Medical Microbiology

Pathogenicity Islands and Type III Secretion

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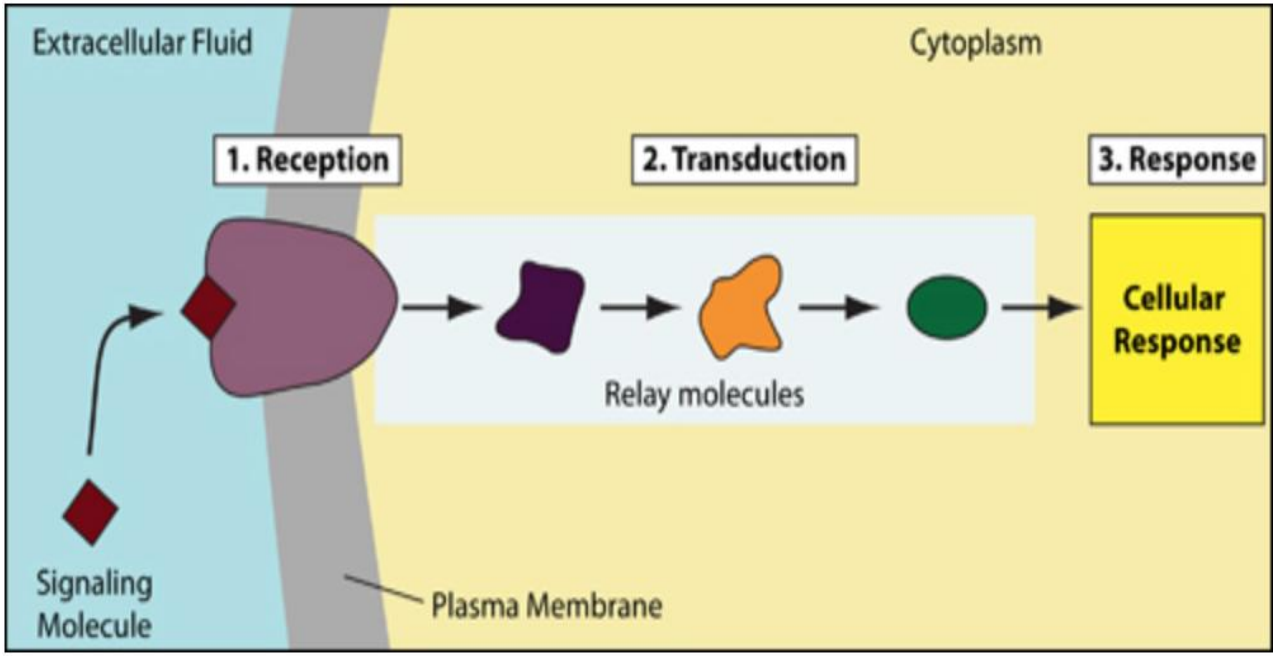
Signal transduction (Basics)

In the adaptive process, these pathogens have evolved complex signal transduction pathways to regulate the genes necessary for virulence.

A virulence factor may be present simply because the bacterium has been infected by a phage.

The gene for diphtheria from *Corynebacterium diphtheriae* is carried on the temperate bacteriophage beta



