

# OCR (B) Biology GCSE

Topic B2.4: How can we identify the  
cause of an infection? **(biology only)**

Flashcards

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How can diseases be detected and identified in the field?



# How can diseases be detected and identified in the field?

- Observation of symptoms
- Symptoms may be specific to a disease and easily identifiable e.g. TMV causes discolouration of leaves, chicken pox causes red, blistering spots
- Books and online resources aid identification



Why is it difficult to identify a disease using symptoms alone?



Why is it difficult to identify a disease using symptoms alone?

Many diseases may have similar symptoms



How can a disease be detected from a sample in the laboratory? (7)



# How can a disease be detected from a sample in the laboratory? (7)

- Counting cells
- Culturing cells
- Microscopes and staining
- Testing with antimicrobials
- Genome analysis
- Isolation and reinfection (plants)
- Using monoclonal antibodies



# How does counting cells help diseases to be identified?





# How does counting cells help diseases to be identified?

- Low RBC count indicates anaemia
- High WBC count shows that the body is fighting off an infection
- Low WBC count may indicate diseases such as HIV, leukaemia etc.



# How does culturing cells enable the identification of disease?



# How does culturing cells enable the identification of disease?

- It increases the number of microorganisms, making it easier to identify the colonies present.
- Antibiotics can be added to a colony. The reaction of the pathogen to the antibiotics can help identify it.



# How do microscopes help to identify pathogens?



How do microscopes help to identify pathogens?

They enable the structure of pathogens to be observed in greater detail



How can staining be used to identify a pathogen?



# How can staining be used to identify a pathogen?

Staining differentiates between different types of pathogens e.g. Gram stain distinguishes Gram negative (stains pink) from Gram positive (stains purple) bacteria.



Describe how genome analysis is used  
to identify a pathogen





## Describe how genome analysis is used to identify a pathogen

- The microorganisms genetic material can be analysed and compared to the genomes of known pathogens
- **Gene probes** added to determine whether a specific pathogen is present



# What is a gene probe?



# What is a gene probe?

- A single strand of DNA (often bound to a fluorescent molecule) that is used to identify a specific base sequence in a DNA sample
- Complementary to a base sequence in a pathogen's DNA
- If the pathogen is present, the gene probe will bind to the pathogen's DNA



Describe the process of isolation and  
reinfection in plants



# Describe the process of isolation and reinfection in plants

- Microorganism thought to be the cause of disease is isolated and cultured
- Used to infect healthy plants
- If the healthy plants develop the same symptoms as the infected plants, the pathogen has been identified



What is important when handling samples containing microorganisms in the lab?



What is important when handling samples containing microorganisms in the lab?

Aseptic techniques



# What are monoclonal antibodies? (higher)





## What are monoclonal antibodies? (higher)

- Antibodies that are clones from one parent cell
- Specific to one type of antigen



Describe how monoclonal antibodies are produced (higher)



# Describe how monoclonal antibodies are produced (higher)

- Specific antigen injected into an animal
- WBCs producing complementary antibodies extracted
- WBCs fused with tumour cells
- Resulting cells cultured
- Monoclonal antibodies collected



# Outline the uses of monoclonal antibodies (higher)



# Outline the uses of monoclonal antibodies (higher)

- Detect pathogens  
(e.g. malaria diagnostic stick)
- Treat cancer
- Pregnancy test kits



What does a malaria test consist of?  
(higher)



## What does a malaria test consist of? (higher)

A diagnostic stick containing monoclonal antibodies (MAs) specific to the antigens on the plasmodium:

- MAs attached to a dye (free to move)
- MAs fixed to the test stick



Describe what happens to the test stick if the pathogen is present (**higher**)





Describe what happens to the test stick if the pathogen is present (**higher**)

- Blood sample placed at one end of the stick and diffuses up the stick
- MAs attached to a dye and MAs fixed to the stick bind to the plasmodium antigens
- Test strip changes colour



Describe what happens to the test stick if the pathogen is not present (**higher**)



Describe what happens to the test stick if the pathogen is not present (higher)

No change



What is the advantage of using monoclonal antibodies to test for diseases? (higher)



What is the advantage of using monoclonal antibodies to test for diseases? (higher)

- Specific to one particular antigen
- Very accurate
- Quick results

