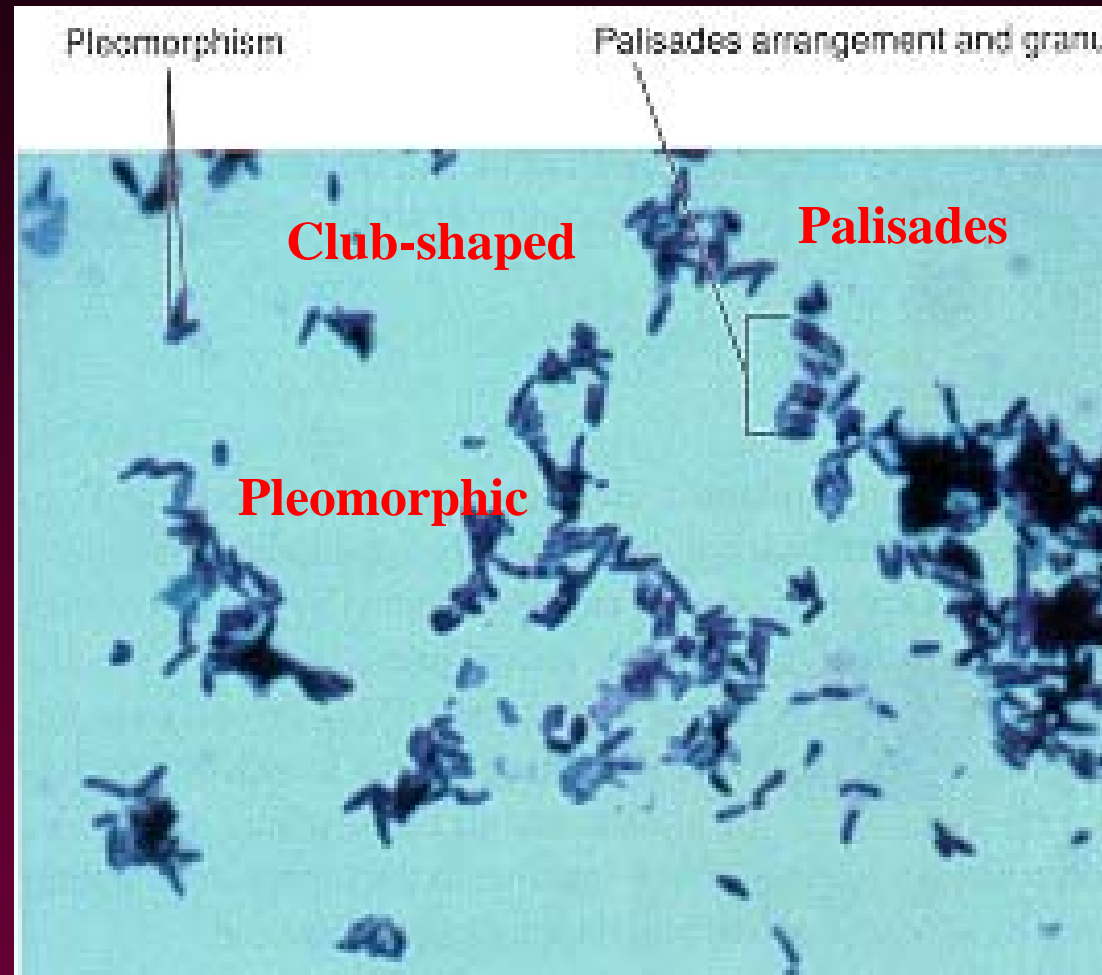


Corynebacterium, Bacillus

A mixed bag of some serious
pathogens

Corynebacterium diphtheriae

- Club-shaped “V” or “L” bacteria
 - Koryne=club in Gr.
- Gram + rods
- Normal flora of skin & mucus membranes
- *C. diphtheriae* only medically important
 - pathogenes due to diphtheria toxin, a potent exotoxin
 - lysogenized *B-corynephage*

