

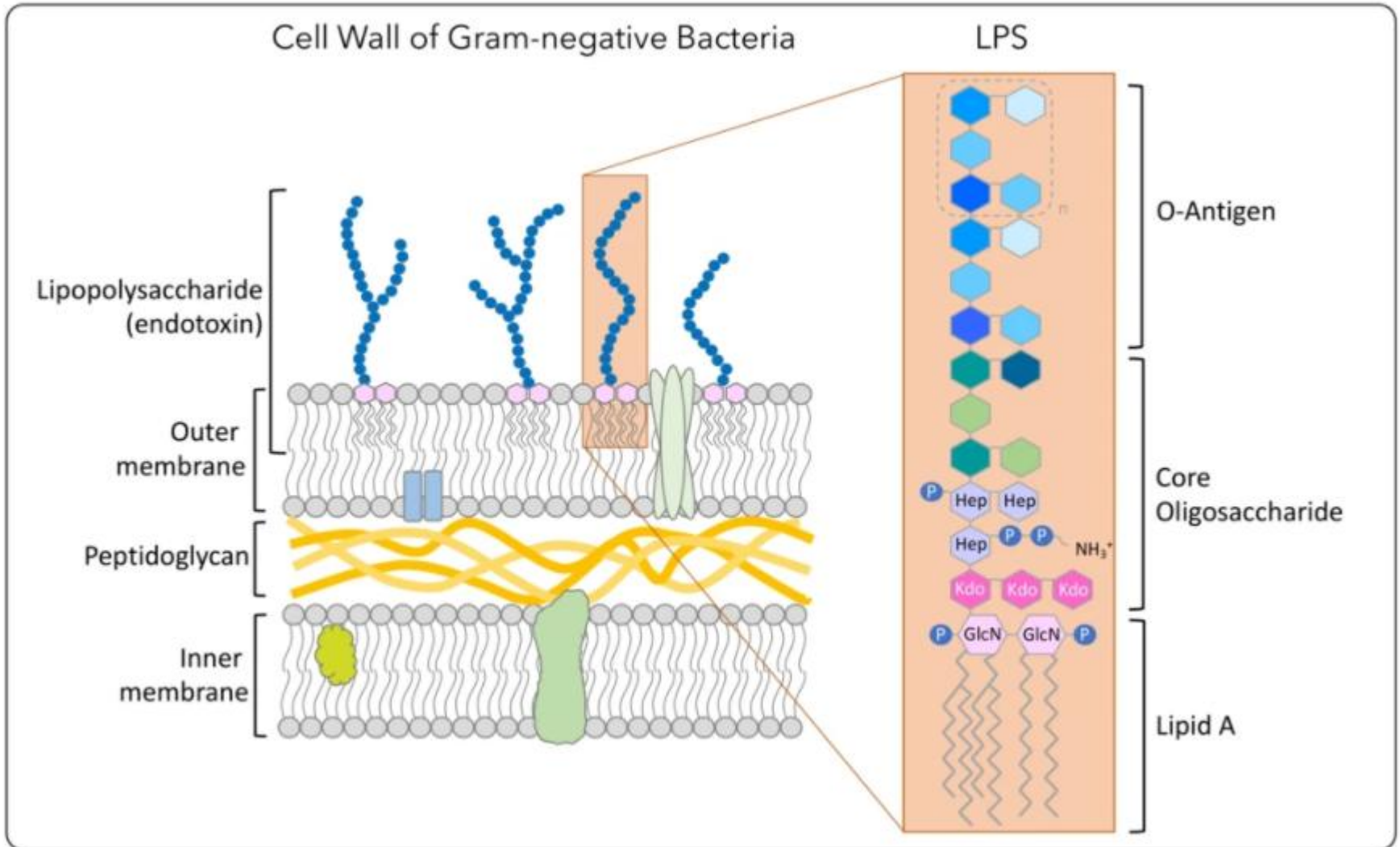
Medical Microbiology

Endotoxins



Dr. Dharmesh Harwani
Department of Microbiology

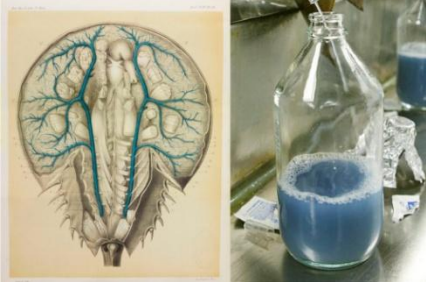
This LPS is called an endotoxin



The toxic component of the LPS is the lipid portion exhibits its associated endotoxicity and Gram-negative bacteremia.

Characteristics of bacterial endotoxins are:

