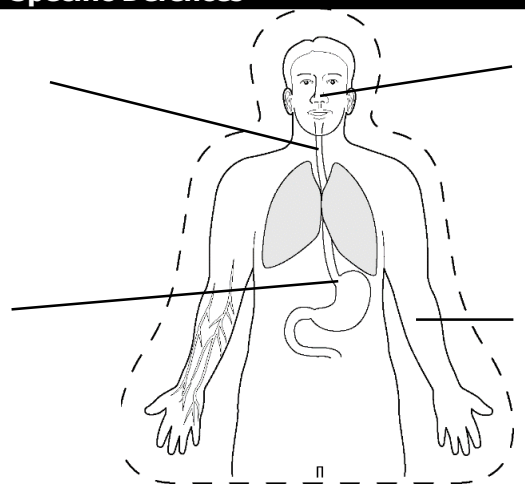
# Biology 3: Infection and Response

## Section 1: Pathogens and Diseases

| | Disease | Pathogen | How it is spread | Effect | Prevention/ Control |
|---|---|---|---|---|---|
| 1 | | **Virus** | **Droplets** from sneezes and coughs | Can be **fatal** | **Vaccination** of children |
| 2 | **HIV** | **Virus** | | **Damages** some **white blood cells** | **Antiretroviral drugs** when infected |
| 3 | **Tobacco Mosaic Virus** | | **Direct contact** | Mottling of leaves**, reduces photosynthesis** | |
| 4 | | **Bacteria** | **Infected food** | **Fever, abdominal cramps, diarrhoea, vomiting** | **Vaccination** of poultry (chickens). |
| 5 | **Gonorrhoea** | **Bacteria** | | **Discharge** from **penis/ vagina, pain** when **urinating** | Controlled by **antibiotics**. Spread prevented by **condoms**. |
| 6 | **Rose Black Spot** | **Fungus** | **Spores** carried by **water** or **wind** | **Leaves** turn **yellow, fall early. Photosynthesis reduced.** | Treated by **fungicides** or **destroying affected leaves**. |
| 7 | **Malaria** | **Protist** | | **Fever,** can be **fatal.** | |

## Section 2: Non-Specific Defences



## Section 3: Key terms

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|---|---|
| | A **microorganism** that **causes disease**. |
| | A type of **pathogen** that **produces toxins that damage tissues**. |
| | A type of **pathogen** that **lives and replicates within cells** and causes **cell damage**. It is **difficult to kill viruses without damaging cells**. |
| | Some white blood cells (lymphocytes) produce antibodies. These **bind to pathogens** and **destroy them** or **stick them together**. |
| | Produced by some white blood cells. **neutralise toxins**. |
| | **kill bacteria**.. **Do not kill viruses**. |
| | **relieve symptoms** but **don't kill pathogens**. |
| | Some white blood cells (phagocytes) **engulf pathogens**. |

## Section 4: Drugs

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|---|---|
| 22 Aspirin | Originates from the **willow** tree. |
| 23 Digitalis | A **heart drug**. Originates from **foxglove** plants. |
| 24 Penicillin | Discovered by Alexander Fleming from the ***Penicillium*** **fungus.** |
| 25 New drugs | Most new drugs are **synthesised by chemists in the pharmaceutical industry.** The **starting point** may be a **chemical extracted from a plant.** |

## Section 5: Clinical Trials

| Trial | Stage | Purpose |
|---|---|---|
| 26 | 1. **Preclinical – cells, animals** | Test for **toxicity** and **efficacy** before testing humans |
| 27 | 2. **Healthy volunteers** | **Very low doses** to test for **toxicity.** |
| 28 | 3. **Patients** | Larger groups. Test for **t_____**, **e_____** and **d_____. Placebos** may be used in a **double-blind trial**. |

## Clinical Trial Key Terms

| | | |
|---|---|---|
| 29 | Placebo | A drug with **no active ingredients**, designed to **mimic a real drug**. Used to test if the effects of a drug on a patient are just **psychological**. |
| 30 | | The volunteers do not know which group they are in, and neither do the researchers, until the end of the trial |
| 31 | Toxicity | How **harmful** the drug is. May have dangerous **side effects**. |
| 32 | Efficacy | How **effective** the drug is. |
| 33 | | The **amount** of the drug given to the patient. |

| 20 Natural Immunity | 21 Vaccination |
|---|---|
| | Dead or weakened pathogen is injected |
| The correct white blood cell is found | |
| Antibodies are produced | Antibodies are produced |
| The white blood cells remain as memory cells | |
| | If the pathogen returns, antibodies will be produced quickly |