

**Gastrointestinal Tract Module**  
**Watery (secretory) diarrhea**  
**Lec 5**

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# Watery (secretory) diarrhea

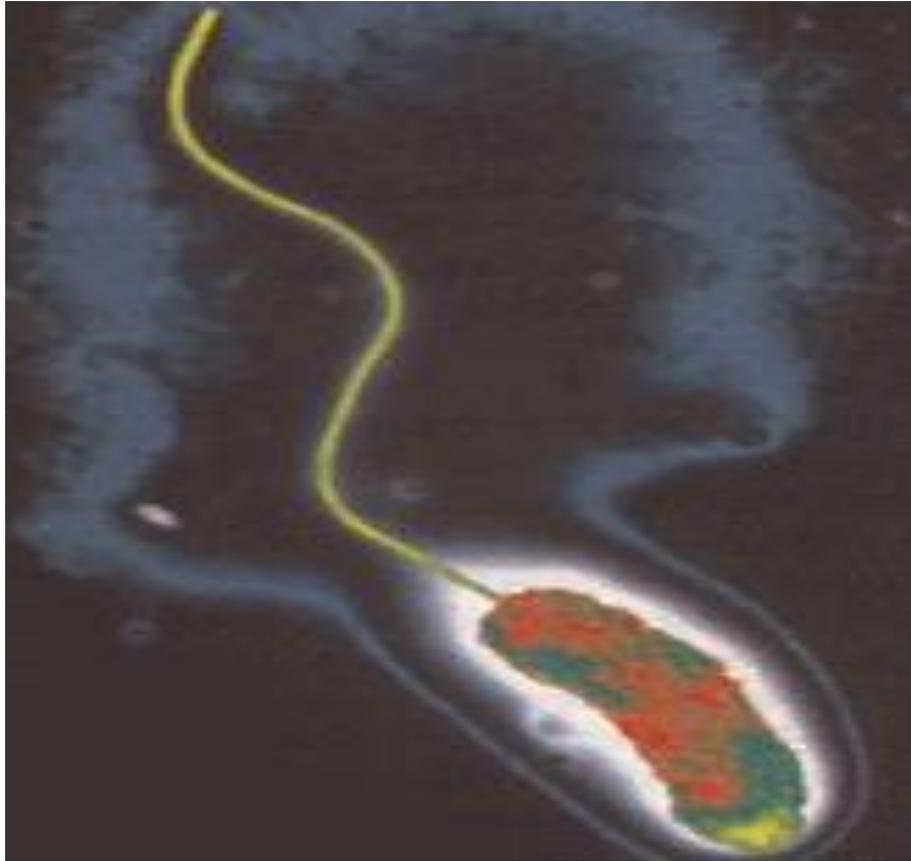
*V. cholera*

ETEC

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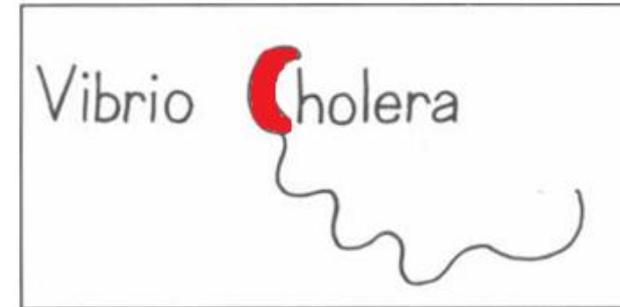
# *Vibrio Cholera*



# *Vibrio Cholera*

## **Bacteriology**

- Curved, Gram-negative rods
- Highly motile (single polar flagellum)
- Optimum growth at alkaline pH (8-8.5)



## **Habitat**

- It normally lives in water attached to the outer surfaces of crustaceans
- Crustaceans: crabs, lobsters and shrimp

## **Infective\_dose**

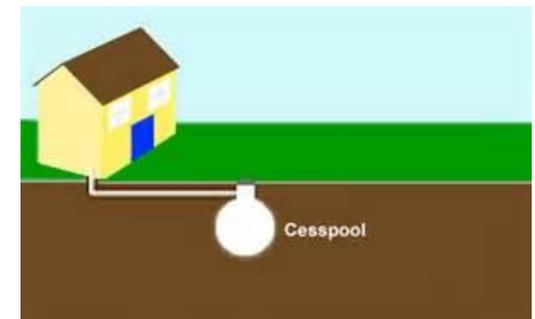
must ingest > 10 million organisms to get colonization of intestine using pili (no invasion)