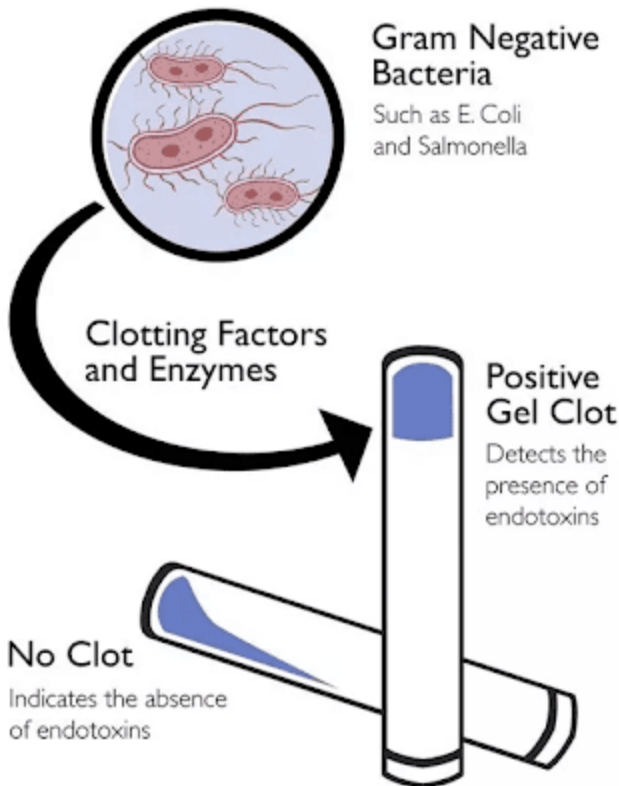
1. Heat stable
2. Lipopolysaccharide complex on outer membrane; lipid A portion is toxic
3. Produce fever by release of interleukin-1
4. Synthesized directly by chromosomal genes
5. Toxic only at high doses (milligram per kilogram amounts)
6. Weakly immunogenic
7. Found only in Gram-negative bacteria
8. Moderate toxicity
9. Toxoids cannot be made
10. Usually capable of producing general systematic effects: fever (are pyrogenic), shock, blood coagulation, weakness, diarrhea, inflammation, intestinal hemorrhage, and fibrinolysis (enzymatic breakdown of fibrin, the major protein component of blood clots)



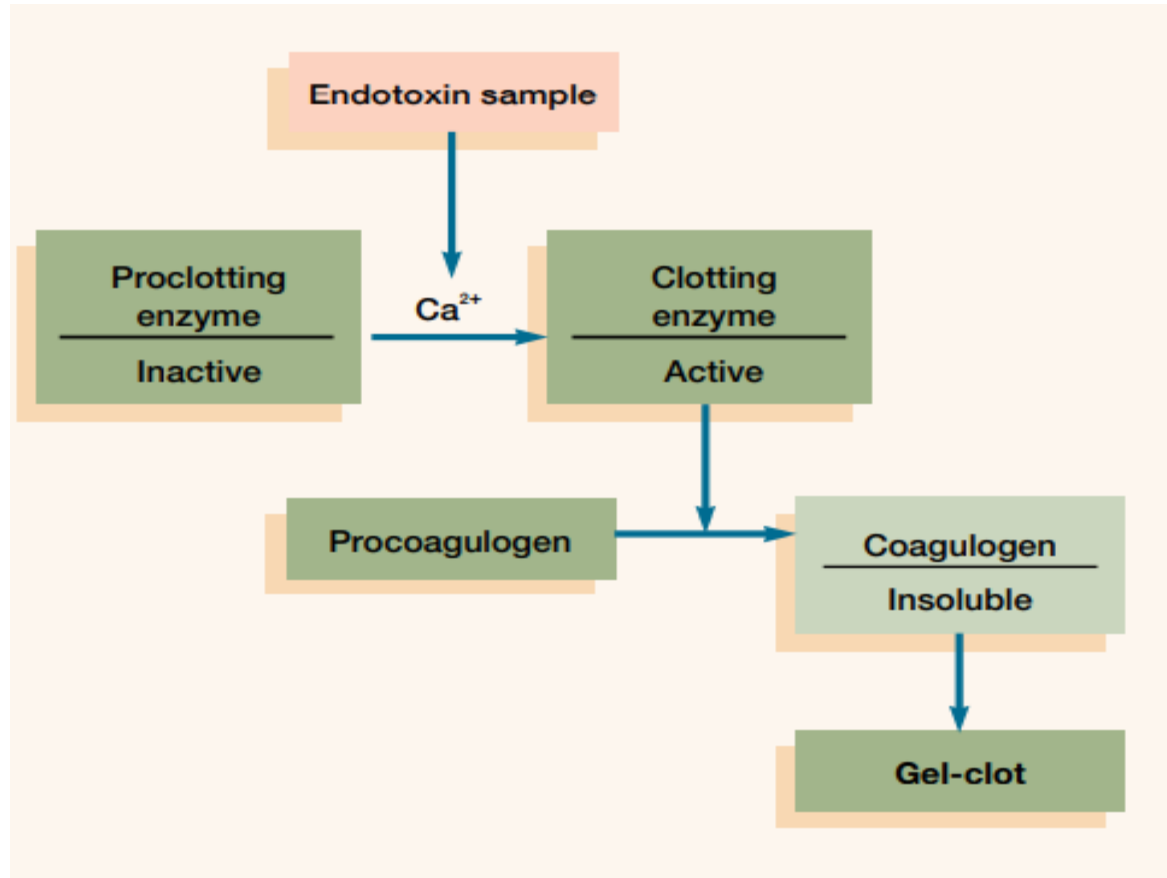
Detection of Endotoxins

Limit of 0.25 endotoxin units (E.U.), 0.025 ng/ml, or less as a release standard for their drugs

THE LAL ASSAY IN ACTION



in vitro *Limulus* amoebocyte lysate (LAL) assay





blue blood

home

- Bacteria Basics
- Disease & Fever
- Blood Cells (Bang & Levin)
- Blood Serum (Armstrong)

Enter Limulus and an MBL scientist named Fred Bang.

This section explains how an MBL scientist discovered some amazing properties in horseshoe crab blood that enable has revolutionized ways to detect potentially lethal bacterial toxins and spawned a multi-million dollar industry.

Bang was studying the circulation of blood using horseshoe crabs when he found that one of his crabs died as a result of a *Vibrio* bacterial

infection. The infection caused a strange disease in which almost the entire blood volume of the crab clotted into a semi-solid mass. Other bacteria had not produced this sort of reaction at all. Bang began to investigate further and found that only gram-negative bacteria



Fred Bang

Jack Levin



https://projects.ncsu.edu/project/bio402_315/Lecture%20two/limulus.html