



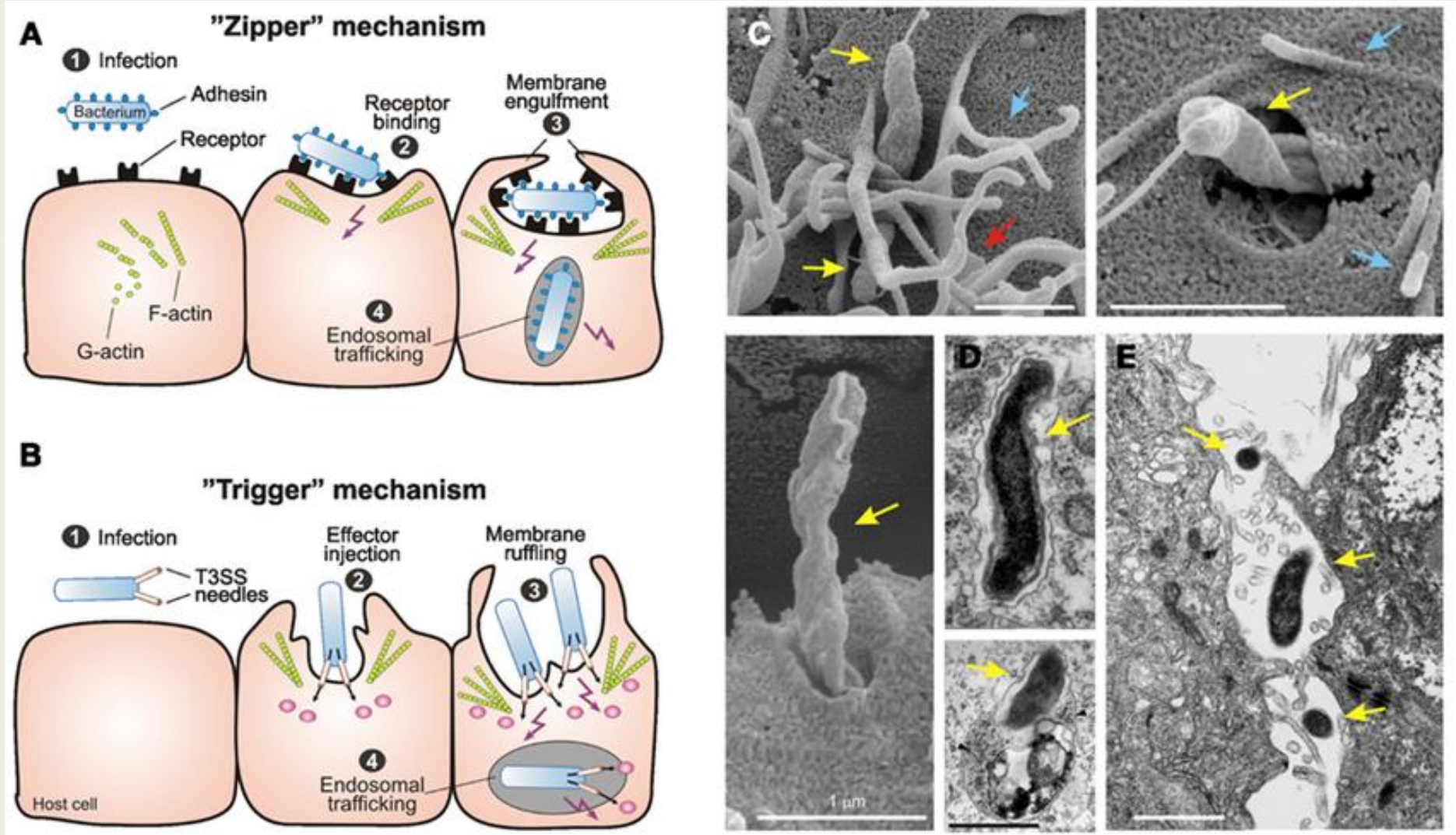
INVASION AND INTOXICATION

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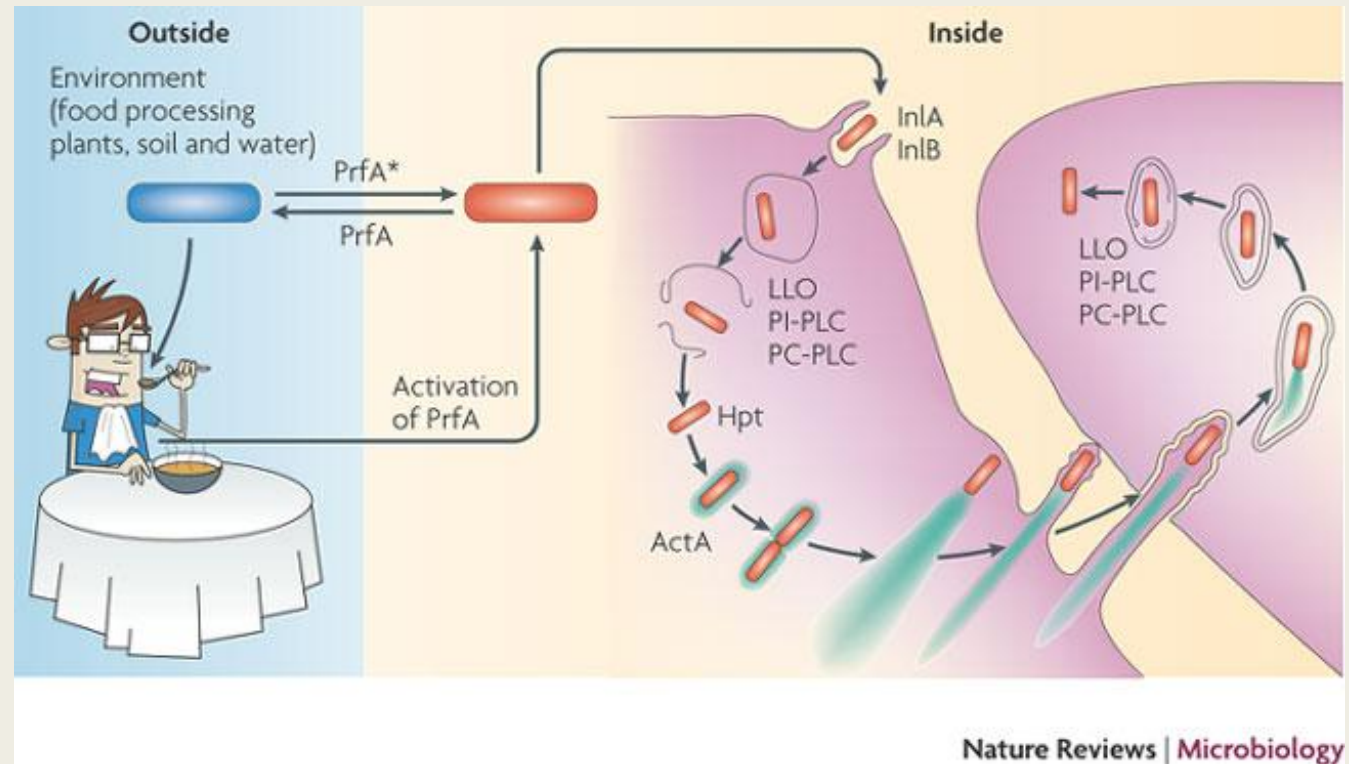
Definition

- "Invasion" is the term commonly used to describe the entry of bacteria into host cells, implying an active role for the organisms and a passive role for the host cells. In many infections, the bacteria produce virulence factors that influence the host cells, causing them to engulf (ingest) the bacteria.



