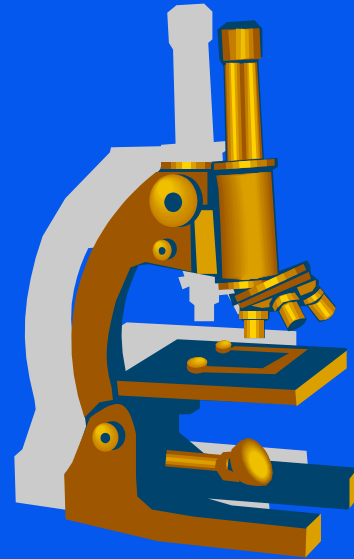
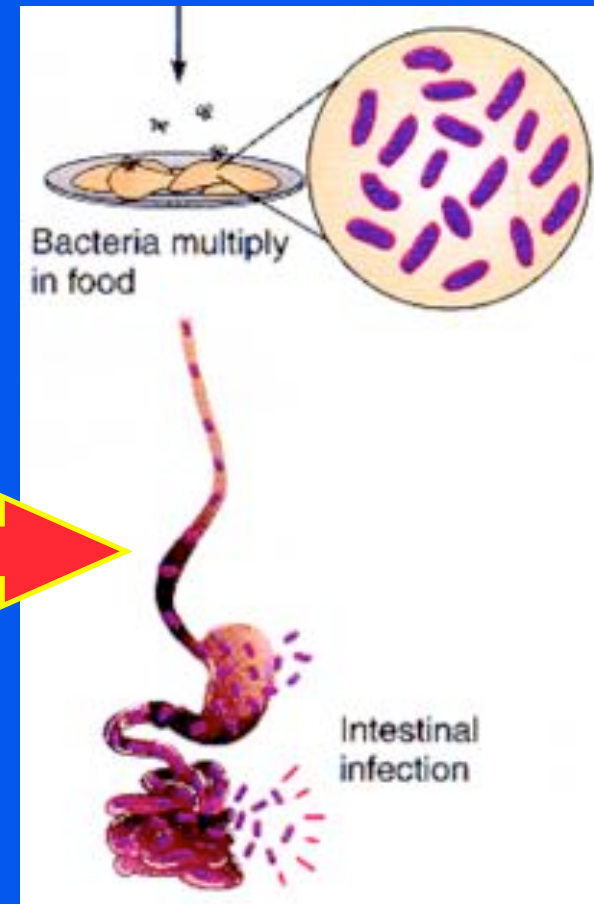
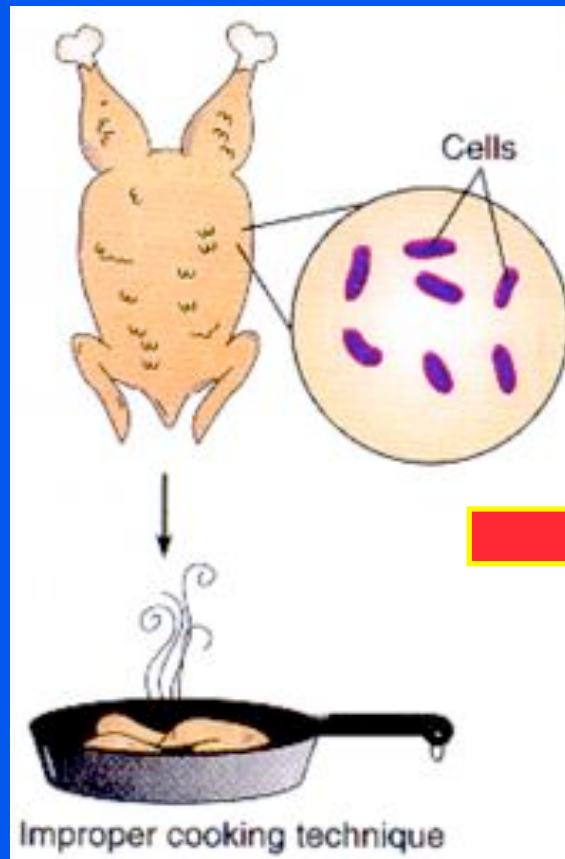
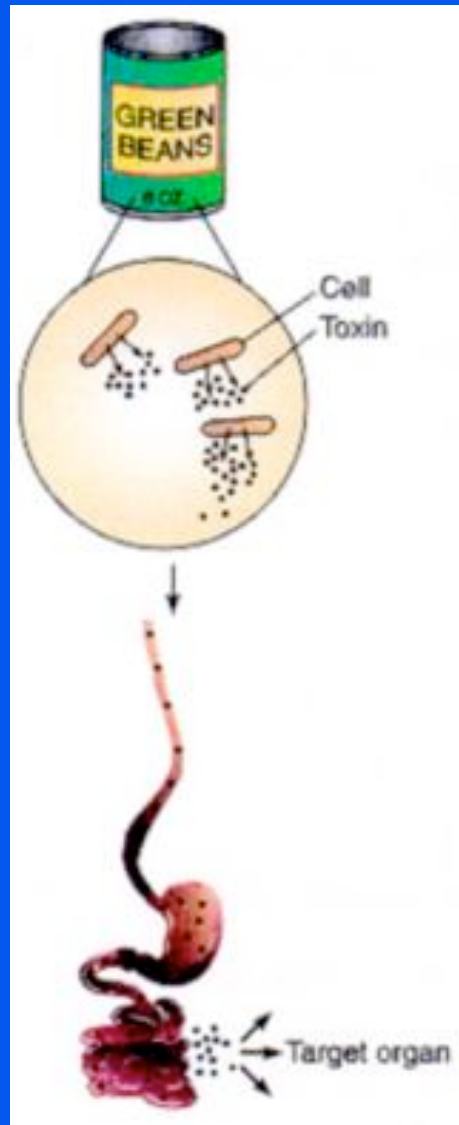