# *Vibrio Cholera*



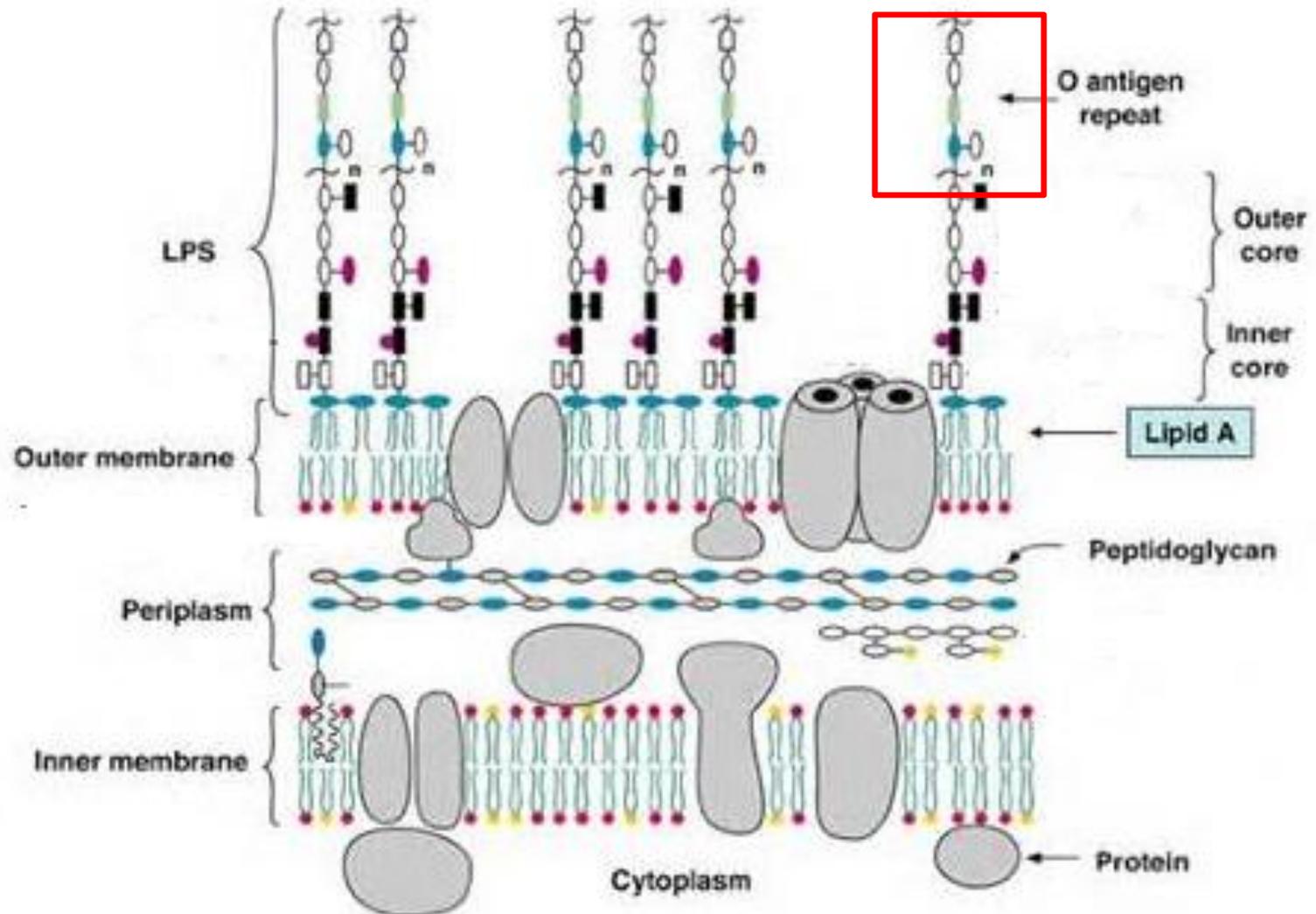
## **Transmission**

- 1- contaminated water and food
- 2- consumption of raw or undercooked seafood
- 3- contaminated vegetables from fields fertilized with cesspools
- 4- Not transmissible from person-to-person



# *Vibrio Cholera*

## Classification



# Vibrio Cholera

## Classification

### Serological classification

Based on Lipopolysaccharide (LPS)