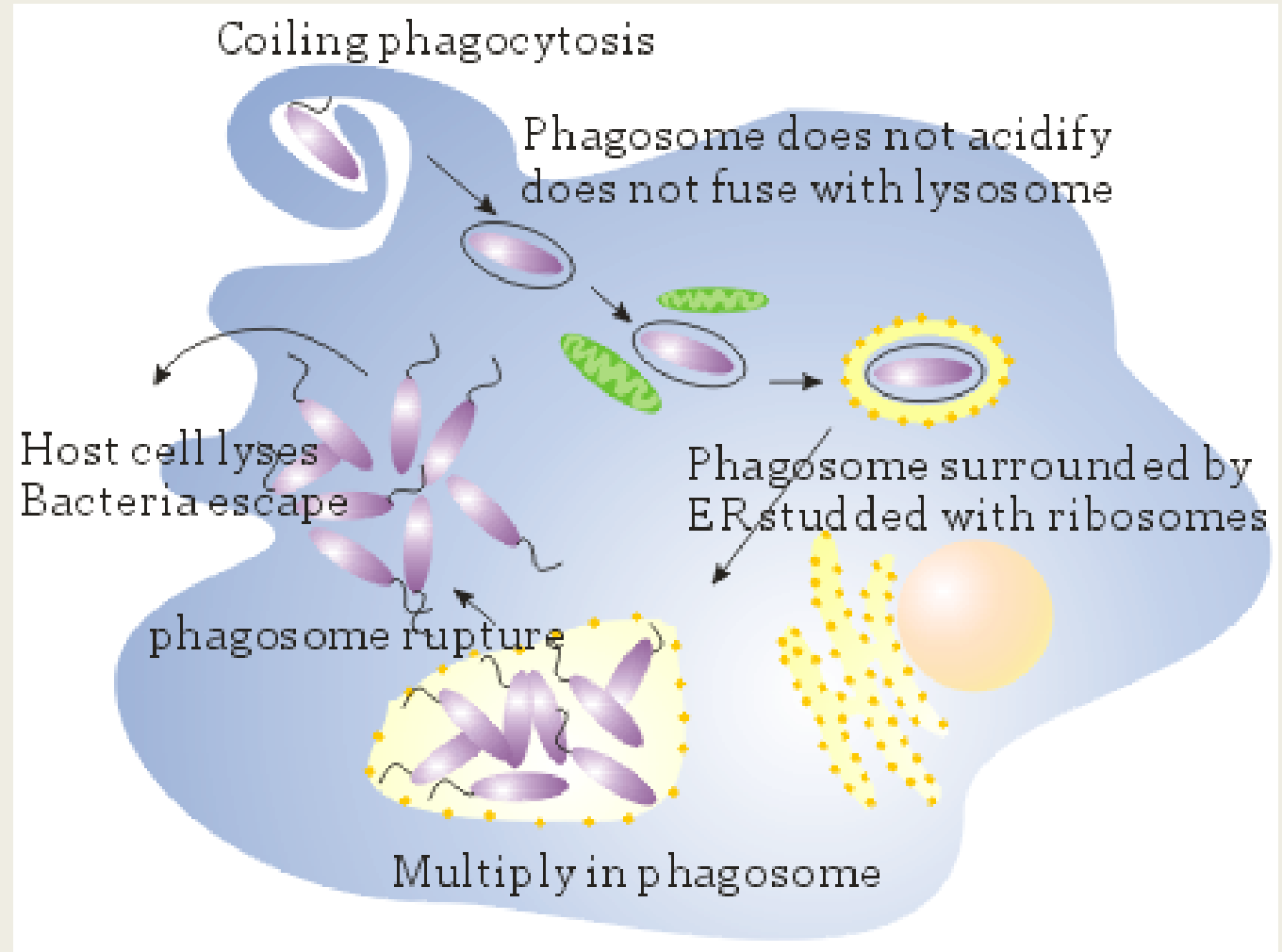
Listeria monocytogenes

L. monocytogenes from the environment is ingested in food. Presumably, the bacteria adhere to and invade the intestinal mucosa, reach the bloodstream, and disseminate. A protein, **internalin**, has a primary role in this process. The engulfment process, movement within a cell and movement between cells, requires actin polymerization to propel the bacteria



