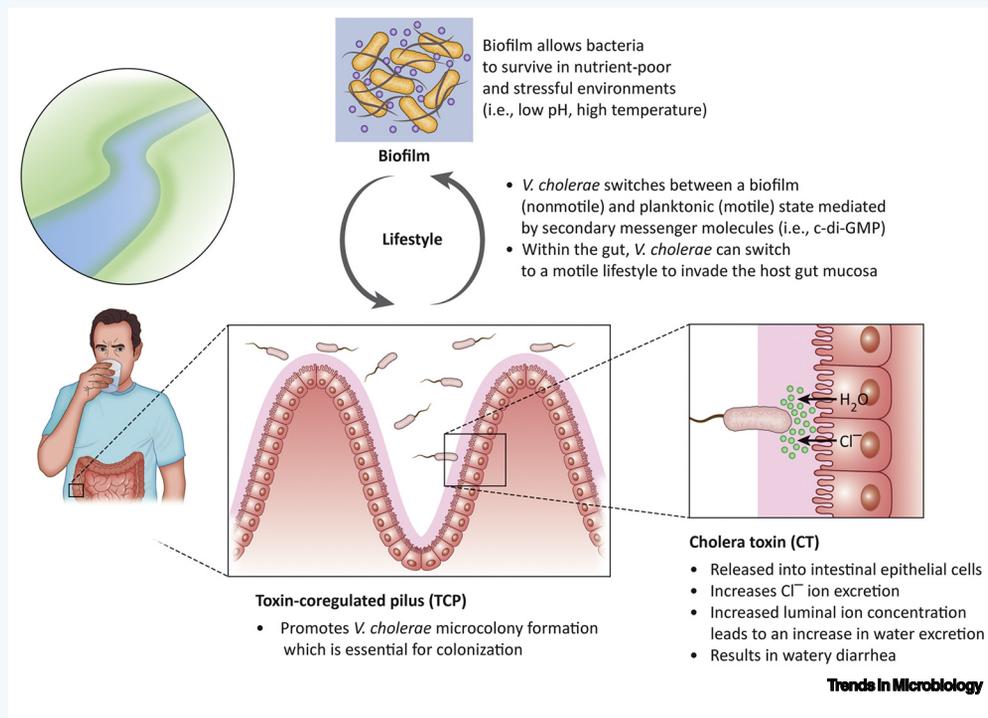


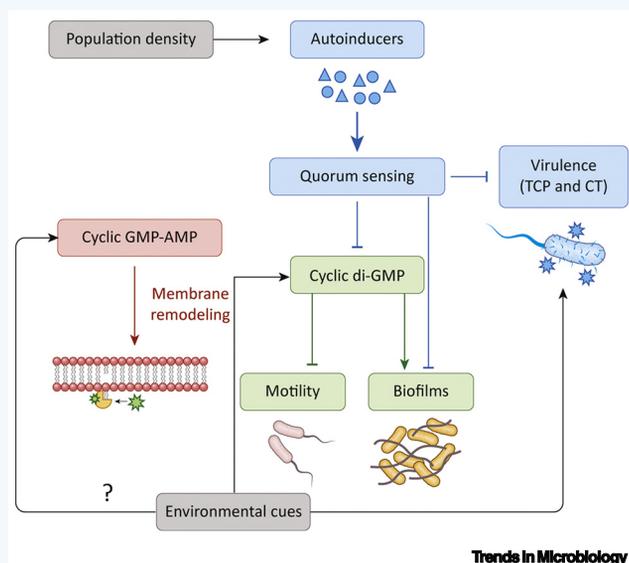
# Vibrio cholerae

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*Vibrio cholerae* is the bacterial pathogen responsible for the disease cholera, plaguing many developing nations and areas of poor sanitation, and causing about 2.9 million cases and ~95 000 deaths annually. It is transmitted through contaminated water and infects the host using two major virulence factors: the toxin-coregulated pilus (TCP) and cholera toxin (CT). TCP is important for colonization of the host gut mucosal layer where CT is released and passes through the gastroendothelial wall to cause watery diarrhea. Biofilm formation by *V. cholerae* provides protection and a means of transportation for the bacteria to colonize a wide range of environments such as humans and aquatic reservoirs. *V. cholerae* is used as a model organism to study virulence due to its high infectious dose, ease of genetic manipulation, and rapid replication time. It is also a model for studying chemical signaling such as cell-to-cell communication via quorum sensing and cyclic dinucleotide signaling.



## TAXONOMY AND CLASSIFICATION:

**KINGDOM:** Bacteria  
**PHYLUM:** Proteobacteria  
**CLASS:** Gammaproteobacteria  
**ORDER:** Vibrionales  
**FAMILY:** Vibrionaceae  
**GENUS:** *Vibrio*  
**SPECIES:** *cholerae*  
 Gram-negative, curved rod-shaped bacterium

## KEY FACTS:

The current 7th pandemic is caused by the El Tor biotype, which has acquired a cyclic GMP-AMP (cGAMP) signaling system.

*V. cholerae* is a model organism to study due to the significant parallels with other Gram-negative bacteria, high infectious dose ( $10^3$ – $10^8$ ), and rapid replication time (17 min).

It is used as a model system for studying chemical signaling, including the transition between motility and biofilm formation controlled by cyclic-di-GMP (c-di-GMP).

## DISEASE FACTS:

Transmitted through the fecal-oral route.

Recent pandemics in Haiti, Ethiopia, and Yemen.

Highest disease burden in sub-Saharan Africa. Low to nonexistent prevalence in developed nations.

Treatable with oral rehydration therapy (ORT); however, it is still largely a problem in settings of poor access to healthcare and sanitation.

An oral cholera vaccine is available in two doses with >85% protection for up to 6 months after the complete course with more efficacious vaccines being developed.

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