Welcome to Pathogen Group 1

- *Clostridium botulinum*
- *Clostridium perfringens*
- *Clostridium tetani*
- *Clostridium difficile*
- *Corynebacterium diphtheriae*
- *Bordetella pertusis*

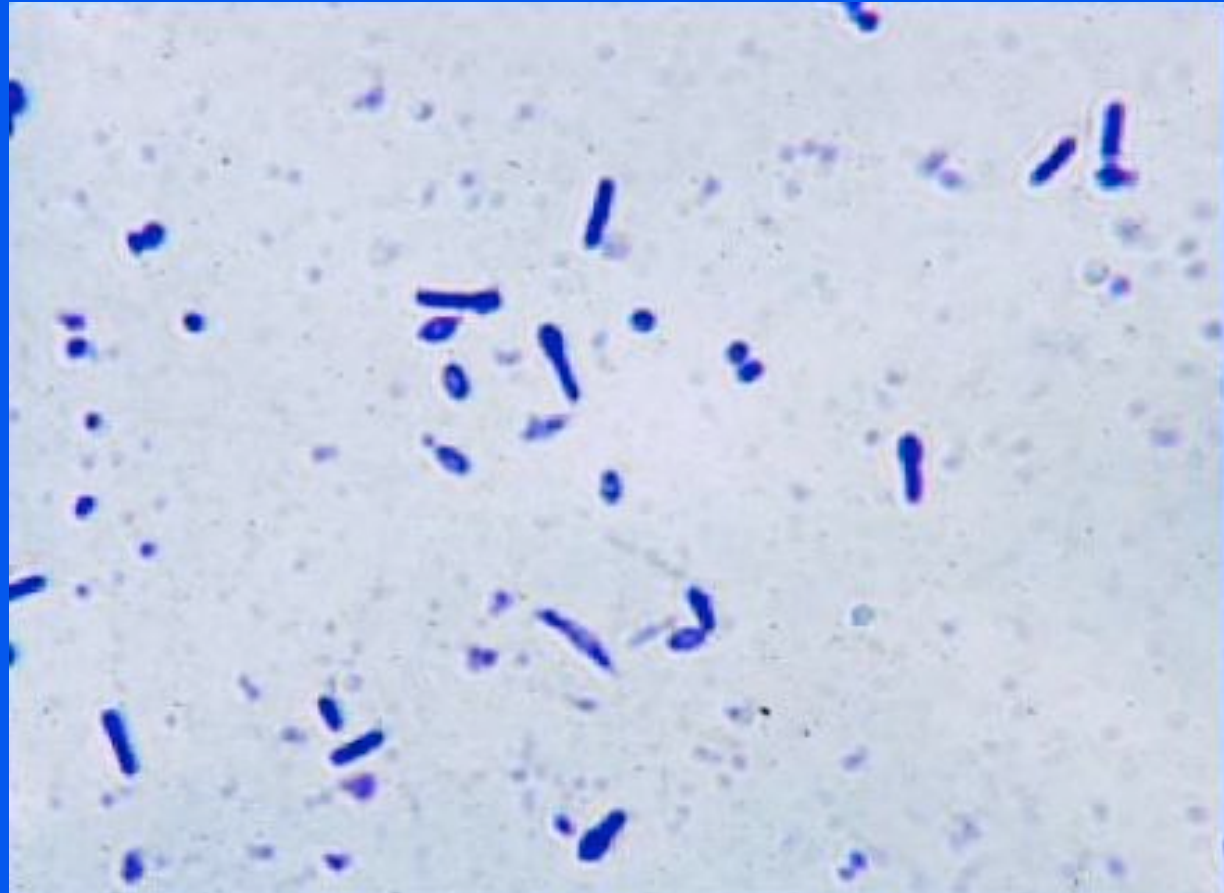


Food Poisoning vs food-borne infection

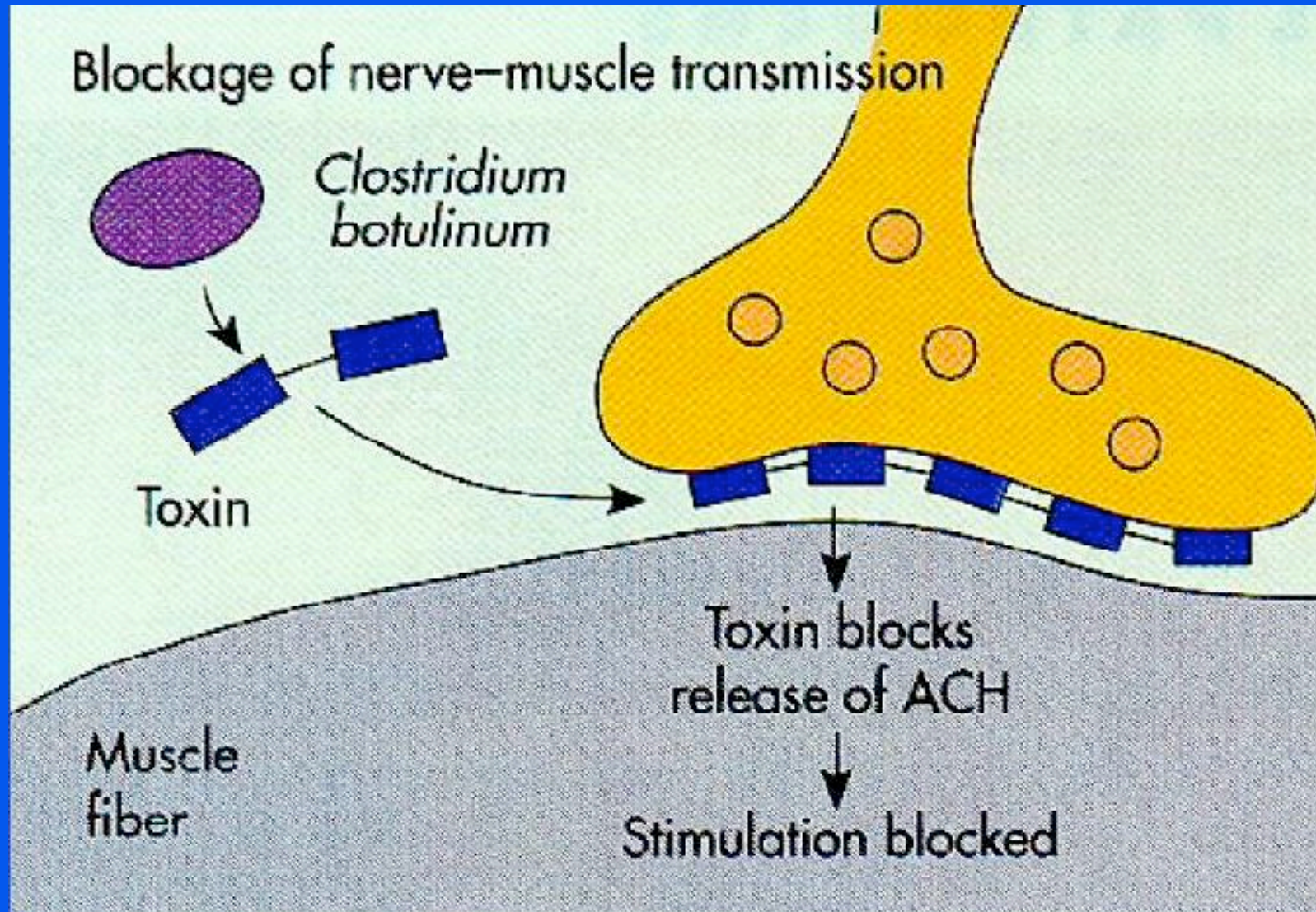


Clostridium botulinum: Botulism

- Long, Gram + bacillus
- Large spore
- obligate anaerobe
- motile



