonsillitis.

**2. Tetracyclines:**

These are broad-spectrum and bacteriostatic

antibiotics.

They stop bacterial protein synthesis.

**Used for**: infections of respiratory tract, urinary tract, and intestines.

**Not used in**: children under 8 years old because they can damage developing teeth.

**3. Sulpha Drugs (Sulfonamides):**

- These are synthetic antibiotics containing the sulfonamide group.
- They are broad-spectrum and bacteriostatic.
- They block folic acid synthesis in bacteria.
- **Used for**: pneumonia and urinary tract infections.
- Also found in some other non-antibiotic medicines like blood pressure drugs.



🌟 **Q4:What is antibiotic resistance? How do bacteria develop resistance to antibiotics?**

❖ **Definition:**

Antibiotic resistance is the condition in which

bacteria become able to survive or grow even in the presence of antibiotics that once killed them.

### Importance:

- Resistant bacteria make it difficult to treat infections.
- It causes longer illnesses, higher costs, and increased death rates.
- It is now a serious global health issue.

### How Do Bacteria Develop Resistance?

**1. Internal Mechanisms:**

- Some bacteria change their internal structure so antibiotics can no longer affect them.

**2. Gene Transfer:**

- Bacteria can share genes that give resistance to antibiotics.

**3. Misuse of Antibiotics:**

- Antibiotics are often used for viral infections (like colds or flu), where they are useless. This increases resistance.

**4. Overuse or Unprescribed Use:**

- Taking antibiotics without doctor's advice can promote resistance.

**5. Use of Expired Antibiotics:**

- Expired medicines lose effectiveness and may damage organs like the kidneys.

🔸 **Impact of Resistance:**

- Some diseases are becoming untreatable.
- Doctors have to use more powerful and expensive antibiotics.
- In some cases, no antibiotic works at all.

🌟**Q5:What are vaccines? Describe the history and mode of action of vaccines.**

❖ **Definition:**

A vaccine is a substance that contains weakened or killed pathogens, and it helps the body to develop immunity against a disease by producing antibodies.

🔸 **History – Edward Jenner's Experiment:**

- **In 1796**, a British doctor Edward Jenner

injected a boy with cowpox virus.

- After recovery, the boy was injected with smallpox virus.
- He did not get sick, proving that cowpox protected against smallpox.
- This method was named vaccination, and the substance was called a vaccine.

### 🔹 Mode of Action of Vaccines:

1. Pathogens contain proteins called antigens.

2. When these antigens enter the blood, they stimulate immune response.

3. B-lymphocytes (a type of white blood cell) recognize the antigens.

4. They produce antibodies to destroy the pathogens.

5. Memory cells are also formed which remain in the blood.

6. If the same pathogen attacks again, quick antibodies are produced to kill it.

### Long-term Immunity:

- Vaccines provide long-lasting protection.
- The body "remembers" how to fight the disease.
- That’s why many vaccines are given once in a lifetime or only after many years.

## Note:

This chapter is designed to provide a solid foundation of knowledge, with the goal of deepening understanding and encouraging further exploration of the subject. The content has been carefully selected to support effective learning and inspire students to engage with the topic more deeply.



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**Purpose**: To contribute to education by offering insightful, valuable content that enhances learning and understanding.

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