

**Spore forming-bacilli**

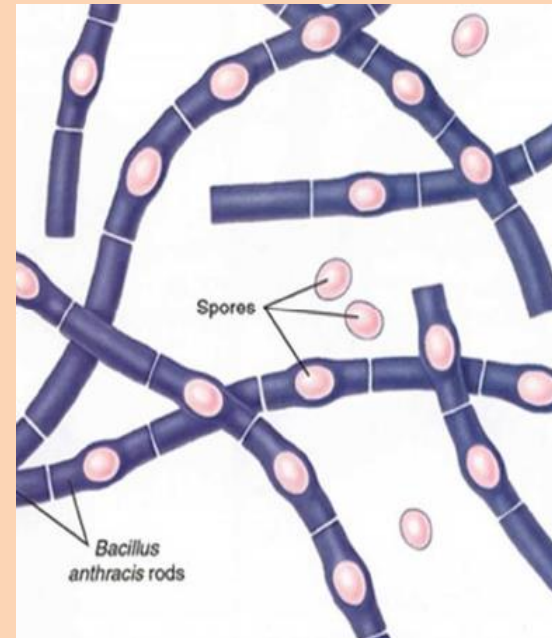
# BACILLUS ANTHRACIS

- Gram-positive
- Large, Spore forming rods, in chains
- Human pathogen
- Zoonosis
- Other Bacillus spp. are ubiquitous, Soil, water, and airborne dust (**anthracoids**)
- Produce endospores