effect of botulinum toxin



botulism symptoms

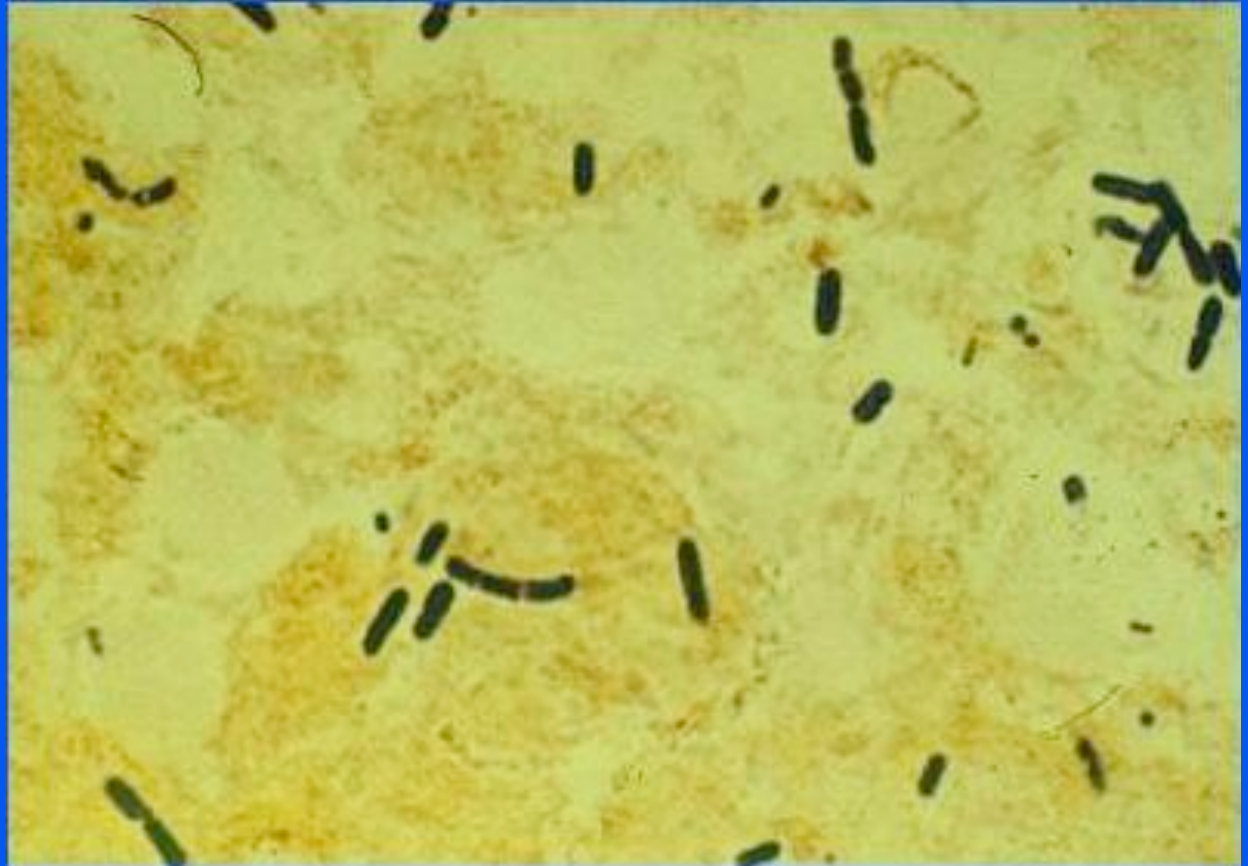
- ***food poisoning***: blurred vision, double vision (diplopia), weakness, dry mouth, symmetric paralysis may progress rapidly to death
- ***infant botulism***: constipation, poor feeding, failure to thrive, progressive weakness, dyspnea, death
- ***wound botulism***
 - increase in wound botulism is linked to black tar heroin

