CHAPTER 8: BODY SYSTEMS
YOU’VE GOT GUTS

- CARBOHYDRATES
- FATS
- PROTEINS
THE DIGESTIVE SYSTEM
WHAT DO PARTS OF THE DIGESTIVE SYSTEM DO?

- A process called digestion turns food into a form that your body can use.
- It happens as food passes down a tube made up of different organs, called the gut.
- Other organs, like the liver, also help with digestion.
- The gut and these other organs make up the digestive system.
THE DIGESTIVE SYSTEM

• THE GUT IS ABOUT 8M LONG. THE INTESTINES ARE COILED UP SO THAT THEY CAN FIT INSIDE THE BODY.

• IT NORMALLY TAKES BETWEEN 24 AND 48 HOURS FOR FOOD TO GO THROUGH THE GUT.

• FIBRE IN YOUR DIET HELPS THIS TO HAPPEN.

• MOST OF THE FOOD WE EAT IS INSOLUBLE (IT WON’T DISSOLVE). TO MAKE THE MOST OF OUR FOOD, MOST OF IT NEEDS TO BE BROKEN DOWN INTO SMALLER, SOLUBLE SUBSTANCES.

• THIS IS WHAT HAPPENS IN DIGESTION.
• SPECIAL CHEMICALS CALLED ENZYMES DO THIS.
• SUGARS (EX: GLUCOSE), VITAMINS AND MINERALS ARE SMALL AND SOLUBLE IN WATER AND AS A RESULT CAN PASS THROUGH THE WALL OF THE SMALL INTESTINE.
• LARGER INSOLUBLE MOLECULES, LIKE STARCH, FATS AND PROTEINS, NEED TO BE BROKEN UP INTO SMALL, SOLUBLE MOLECULES, BY ENZYMES.
INGESTION

• PUTTING FOOD IN YOUR MOUTH IS CALLED INGESTION.
• YOUR TEETH GRIND YOUR FOOD INTO SMALLER PIECES.
• THE SALIVARY GLANDS PRODUCE A LIQUID CALLED SALIVA.
• SALVIA MAKES THE FOOD MOIST SO THAT IT’S EASY TO SWALLOW.
• CARBOHYDRATE DIGESTION STARTS IN THE MOUTH.
THE GULLET

- WHEN YOU SWALLOW, THE WINDPIPE IS SHUT OFF AND FOOD GOES INTO THE GULLET.
- MUSCLES IN THE WALL OF THE GULLET CONTRACT (GET SMALLER) TO NARROW THE TUBE ABOVE THE FOOD. THIS IS CALLED PERISTALSIS.
- THIS PUSHES FOOD DOWN TO THE STOMACH.
THE STOMACH

• PROTEIN DIGESTION STARTS IN THE STOMACH, BY THE ENZYME PEPSIN.

• IN THE STOMACH, FOOD IS CHURNED UP WITH A STRONG ACID (HYDROCHLORIC ACID, PH 1-2). THE ACID IS NEEDED TO ACTIVATE THE ENZYMES AND TO KILL ANY BACTERIA.
THE SMALL INTESTINE

• THE PARTICLES THAT MAKE UP FOOD ARE CALLED MOLECULES.

• SMALL MOLECULES ARE ABSORBED (TAKEN INTO THE BODY) THROUGH THE WALL OF THE SMALL INTESTINE.

• STARCH, PROTEINS AND FATS ARE BROKEN DOWN IN THE SMALL INTESTINE.

• THE SMALL INTESTINE IS HIGHLY FOLDED TO INCREASE THE SURFACE AREA FOR ABSORPTION.
THE SMALL INTESTINE – VILLI

• THE SMALL INTESTINE IS COMPLETELY LINED WITH VILLI.
• THESE ARE NEEDED TO INCREASE THE SURFACE AREA FOR ABSORPTION OF NUTRIENTS.
• THE LARGER THE SURFACE AREA, THE MORE NUTRIENTS CAN BE ABSORBED.
THE LARGE INTESTINE

- FOOD THAT WE CANNOT DIGEST, (EX: FIBRE) GOES INTO THE LARGE INTESTINE, WHERE WATER IS REMOVED.
- THIS FORMS A MORE SOLID MATERIAL CALLED FAECES.
RECTUM AND ANUS

- Faeces are stored in the rectum.
- They are eventually pushed out of the anus in a process called egestion.
SUMMARY

• FOOD IS CHEWED TO MAKE DIGESTION EASIER.
• THE STOMACH STARTS TO DIGEST THE FOOD AND MAKES IT INTO A LIQUID.
• THE SMALL INTESTINE FINISHES DIGESTING THE FOOD AND THE TINY DISSOLVED FOOD PARTICLES MOVE INTO THE BLOOD.
• UNDIGESTED FOOD PASSES OUT THROUGH THE LARGE INTESTINE.
CIRCULATION
BLOOD VESSELS

• THERE ARE 3 TYPES OF BLOOD VESSELS IN HUMANS:

1) ARTERIES (CARRY BLOOD AWAY FROM THE HEART)
   ➢ CARRY OXYGENATED BLOOD.