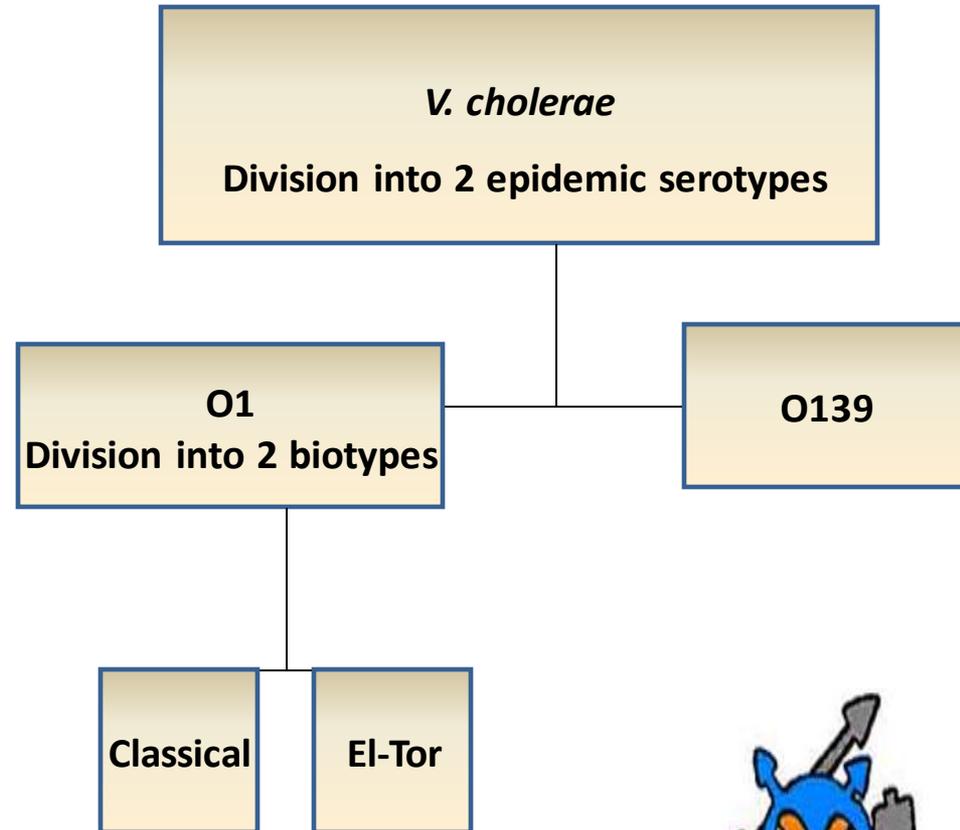
O antigen structure

1- Toxigenic strains

- O1 (Classical and EL Tor strains)
- O139
- Produce cholera toxin

2- Nontoxigenic strains (>150 exist):

- Called nontoxigenic O1 strains
- Rarely associated with epidemic
- Do not produce cholera toxin
- Produced other virulence factors associated with diarrhea



