



Sadiq Public School
Do the right, fear no man

Subject: BIOLOGY

Class: C2

Day: Saturday, 16th November 2024

LESSON:

Topic:

Disease and Immunity

This lesson is about the Cholera as a disease, its transmission and diarrhea.

A: Inquiry:

Do you know that Cholera is a highly infectious disease caused by *Vibrio cholerae*, typically spread through contaminated water, food, and poor sanitation? Symptoms include watery diarrhea, vomiting, rapid dehydration, electrolyte imbalance, abdominal cramps, fever, headache, and fatigue. If left untreated, cholera can lead to severe dehydration, kidney failure, respiratory distress, septicemia, and even death.

The disease is often endemic in developing countries, particularly in Africa, Asia, and Latin America, where poor infrastructure and limited access to healthcare exacerbate outbreaks. Conflict zones and natural disasters, such as floods and earthquakes, also increase the risk of cholera transmission. The global incidence of cholera is estimated at 1.3 million cases and 21,000-143,000 deaths annually.

B: Information

Cholera is a highly infectious bacterial disease caused by *Vibrio cholerae*. Cholera's history dates back to 1563, with seven pandemics occurring between 1817 and 1961. The current pandemic, ongoing since 1961, has seen notable outbreaks in Haiti, Yemen, and Somalia. Despite challenges such as limited access to healthcare, poor infrastructure, and lack of awareness, solutions include improving WASH infrastructure, enhancing community education, increasing access to healthcare, developing effective vaccines, and strengthening global response to outbreaks, typically spread through:

1. Contaminated water
2. Food (especially seafood, fruits, and vegetables)
3. Fecal-oral route (poor sanitation and hygiene)
4. Person-to-person contact

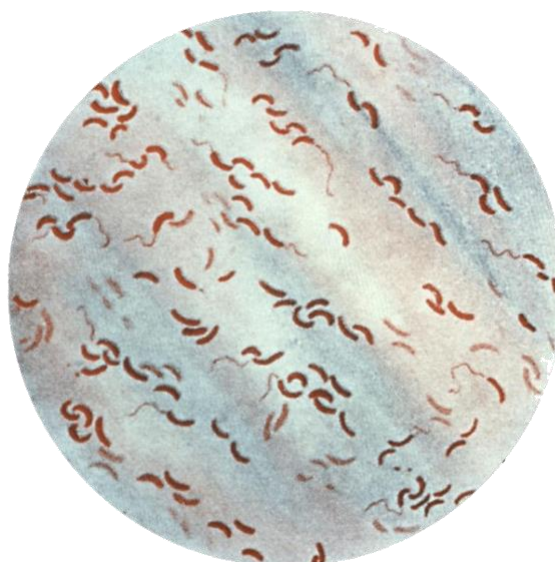
Symptoms:

1. Diarrhea (watery, pale, and profuse)
2. Vomiting
3. Rapid dehydration
4. Electrolyte imbalance
5. Abdominal cramps
6. Fever (in some cases)

Cholera causes diarrhea

- Diarrhea is the loss of large volumes of watery faeces from the anus
- If it is severe and continues for a long time, it can lead to death by dehydration
- Severe diarrhea can cause the loss of significant amounts of water and ions from the body, causing the tissues and organs to stop working properly
- It can be effectively treated by oral rehydration therapy
- This is a drink with a small amount of salt and sugar dissolved in it
- There are many causes of diarrhea, one of which is infection with the bacterium *Vibrio cholerae*, which causes the disease cholera