Botulism as a biological weapon?

- **Botulism (as is Anthrax) is now designated as a category A agent for bioterrorism**
 - **The potential of being used as a biological weapon**
- **Traditionally, individual cases have required intervention by public health with coordination with laboratories**
- **The threat of bioterrorism represents a challenge for planning and protecting the nation's food supply**
- **A significant number of cases at one time may result in the difficulty providing an adequate supply of antitoxin!**

Clostridium perfringens : perfringens food poisoning and gas gangrene

- nonmotile
- sporeforming
- anaerobic
- food poisoning:
see charts in thick
packet
- “gangrene” vs “gas
gangrene”



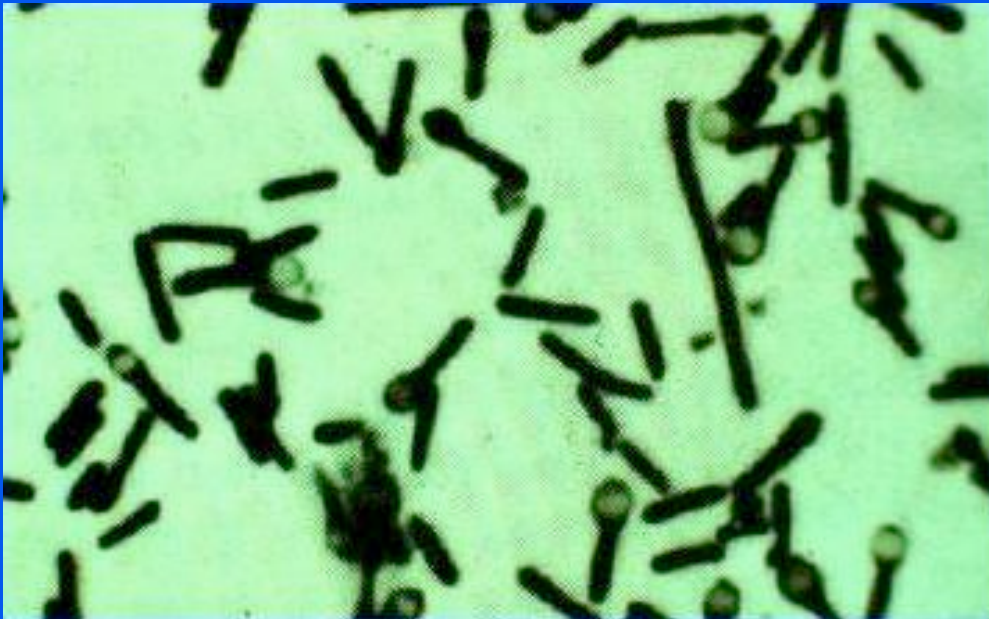