2) VEINS (CARRY BLOOD TOWARDS THE HEART)
   ➢ CARRY DEOXYGENATED BLOOD.

3) CAPILLARIES (CONNECT AN ARTERY TO A VEIN)
THE HEART

- Left Atrium
- Right Atrium
- Left Ventricle
- Right Ventricle
The heart (diagrammatic).

- Vena Cava
- Pulmonary Veins
- Right Atrium
- Pulmonary Artery
- Right Ventricle
- Left Atrium
- Left Ventricle
- Aorta

Direction of blood flow:
- Venous blood returned to heart
- Oxygenated blood from lungs
Microorganisms are Very Small

When millions of them grow in one place then you can see them.

Colonies of Bacteria and Fungi growing in an agar plate.

Agar jelly is their food.

Biggest

Smallest

Fungi

Bacteria

Viruses

FunGI

VIRUSES

BACTERIA

(On a needle)
Some diseases are caused by the things we do:
Over eating, cigarettes, alcohol, drugs
These are called **LIFESTYLE** diseases:
Obesity, Heart disease, lung cancer.
Remember: **YOU** can change your lifestyle

If you are infected with one of these you will show **symptoms**:
E.g. runny nose, high temp, spots, sneezing etc.

- Athletes foot
- Flu, HIV
- Tuberculosis, Cholera

- Fungal
- Viral
- Bacterial
HOW DO MICROBES SPREAD?
## HOW DO MICROBES SPREAD?

### STARTER:

MATCH THE DISEASE TO THE MICROBE WHICH CAUSES IT:

<table>
<thead>
<tr>
<th>Disease</th>
<th>Microbe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlete’s foot</td>
<td>HIV virus</td>
</tr>
<tr>
<td>Flu</td>
<td>Bacteria</td>
</tr>
<tr>
<td>Common cold</td>
<td>Fungus</td>
</tr>
<tr>
<td>Aids</td>
<td>Not caused by a microbe</td>
</tr>
<tr>
<td>Food poisoning</td>
<td>Virus</td>
</tr>
<tr>
<td>Cancer</td>
<td>Virus</td>
</tr>
</tbody>
</table>
DISEASES CAN SPREAD BY...

- Coughs/Sneezing (Air)
- Water
- Food
- Touch
- Animals
- Sexual contact
DISEASES

SOME HARMFUL MICROBES CAUSE DISEASES. BACTERIA AND VIRUSES ARE THE MOST COMMON CAUSES OF DISEASES.

THE SPREAD OF DISEASES IS KNOWN AS TRANSMISSION
AIR

DROPLETS CONTAINING MICROBES FLY INTO THE AIR WHEN PEOPLE SNEEZE OR COUGH. THE MICROBES THEY CONTAIN GET INTO OTHER PEOPLE IF BREATHED IN.

EG. CHICKEN POX, COLDS, MEASLES
ANIMALS

ANIMALS MAY CARRY HARMFUL MICROBES. THE MICROBES CAN GET INTO A PERSON WHO IS SCRATCHED OR BITTEN BY SUCH AN ANIMAL

EG. MALARIA SPREAD BY MOSQUITOES
FOOD

FOOD CAN HAVE HARMFUL MICROBES IN AND ON IT. THE MICROBES GET INTO THE BODY WHEN THE FOOD IS EATEN, CAUSING FOOD POISONING.
Microbes can be passed from one person to another when people touch each other, or when they touch something an infected person has handled.

Ex: Athlete's Foot
WATER CAN HAVE HARMFUL MICROBES IN IT. THE MICROBES GET INTO THE BODY WHEN THE WATER IS SWALLOWED.

EG. CHOLERA
DISINFECTANTS

- **DISINFECTANTS** are substances that are applied to non-living objects to destroy microorganisms.
ANTISEPTICS

ANTIMICROBIAL SUBSTANCES THAT ARE APPLIED TO LIVING TISSUE/SKIN TO REDUCE THE POSSIBILITY OF INFECTION
How do microbes make us ill?