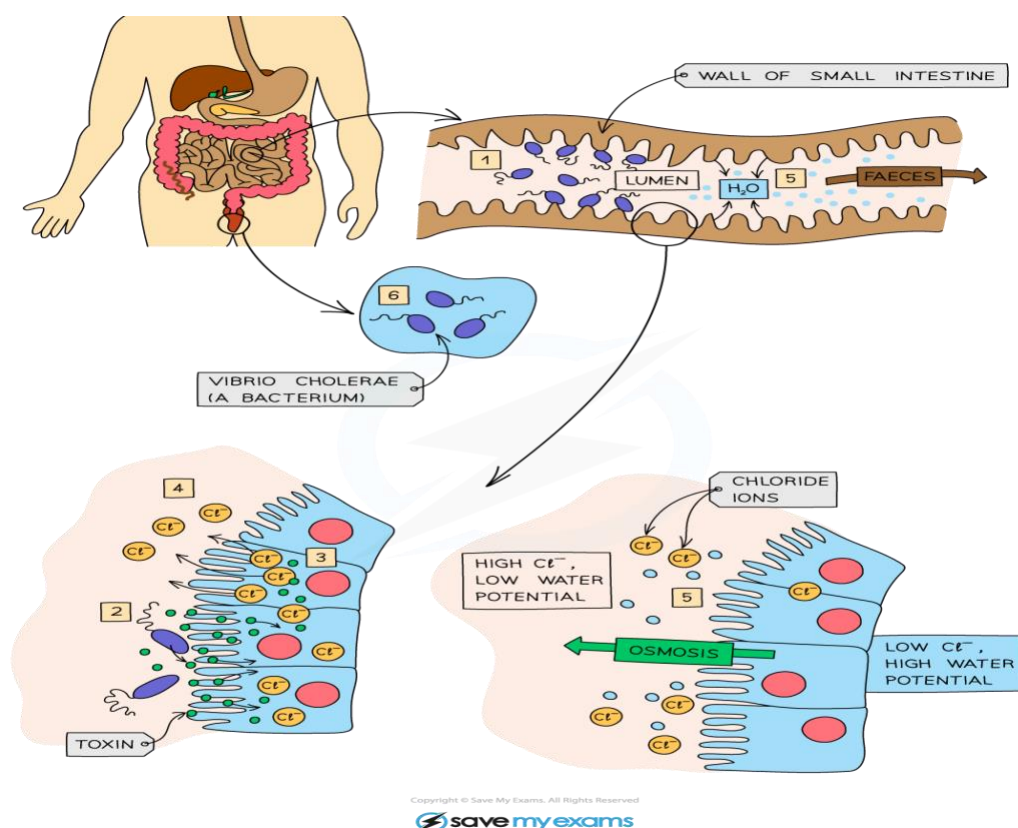
The pathogen *Vibrio cholerae* can cause cholera



How does *Vibrio cholerae* cause diarrhea?

When *V. cholerae* is ingested via infected water or food and enters the small intestine, it can cause illness as follows:

1. Bacteria attach to the wall of the small intestine
2. They produce a toxin
3. The toxin stimulates the cells lining the intestine to release chloride ions from inside the cells into the lumen of the intestine
4. The chloride ions accumulate in the lumen of the small intestine and lower the water concentration there
5. Once the water concentration is lower than that of the cells lining the intestine, water starts to move out of the cells into the intestine (by osmosis)
6. Large quantities of water are lost from the body in watery faeces
7. The blood contains too few chloride ions and water



Diarrhoea is a symptom of cholera; it can lead to severe dehydration and death

Prevention and control:

Prevention measures include providing safe water supply, improving sanitation, promoting handwashing, ensuring food safety, and vaccinating at-risk populations. Treatment involves oral rehydration therapy, intravenous fluids, antibiotics, and zinc supplementation. Research focuses on developing more effective vaccines, improving diagnostic tests, addressing antibiotic resistance, and enhancing water purification technologies. Effective control measures require a multi-faceted approach, including community-based initiatives, healthcare provider training, and policy changes. By addressing the root causes of cholera transmission and improving response strategies, we can reduce the burden of this disease and protect vulnerable populations.

C: Feedback

1. Write your own summary-notes in your notes book based on the information you read.

D: Practicing activity:

1. Revise your concepts.
2. Solve the Exam-styled questions given at the end of units on your Cambridge endorsed text books.
3. Practice past paper questions relevant to the topic