Vibrio Cholera Disease

Vibrio cholera is a gram negative, oxidase positive, comma shaped bacteria that causes a life threatening, rice water diarrhea. The biochemistry behind this infective organism is in the toxin’s ability to sustain the Gs subunit of the Cl channel into the “on” position with ADP ribosylation. This sustains the channel’s secretory ability and results in continued secretion of Cl into the gut lumen where Na and water follow. This ends in severe dehydration, electrolyte depletion and possible death. The organism is typically found in seafood, and should be treated with both glucose and Na rich electrolyte fluids.



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ADP Ribosylating AB Toxin
ADP Red-bull with (A) Apple and (B) Bee Toxin
The bacterial toxin acts via ADP ribosylation of the Gs subunit.

Turn Gs on Causing Increase in cAMP
Hit G-spot, Increase cAMP
Through ribosylation, the Gs subunit remains in a locked “on” position, resulting in the increase of cAMP within the cell. This continued elevation of cAMP results in excessive secretion of electrolytes and water into the gut lumen.

Secretion of Cl
Cl Into Intestines
In cholera, the Cl- channel is persistently open due to a locked Gs subunit. This openness results in the accumulation of cAMP and subsequent Cl secretion into the lumen, contributing to the diarrhea.

Blocks Reabsorption of Na
Reabsorption of Na in Intestine Blocked
The reabsorption of Na is a necessary piece of the gut's function. By inhibiting this function, cholera causes profuse diarrhea that can be fatal due to electrolyte imbalances.

Rice Water Diarrhea
Toilet in Rice-field
The diarrhea is classically described as rice water diarrhea due to the high fluid and electrolyte content. It also signifies that there is a lack of inflammatory cells because this is secretory diarrhea as opposed to invasive diarrhea.

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