growing in necrotic tissue

gangrene in toes



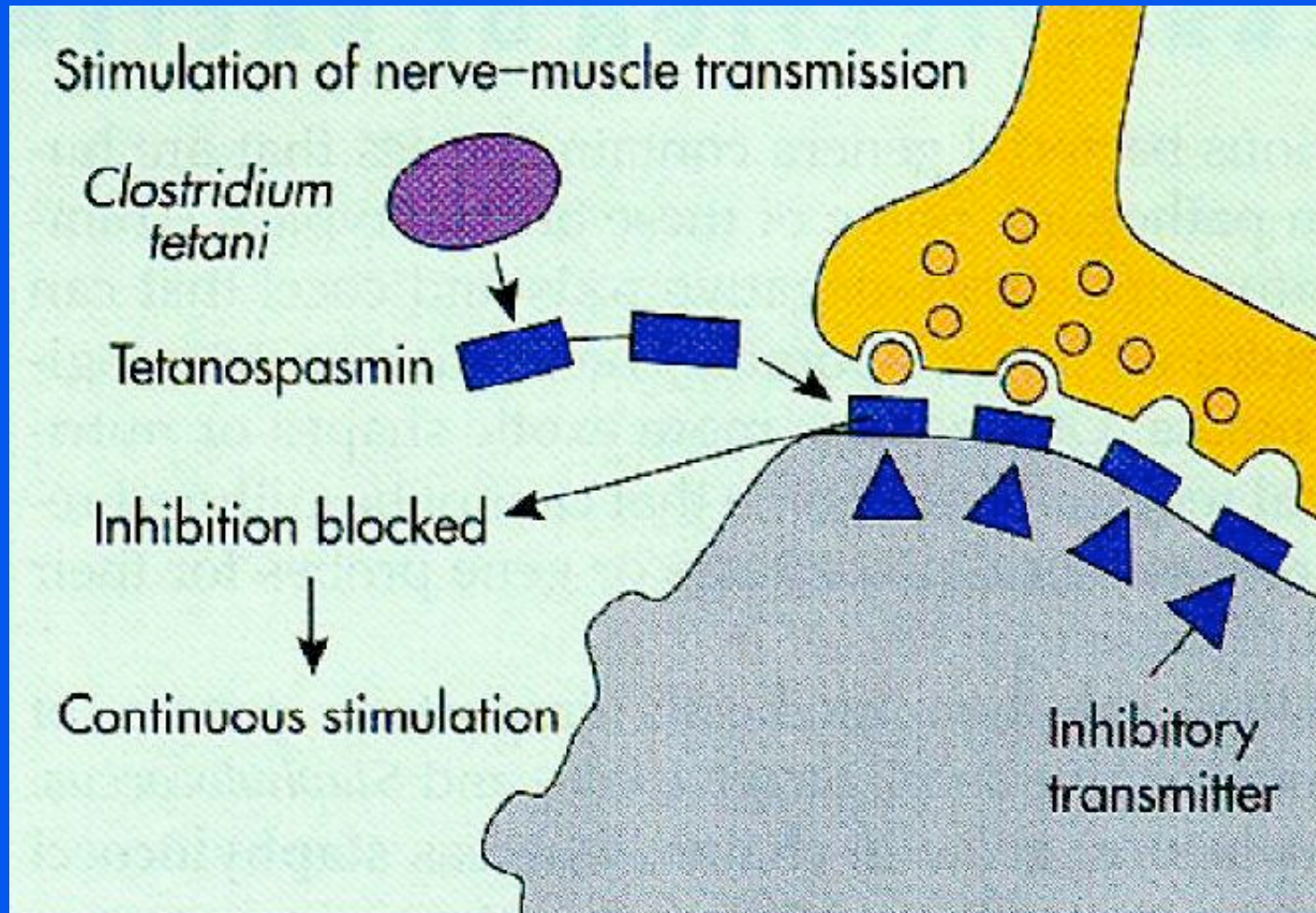
Clostridium tetani: Tetanus

- motile
- anaerobic
- sporeforming



with spore vegetative

effect of tetanus toxin



tetanus symptoms

- painful muscle contraction, especially in jaw and neck



- “lockjaw”



tetanus

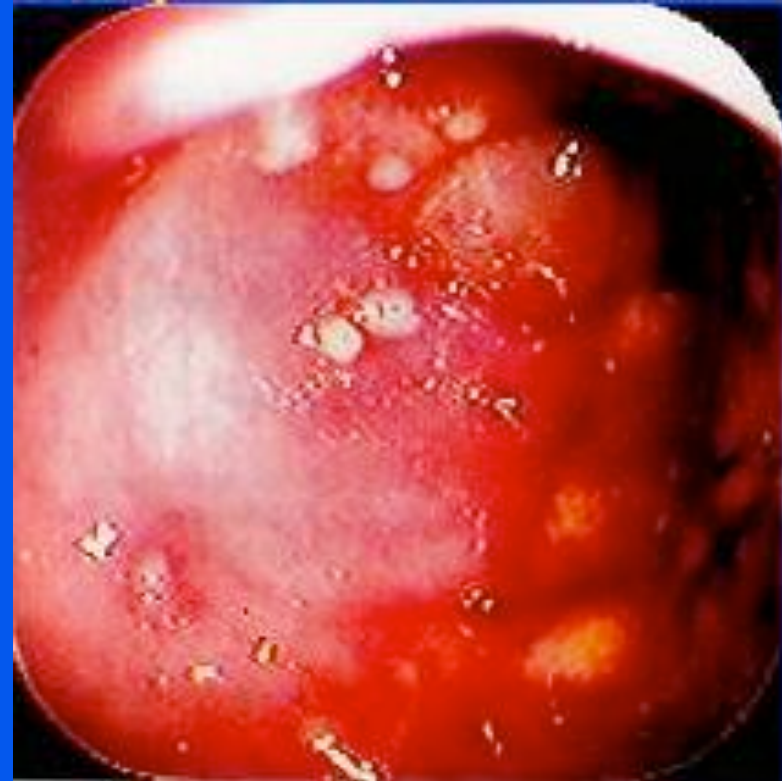


Tetanus Shots

- **DTaP** : childhood diphtheria, tetanus, acellular pertussis vaccine
- **Tdap**: adolescent and adult tetanus, diphtheria, and pertussis boosters
 - Boostrix for ages 10-18
 - Adacel for ages 11-64
- **Td**: adult tetanus diphtheria vaccine
 - Booster dose every 10 years
 - Expected to be phased out as it is replaced by Tdap
- **TIG** (tetanus immune globulin) for passive immunity during wound management