# BACILLUS ANTHRACIS

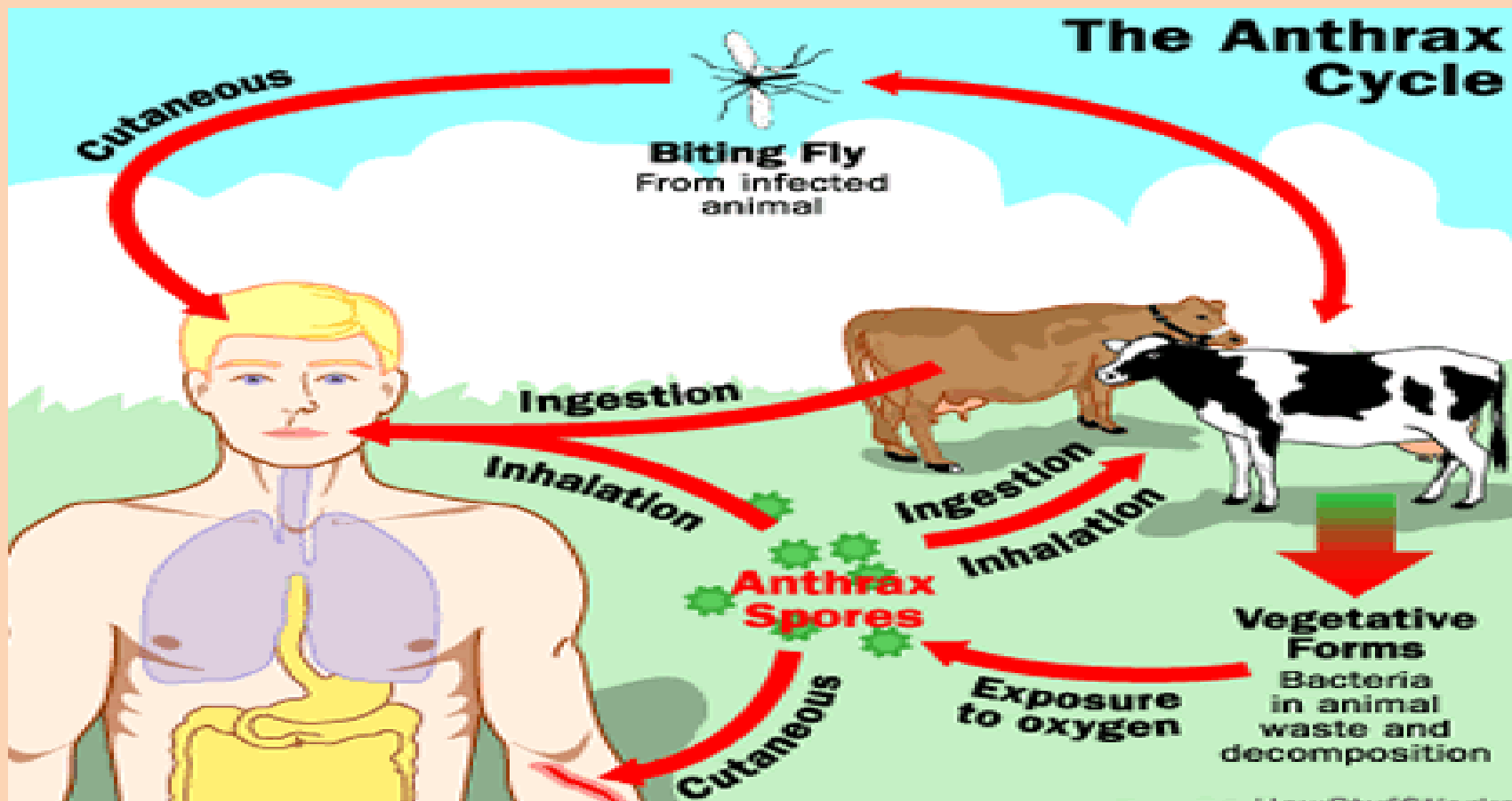
## The Spore

- Sporulation requires
  - Poor nutrient conditions
  - Presence of oxygen



# BACILLUS ANTHRACIS

## Pathogenicity



# BACILLUS ANTHRACIS

## Pathogenicity:

### Virulence factors

Capsule (poly-D-glutamic acid)

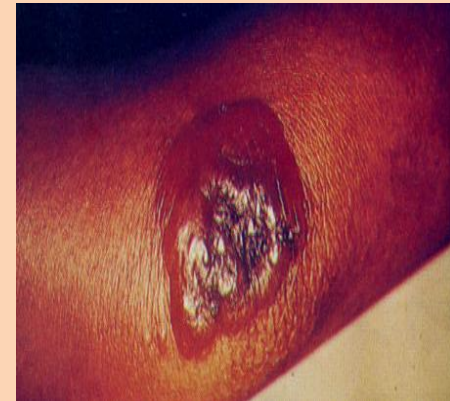
- Plasmid-coded exotoxins:
  - *Protective antigen*
  - *Oedema factor*
  - *Lethal factor*

# BACILLUS ANTHRACIS

## Anthrax clinical presentations

### A. Cutaneous anthrax

- blister (malignant pustule)
- Fatal septicaemia and meningoen­cephalitis
- Mortality rate is about 20%



### B. Pulmonary anthrax (*wool-sorter's disease*)

- Hemorrhagic lymphadenitis
- Hemorrhagic mediastinitis

# BACILLUS ANTHRACIS

## **Anthrax clinical presentations**

### **C. Enteric anthrax**

- A severe form of gastroenteritis
- High mortality

### **D. Meningoencephalitis**

# BACILLUS ANTHRACIS

## Diagnosis

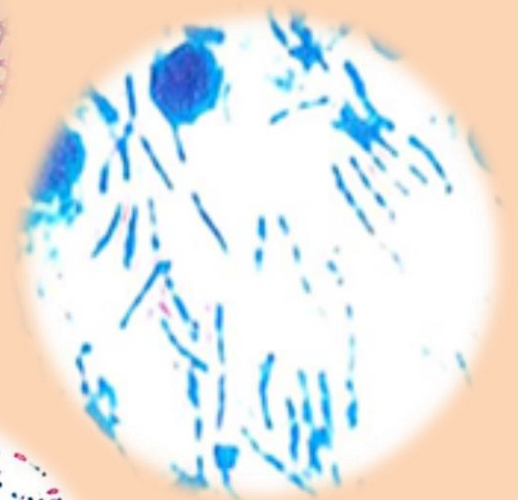
- Precautions
  - *B. anthracis* is a high risk infectious pathogen
  - Sterilization



# BACILLUS ANTHRACIS

## Diagnosis

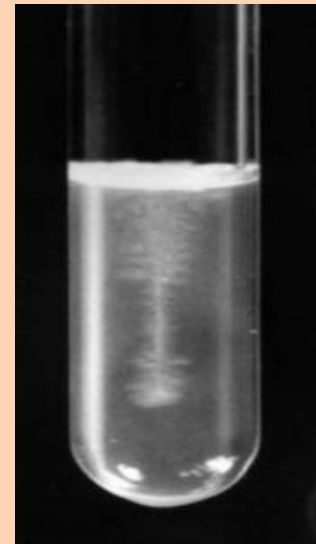
- The capsule:
  - From clinical specimens
  - (McFedyean reaction)
- The spores:
  - *In vitro* aerobic cultures



