

# OCR (B) Biology GCSE

Topic B2.2: How do organisms protect themselves against pathogens?

Flashcards

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# What is a non-specific defence?



# What is a non-specific defence?

- Always present
- Same for all organisms
- Prevent pathogens from entering the body



Name the three types of non-specific defence



## Name the three types of non-specific defence

- **Physical** - barrier to pathogens
- **Chemical** - chemicals damage or kill pathogens
- **Microbial** - microorganisms compete with pathogens



Give some examples of the body's  
physical defence system (3)



## Give some examples of the body's physical defence system (3)

- **Skin** - protective surface barrier
- **Blood clotting** - platelets seal wounds preventing entry of pathogens into the blood
- **Respiratory tract** - mucus traps pathogens, cilia waft mucus to the back of the throat where it is swallowed



Describe how platelets are adapted to their function





# Describe how platelets are adapted to their function

- Small and flexible (no nucleus) allowing easy movement through capillaries
- Surface proteins enable adhesion to other platelets or to rough edges around the site of damage
- Can change shape to form a plug that seals the wound
- Contain other chemicals which aid blood clot formation



Give some examples of the body's  
chemical defence system (3)



## Give some examples of the body's chemical defence system (3)

- **Tears** - contain lysozyme which digests bacterial cell walls, killing bacteria and protecting the eye
- **Hydrochloric acid** in stomach - acidic pH kills pathogens
- **Saliva** - contains chemicals that destroy pathogens in the mouth



Give an example of the body's microbial defence system



Give an example of the body's microbial defence system

Bacteria in the gut and on the skin compete with pathogens, reducing their chance of survival.



Describe the physical defence system  
within plants (biology only)



# Describe the physical defence system within plants (biology only)

- **Waterproof waxy cuticle** - surface barrier preventing the entry of pathogens
- **Cellulose cell wall** - further barrier against pathogens



# What is the immune system?





# What is the immune system?

- The body's defence against pathogens once they have entered the body
- Aims to prevent or minimise disease caused by pathogens



# How do white blood cells detect pathogens in the body?



## How do white blood cells detect pathogens in the body?

- Pathogens have unique antigens on their surface
- WBCs have specialised receptors which can detect these ‘non-self’ antigens on pathogens



# How do white blood cells destroy pathogens? (3)



## How do white blood cells destroy pathogens? (3)

- Phagocytosis
- Antibody production
- Antitoxin production



# Describe phagocytosis



## Describe phagocytosis

A phagocyte (type of WBC) engulfs a pathogen and digests it



# How is a phagocyte adapted to its function?





## How is a phagocyte adapted to its function?

- **Flexible membrane** allows it to engulf foreign material
- Contains **enzymes** that digest the pathogen



# What are antibodies?



# What are antibodies?

- Proteins produced by B-lymphocytes (type of WBC) in response to an antigen
- Each antibody is specific to an antigen and binds to it
- ‘Tags’ pathogens or causes them to clump together, disabling them and aiding phagocytosis



# How do white blood cells produce antibodies?



# How do white blood cells produce antibodies?

- WBCs detect 'non-self' antigens on foreign material
- Receptors on WBCs bind to antigens
- WBCs produce antibodies specific to the antigens
- WBCs divide by mitosis, producing copies of themselves, enabling the rapid production of antibodies



# What are memory cells?



# What are memory cells?

- WBCs that remain in the body after a pathogen has been destroyed
- Provide immunity - if the body is re-infected, antibodies are produced more rapidly and the pathogen is destroyed before it can produce disease symptoms



# What are antitoxins?





# What are antitoxins?

Proteins produced by WBCs to neutralise toxins released by pathogens



Describe the chemical defence system  
within plants (biology only)



## Describe the chemical defence system within plants (biology only)

- Produce antimicrobial substances in response to pathogens
- These destroy or prevent the growth of pathogens



# Why are plant defence systems important? (biology only)



# Why are plant defence systems important?

(biology only)

- Plants are producers so all organisms higher up in food chains rely upon their survival and ability to fight disease
- Important in maintaining human food security