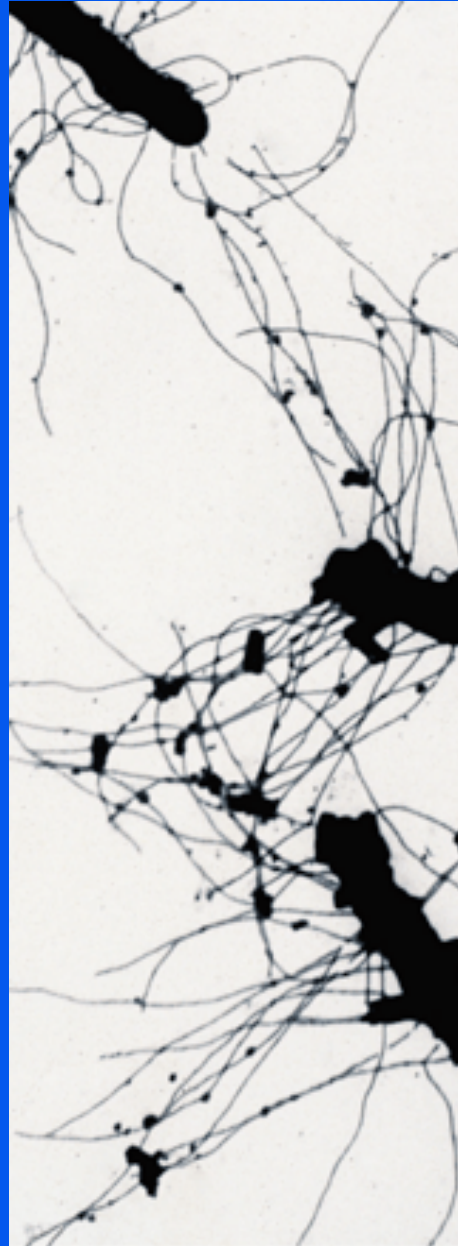
Clostridium difficile

- Most common cause nosocomial diarrhea in developed countries
- Pseudomembranous colitis: membranous lesions cover intestinal wall (>90% of cases are *C. dif*)
- Almost always result of antibiotic use



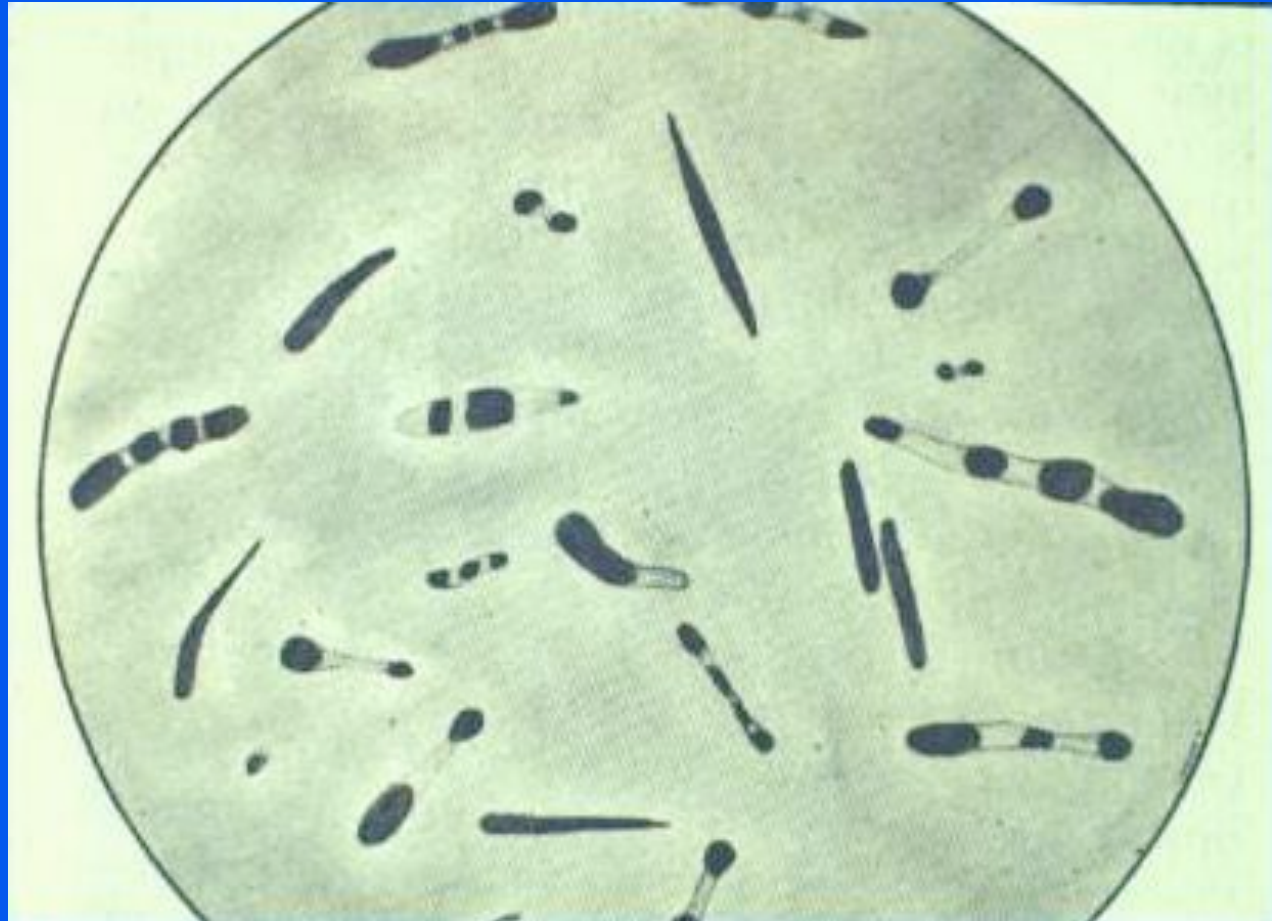
Clostridium difficile

- strictly anaerobic
- Sporeforming
- Motile by peritrichous flagella
- Source: soil, animal feces