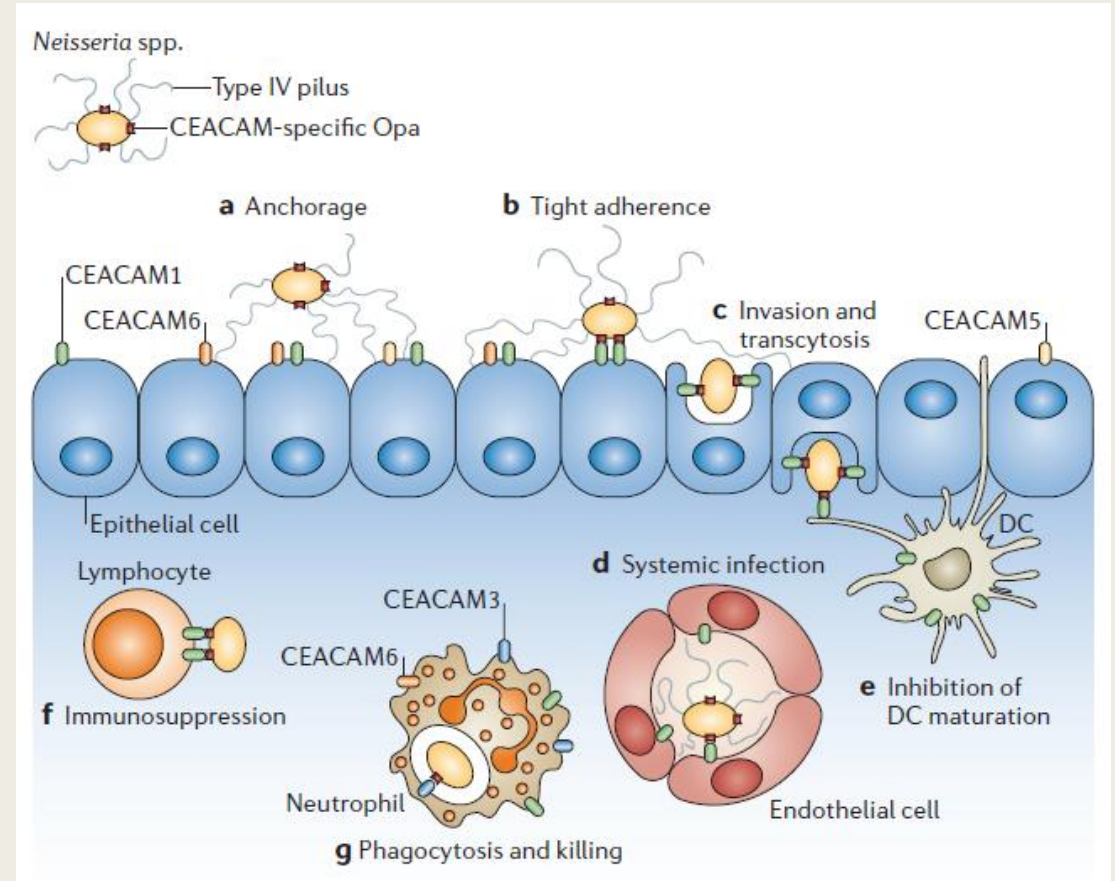
Legionella pneumophila

Legionella pneumophila infects pulmonary macrophages and causes pneumonia. Adherence of the legionellae to the macrophage induces formation of a long, thin pseudopod which then coils around the bacteria, forming a vesicle (coiling phagocytosis). The vesicle remains intact, phagolysosome fusion is inhibited, and the bacteria multiply within the vesicle.



Neisseria Gonorrhoea

N. gonorrhoeae uses pili as primary adhesins and opacity associated proteins (Opa) as secondary adhesins to host cells. Certain Opa proteins mediate adherence to polymorphonuclear cells. Some gonococci survive after phagocytosis by these cells.