# *Vibrio Cholerae*

## Clinically

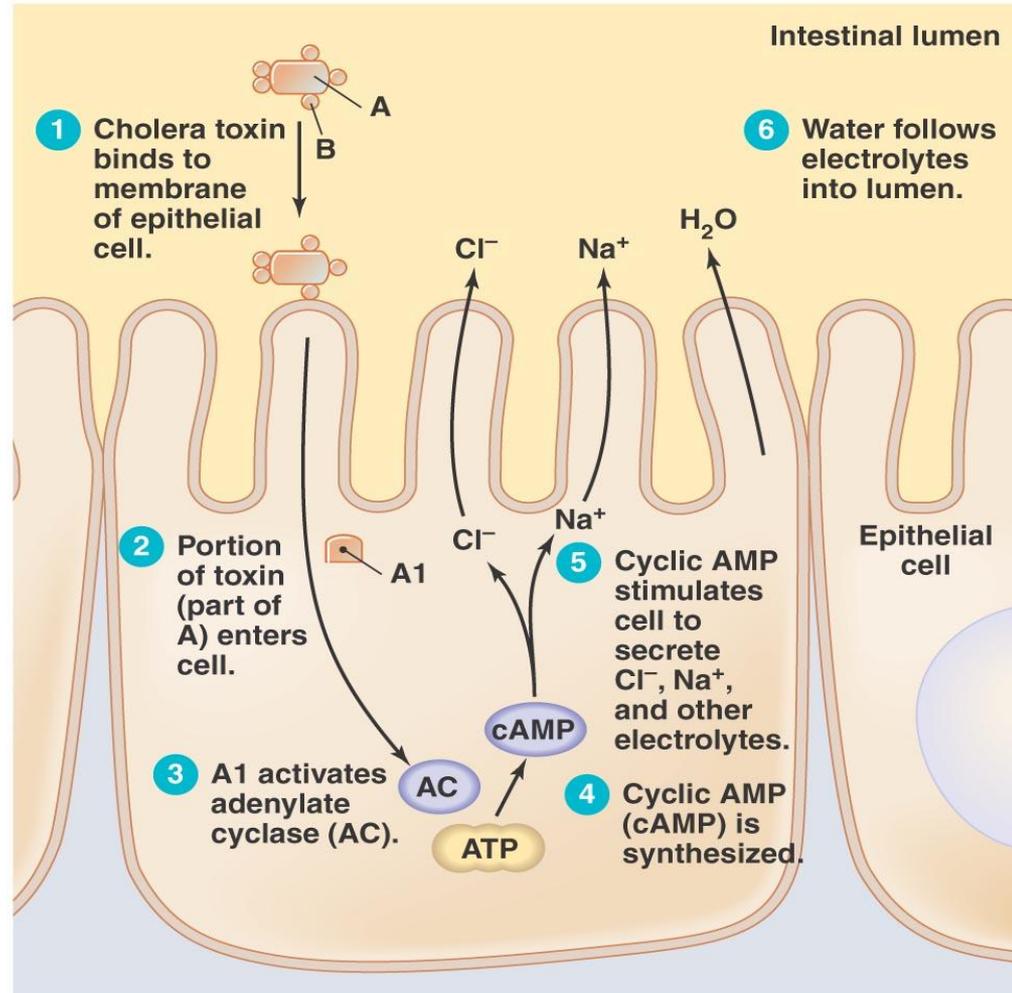
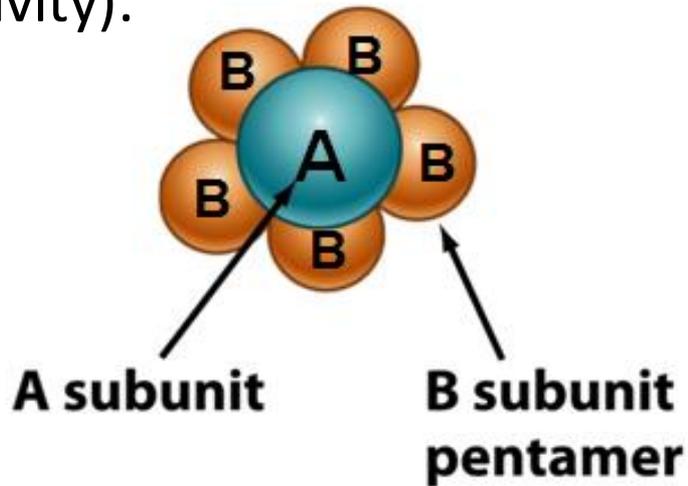
- **Watery diarrhea** flecked with mucus and dead cells and resembles rice water (rice-water stool).
- Nausea, **vomiting**, and **muscle cramps**
- **Dehydration**, a dry mouth, extreme thirst, low blood pressure, and an irregular heartbeat (arrhythmia).
- **Shock.**
- **Visible Symptoms** : sunken eyes, poor skin turgor (elasticity), and little or no urine output.



# Vibrio Cholera

## Toxin structure and mode of action

The cholera toxin is composed of five B subunits (for binding) and one A subunit (has the toxic enzymatic activity).



# *Vibrio Cholera*

## Treatment:

- The course of treatment is decided by the degree of dehydration
  - Oral Rehydration
    - ✓ 80% of cases can be treated through oral rehydration salts
    - ✓ Used when the dehydration is less than 10% of body weight
  - Intravenous Rehydration

Used in patients who lost more than 10% of body weight from dehydration or are unable to drink due to vomiting
  - Antimicrobial Therapy
    - ✓ antibiotics are reserved for more severe cholera infections
    - ✓ antibiotics can diminish duration of diarrhea, reduce volume of rehydration fluids needed, and shorten duration of *V. cholera* excretion
- No antitoxin

# *Vibrio Cholera*

## Diagnosis

- Rice-water diarrhea
- Gram negative curved rods
- Vibrios often detected by dark field or phase contrast microscopy of stool
- Isolation of bacteria using special media
- Additional methods including PCR

## Prevention:

- Hygiene and clean water
- Avoid eating raw or undercooked fish and shellfish
- Vaccine: Oral killed vaccine for O1 Ag type

**Thank you**