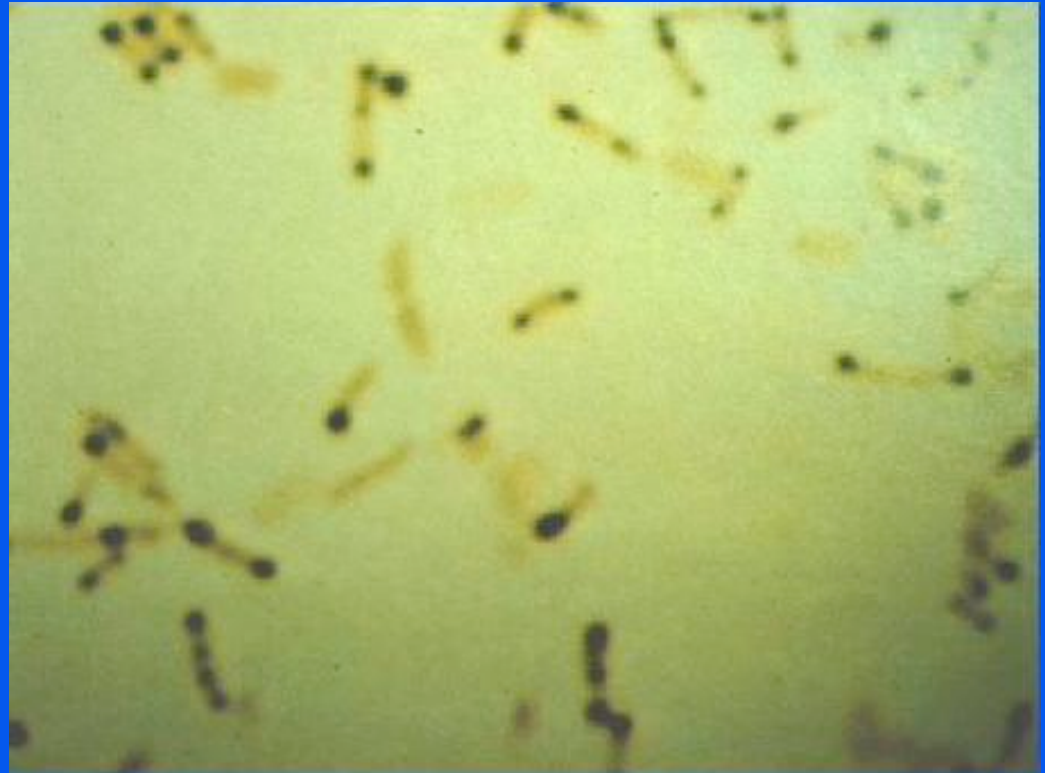
Corynebacterium diphtheriae: Diphtheria

- Gram + pleomorphic bacillus
- uneven staining
- nonmotile
- aerobic

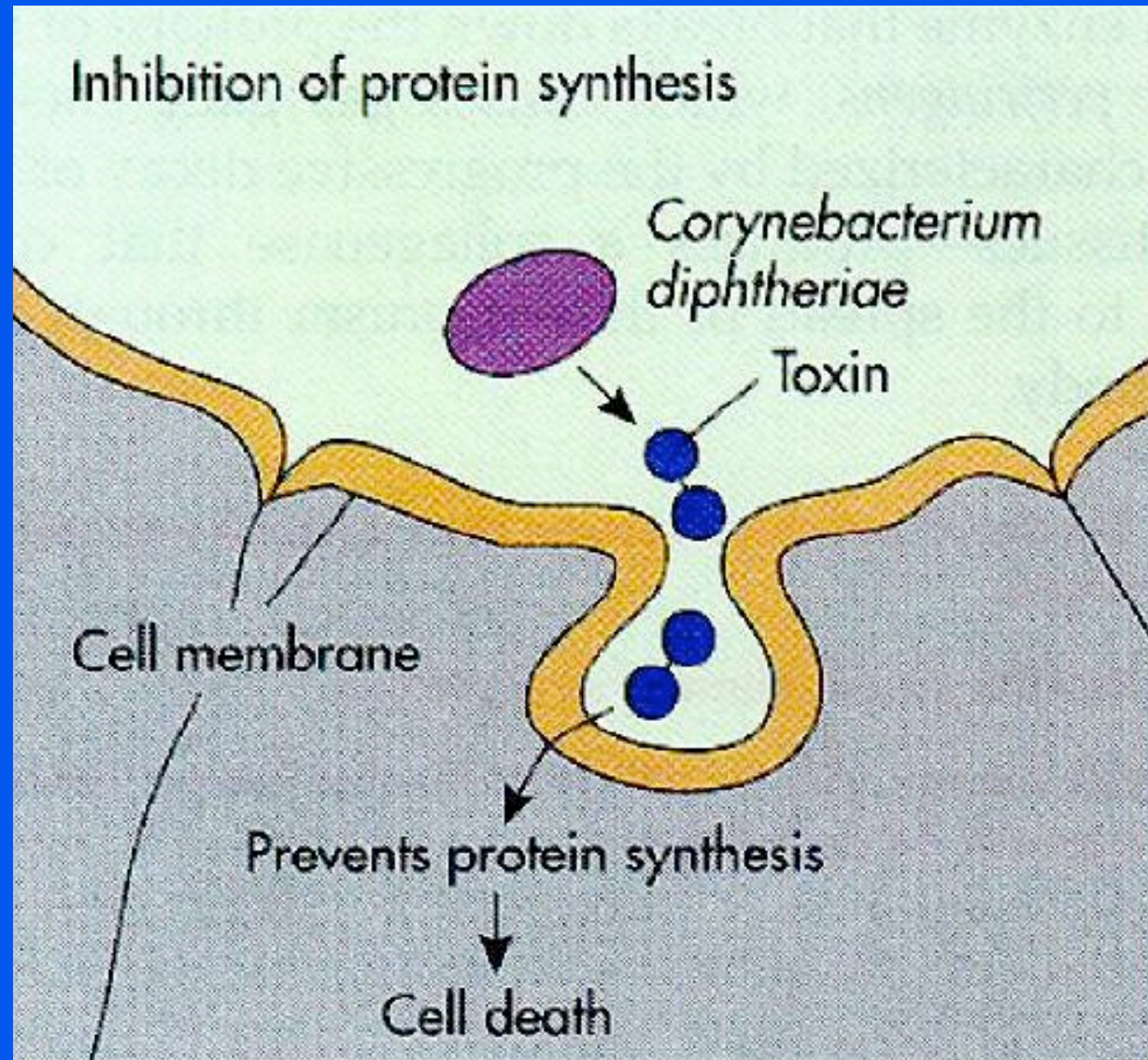


Corynebacterium

- powerful exotoxin damages heart and nerves
- sore throat, fever, membrane in throat
- Vaccine
 - DTaP