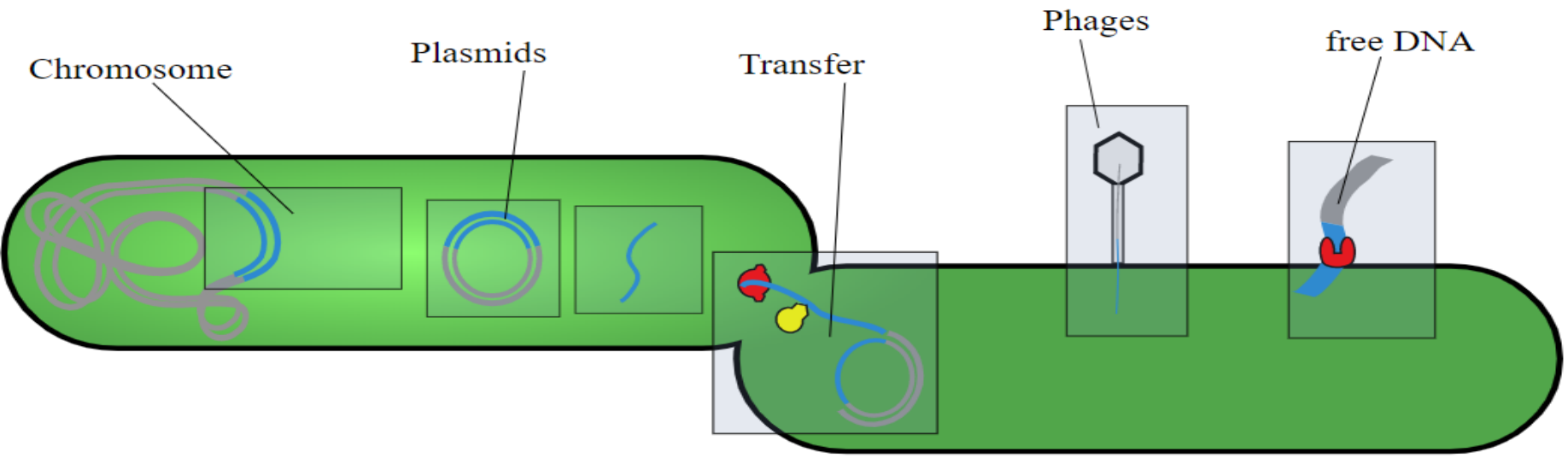
Protein kinases

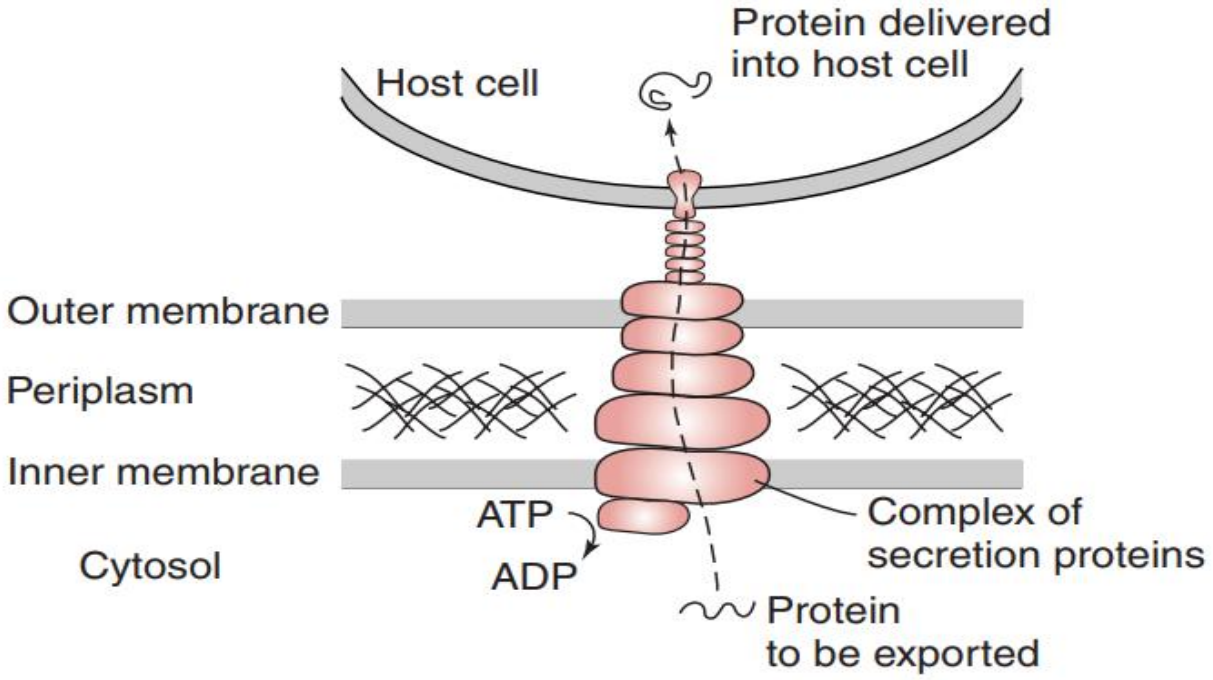
Phosphatases

Phosphorelay

35 to 170 kilobases in size

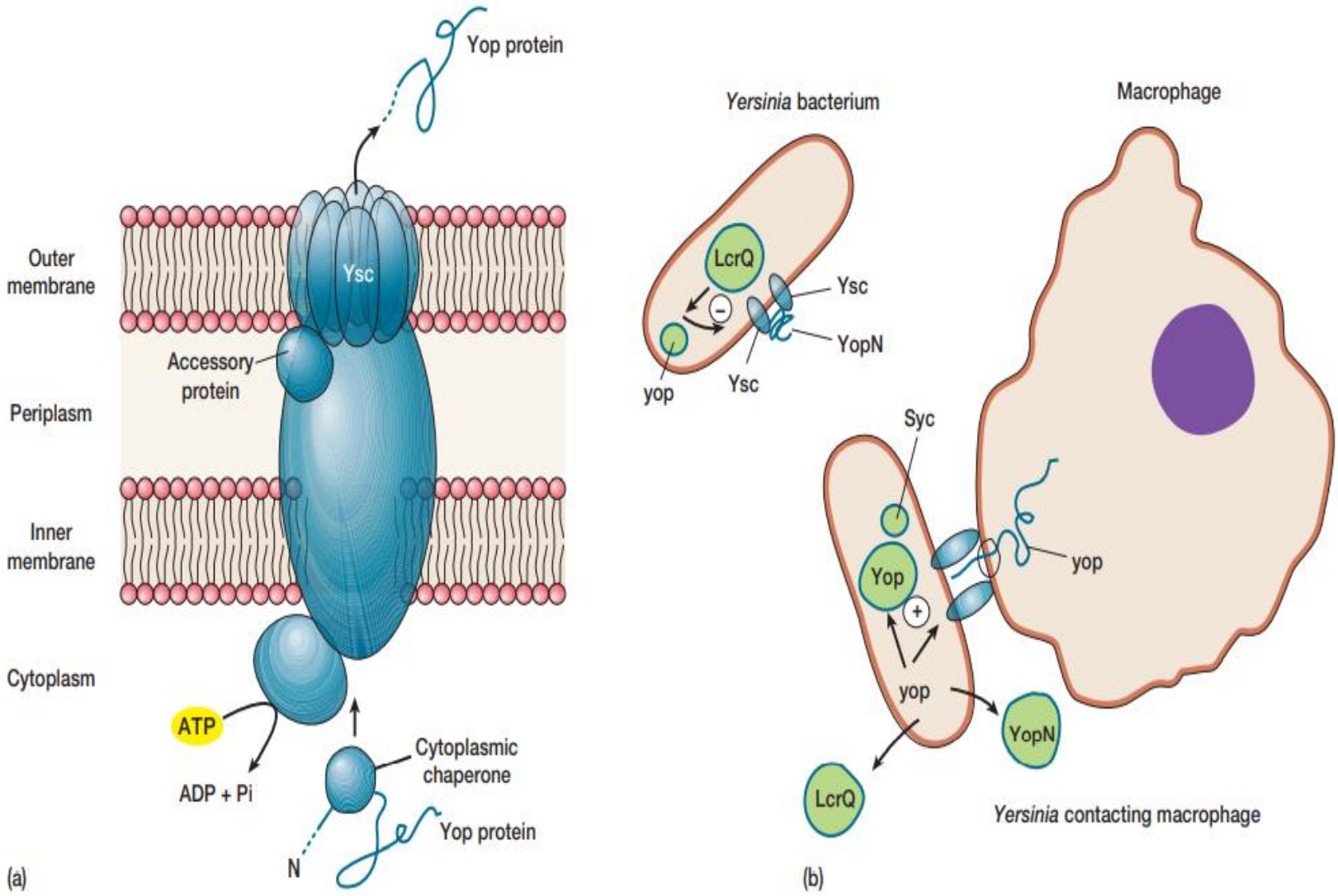
Pathogenicity Islands





Yersinia spp., Pseudomonas aeruginosa, Shigella flexneri Salmonella typhimurium, enteropathogenic E. coli

Stealth and interdiction



Type III Secretion System and Yop Protein

Toxigenicity

Two distinct categories of disease

Infection: The pathogen's growth and reproduction (or invasiveness)

Intoxications: The entrance of a specific preformed toxin into the body of a host.

A **toxin [Latin *toxicum*, poison]** is a substance, such as a metabolic product of the organism, that alters the normal metabolism of host cells with deleterious effects on the host.

The term toxemia refers to the condition caused by toxins that have entered the blood of the host.

Two main categories: Exotoxins and Endotoxins

Exotoxins are soluble, heat- labile, proteins that usually are released into the surroundings as the bacterial pathogen grows.

Exotoxins

1. Synthesized by specific bacteria that often have plasmids or prophages bearing the exotoxin genes
2. Heat-labile proteins inactivated at 60 to 80°C
3. Among the most lethal substances known (toxic in very small doses [microgram per kilogram amounts]
4. Associated with specific diseases and have specific mechanisms of action
5. Highly immunogenic and stimulate the production of neutralizing antibodies called antitoxins
6. Easily inactivated by formaldehyde, iodine, and other chemicals to form immunogenic toxoids

Build colonies:

I will supply adequate warmth and moisture, the sebum and lipids you need, on condition you never do me annoy with your presence, but behave as good guests should, not rioting into acne or athlete's-foot or a boil.

AUDEN WH