# BACILLUS ANTHRACIS

## Diagnosis

- Smears should be chemically fixed by potassium permanganate
- blunt-ended bacilli, singly; in pairs; or frequently in long chains
- Catalase test
- Blood agar
- Direct fluorescent antibody (DFA) test
- Gelatin stab culture



# BACILLUS ANTHRACIS

## Anthrax vaccine

- Attenuated strain of *B. anthracis*

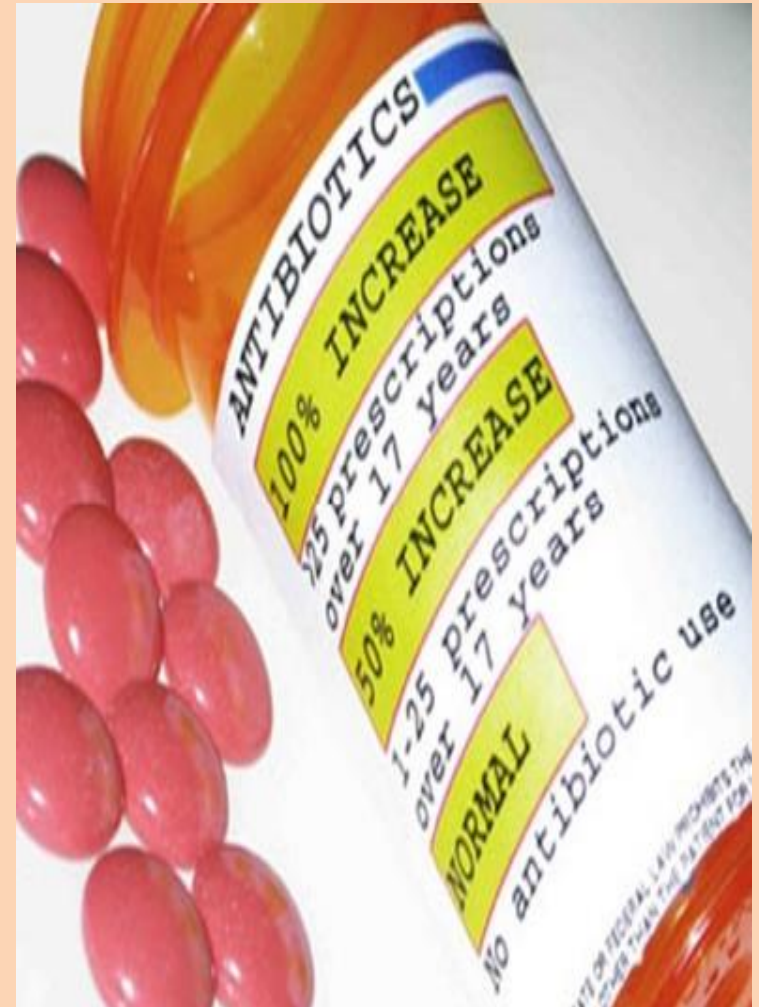
# BACILLUS ANTHRACIS

## Treatment

- Multidrug therapy (ciprofloxacin + rifampin + vancomycin)

## Prevention

- Post exposure prophylaxis with ciprofloxacin
- Autoclaving for decontamination



*Bacillus cereus*

# BACILLUS CEREUS

- Large rods
- Heat resistant spores
- *Bacillus cereus* enterotoxins causes food poisoning
- Opportunistic infections

# *BACILLUS CEREUS*

**Food poisoning has two forms:**

## **1. Emetic form**

- Incubation period
- Lasts 8-10 hours

## **1. Diarrheal form**

- Incubation period
- Lasts 20-36 hours

# *BACILLUS CEREUS*

## Diagnosis

- Blood agar
- Gelatin stab culture
- Spore stains
  - In the Malachite green stain
  - In the Nigrosine stain



# *BACILLUS CEREUS*

## **Antibiotic sensitivity**

- Gentamycin
- Erythromycin
- Vancomycin
- Clindamycin