 - Tdap



effect of diphtheria toxin

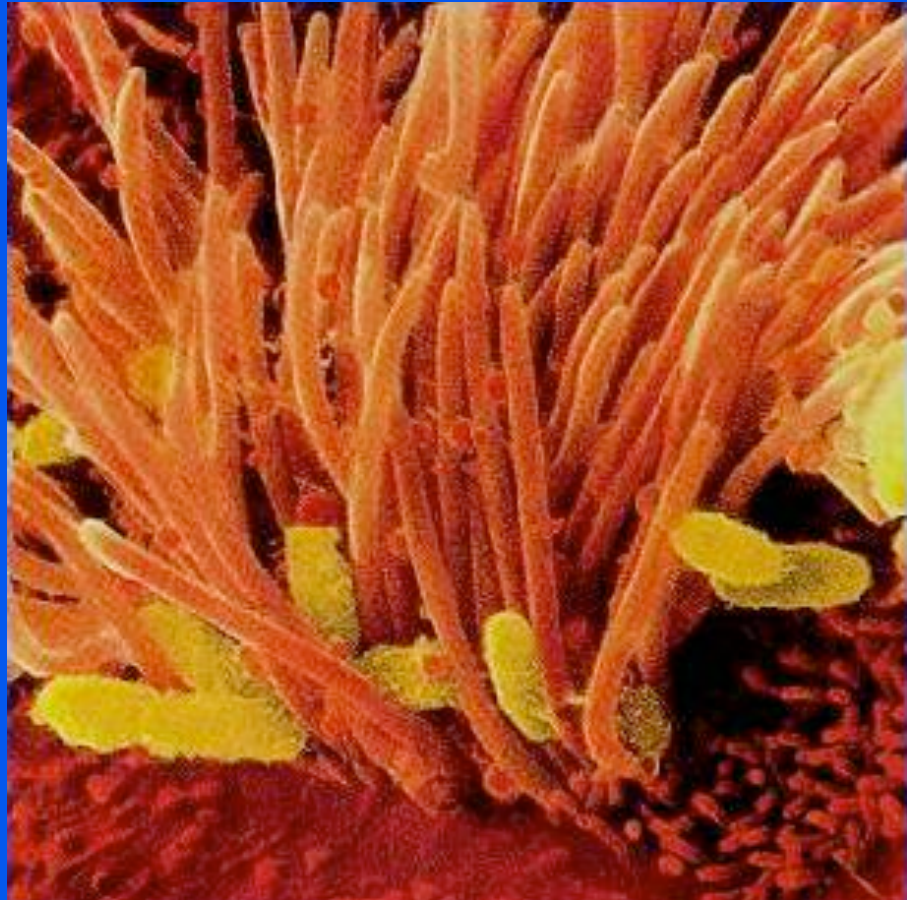


diphtheria



***Bordetella pertussis*: Pertussis or whooping cough**

- Gram - bacillus
- aerobic
- nonmotile
- bronchitis
- paroxysms of coughing, inspiratory whoop, may vomit after coughing
- Vaccine
 - DTaP
 - Tdap



on respiratory cilia