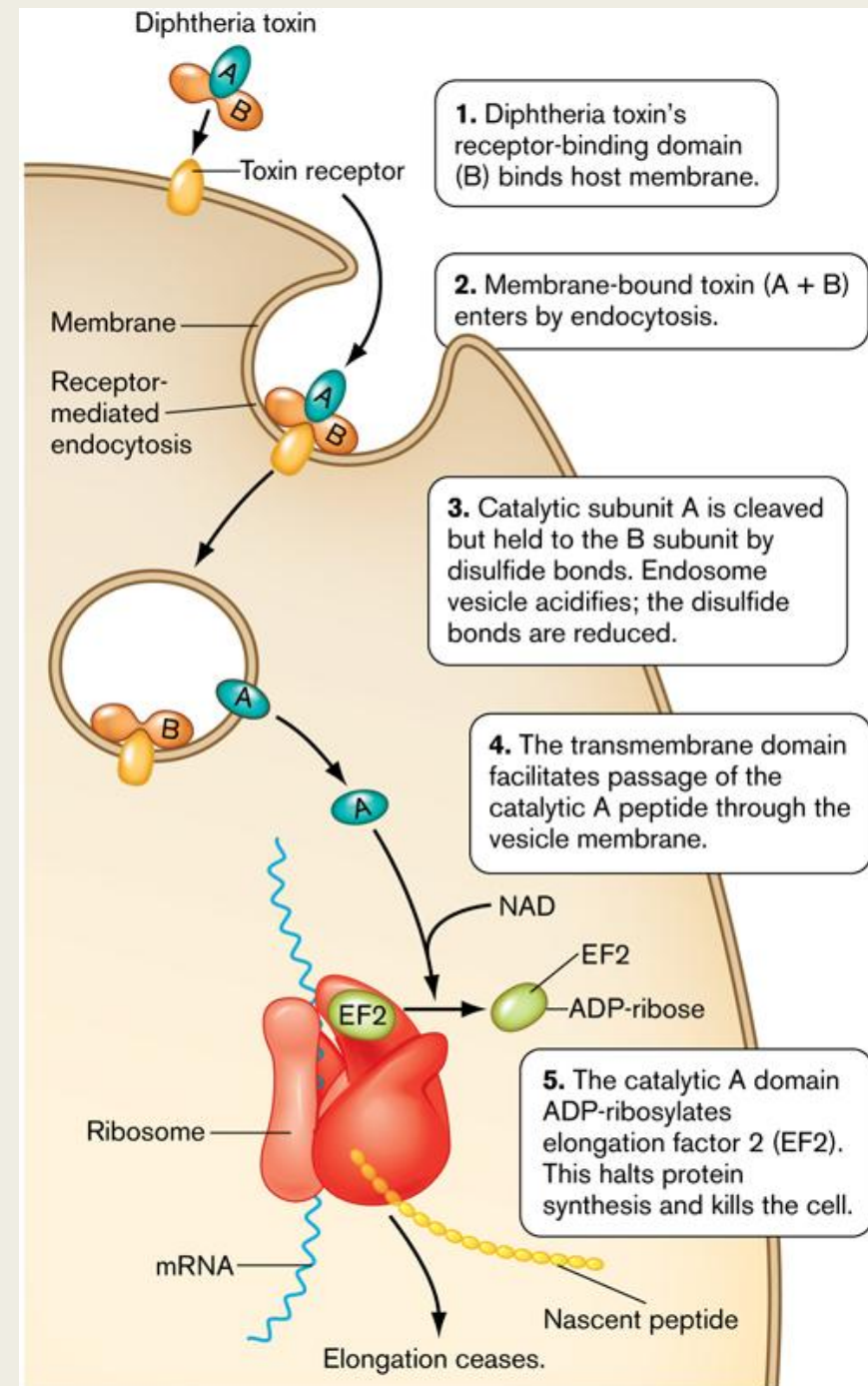


Toxins

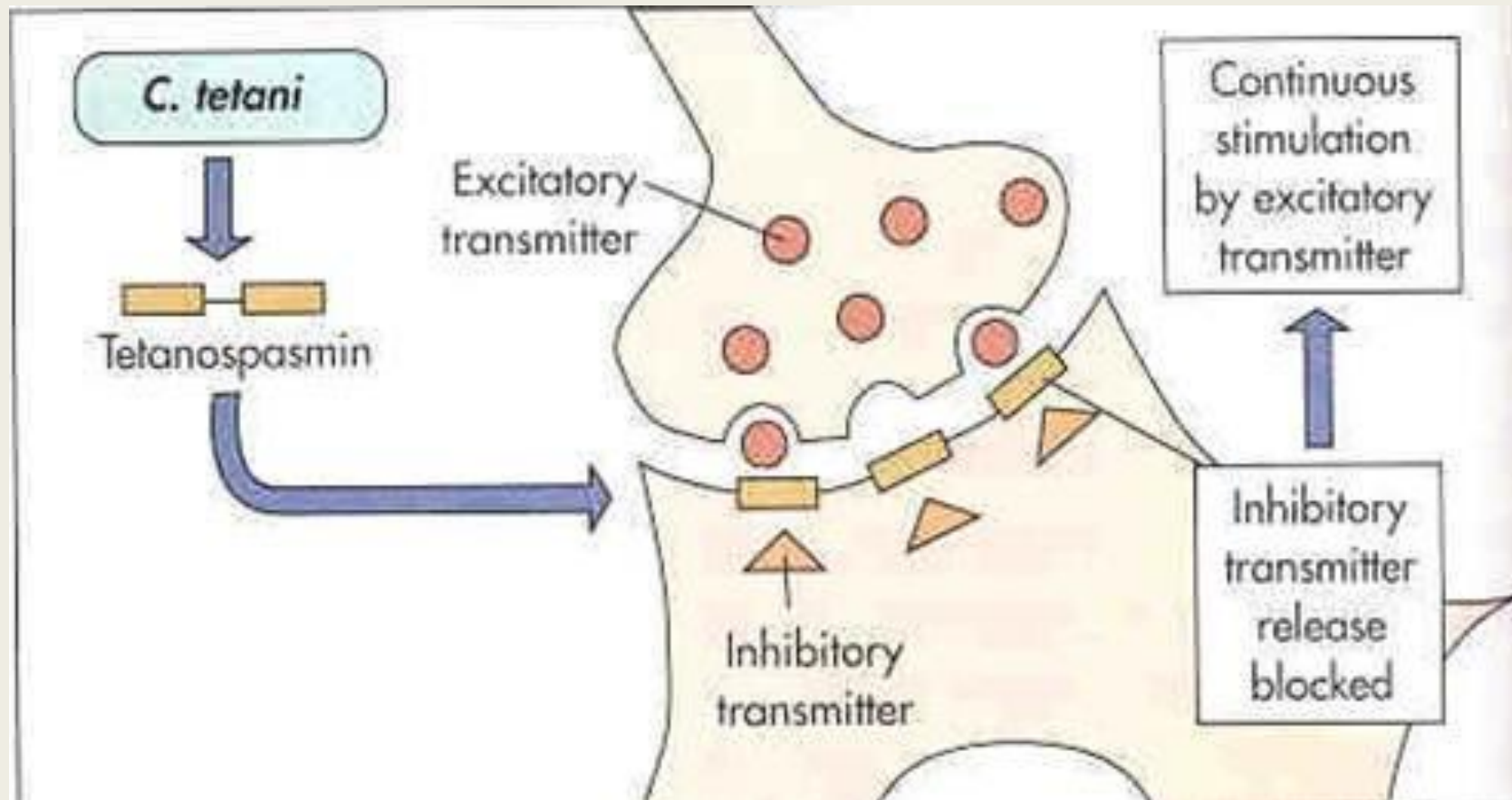
Property	Exotoxin	Endotoxin
Source	Certain G+ and G-	Cell wall of G-
Secreted from Bacteria	Yes	No
Chemistry	Polypeptide	Lipopolysaccharides
Location of Genes	Plasmid or bacteriophage	Bacterial chromosome
Toxicity	High (fatal dosage at 1ug)	Low (fatal dose at >100ug)
Clinical Effects	Various	Fever shock
Mode of Action	Various	TNF and IL-1
Antigenicity	Induces high-titer antibodies called antitoxins	Poorly antigenic
Vaccines	Toxoids used as vaccines	No toxoids, no vaccines
Heat Stability	Destroyed rapidly at 60C (except staphylococcal enterotoxin)	Stable at 100C for 1 hr
Typical Diseases	Tetanus, botulism, diphtheria	Meningococemia, Sepsis by G- rods

Corynebacterium diphtheriae

C. diphtheriae is a gram-positive rod that can grow on the mucous membranes of the upper respiratory tract or in minor skin wounds. Strains of *C. diphtheriae* that carry a temperate bacteriophage with the structural gene for the toxin are toxigenic and produce diphtheria toxin and cause diphtheria.



clostridium tetani toxin



Staphylococcus aureus toxin

- *S aureus* strains growing on mucous membranes (eg, the vagina in association with menstruation), or in wounds, elaborate **toxic shock syndrome toxin-1 (TSST-1)**, which causes **toxic shock syndrome**. The illness is characterized by shock, high fever, and a diffuse red rash that later desquamates; multiple other organ systems are involved as well. TSST-1 is a super antigen and stimulates lymphocytes to produce large amounts of IL-1 and TNF.