Microbes are microorganisms that are too small to be seen. A pathogen is a microbe that can cause diseases if it enters the body:

- They can be breathed in through the mouth or nose
- They can be ingested (eaten) through the mouth
- They can enter through cuts or bites in the skin or just by touching something
- ...or other natural openings...
CHICKEN POX

Spread by:

**Direct contact** — eg touching or hugging someone with it

**In the air** — you can breathe in the microbes

Symptoms:
- Rash
- Coughing
- Sneezing
MALARIA

Spread by: Mosquitoes.

- A mosquito bites an infected person and drinks their blood.
- If the mosquito bites someone else – they pass the microbes on in the blood.

Symptoms
- Headache
- Vomiting
- Diarrhoea
COMMON COLD

Spread by:

**Direct contact** – ex: touching or hugging someone with it

**Sneezing** – you release viruses into the air

Symptoms:
- Coughing
- Sneezing
- Sore throat
- Headache/tummy ache
CHOLERA

Spread by:

Water

If an infected person goes to the toilet, the bacteria enters the water.

If someone else drinks the water they will become infected

Symptoms:
- Vomiting
- Diarrhoea
- Muscle cramps
How is it spread?

• Food poisoning is caused by bacteria in food.
• Certain foods like meat contain bacteria that could make you ill.
• When you cook food it kills the bacteria
• If your food is not cooked all the way through the bacteria are not killed. If the food is eaten the bacteria are able enter you body.

Symptoms:
• Vomiting
• Diarrhoea
• Muscle cramps
ATHLETES FOOT

• SPREAD BY:
  • ATHLETES FOOT IS CAUSED BY A SPECIFIC TYPE OF FUNGUS.
  • IT IS MAINLY TRANSMITTED THROUGH PUBLIC SHOWERS.

• SYMPTOMS:
  • PEELING, CRACKING, AND SCALING OF THE FEET.
  • REDNESS, BLISTERS, OR SOFTENING AND BREAKING DOWN OF THE SKIN.
  • ITCHING, BURNING, OR BOTH
HIV: Human Immunodeficiency Virus

HIV is a virus which attacks immune system in humans.

AIDS: Acquired Immune Deficiency Syndrome

AIDS is a medical condition (immune system is too weak to fight infections).
Example: **Tetanus**

**How is it spread?**

- Tetanus is caused by a bacteria
- The bacteria lives on dirty objects such as rusty nails
- If you have an open cut that touches something with the bacteria on it the bacteria will pass through the cut into your body.
- If something with the tetanus bacteria on it pierces your skin the bacteria will also be able to pass into your blood.

**Symptoms:**

- Lockjaw
- Spasms

Mode of transmission: **Through cuts or breaks in the skin.**
Mode of transmission: **Bitten by an infected animal**

Example: **Rabies**

**How is it spread?**

If an animal infected with the rabies virus bites you the virus enters your body through the cut when you are bitten.

**Symptoms:**

- Flu like symptoms
- Hallucinations
- Brain damage / death
The purpose of the immune system is to keep pathogens, such as certain bacteria, viruses, and fungi, out of the body, and to destroy any infectious microorganisms that do invade the body.

The immune system is made up of a complex and vital network of cells and organs that protect the body from infection.

The following are some of the organs that make up the immune system: appendix, tonsils, and spleen. Thus these organs help to fight off infections.
YEAST

• YEAST IS A UNICELLULAR FUNGUS THAT IS ADDED TO BREAD TO ALLOW IT TO RISE.

• WHEN THE YEAST IS ADDED TO THE BREAD, IT RESPIRES:
• GLUCOSE + OXYGEN $\rightarrow$ CARBON DIOXIDE + WATER + ENERGY

• THE CARBON DIOXIDE THAT IS PRODUCED IS WHAT ALLOWS THE DOUGH TO RISE BY FORMING AIR POCKETS IN THE DOUGH
YOGURT PRODUCTION

• WHEN SPECIFIC TYPES OF BACTERIA ARE ADDED TO MILK, THEY CAUSE IT TO COAGULATE. THIS FORMS YOGURT.

• THE LACTOSE IN THE MILK IS CONVERTED INTO LACTIC ACID, GIVING YOGURT ITS PARTICULAR SOUR TASTE.
WINE AND BEER PRODUCTION

• Yeast can also be used to produce wine and beer.

• A special type of reaction takes place which results in the production of alcohol.