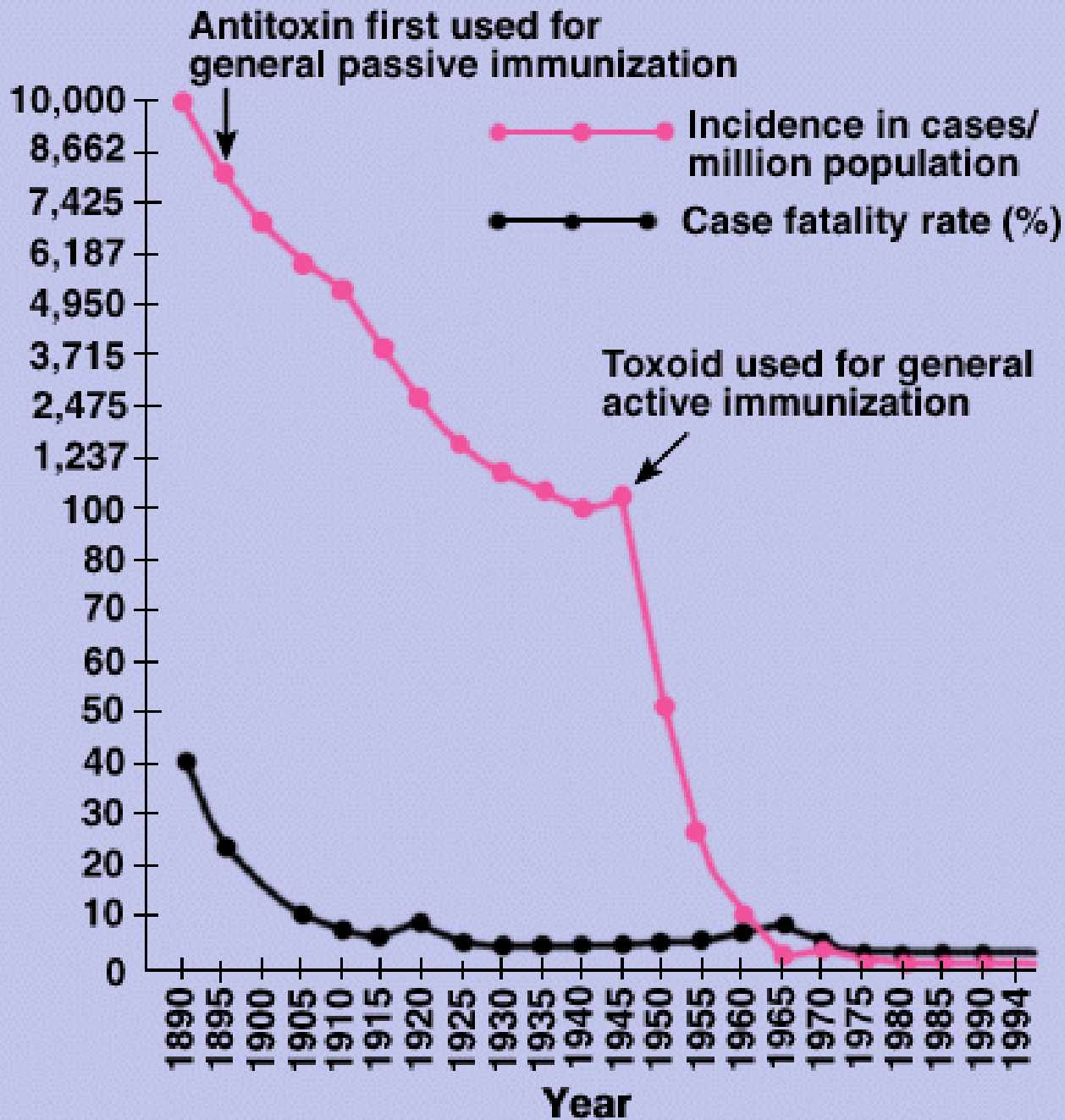


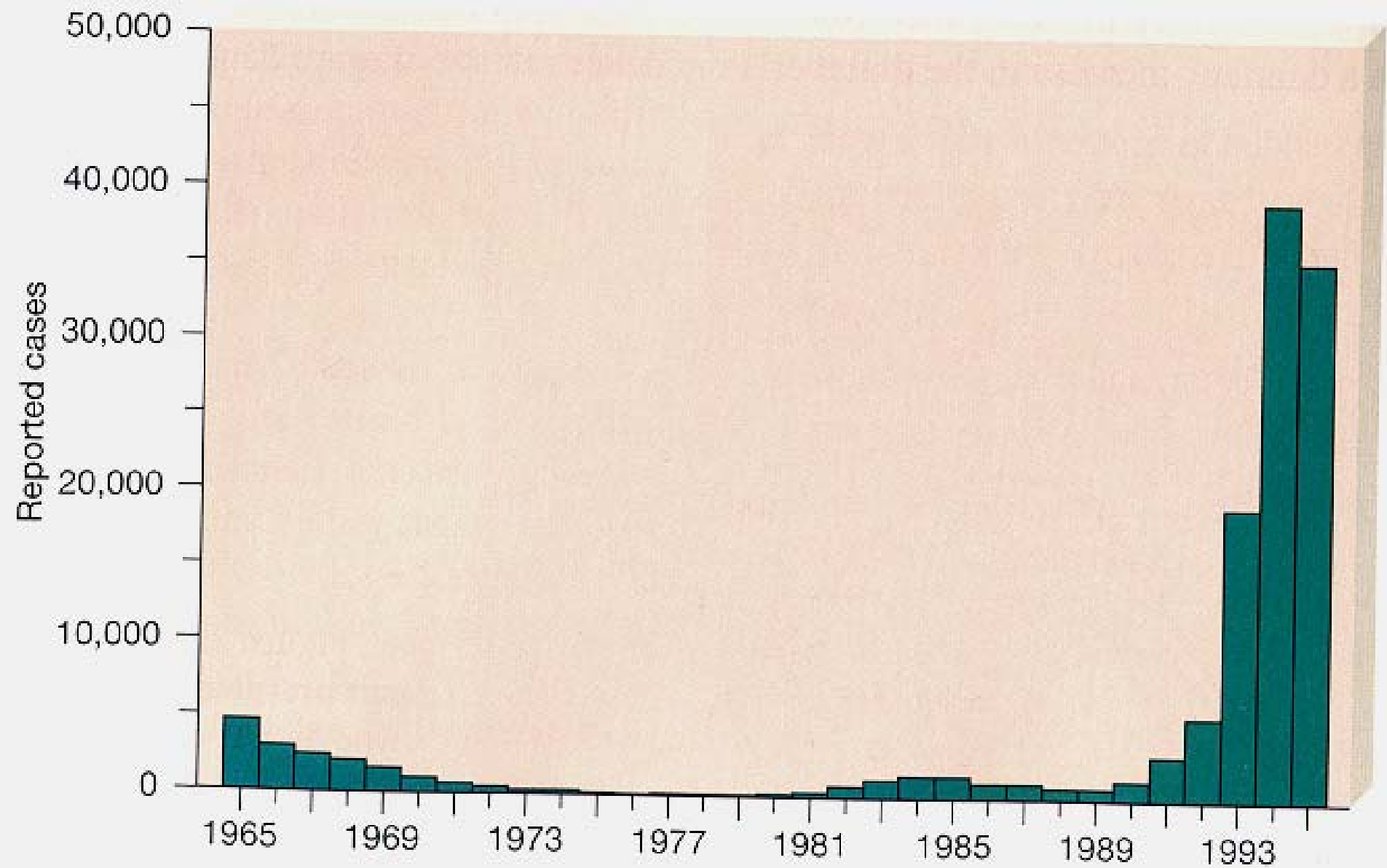
Gram + pleomorphic rods

Historical Considerations

- Hippocrates, 300BC
 - sore throats with throat-membranes & suffocation
- Loeffler in Koch's lab:
 - noted pseudomembrane
 - bacteria did not invade other tissues
 - cardiac & CNS lesions predicted a toxin
 - toxin discovered Pasteur Institute
 - Von Behring made toxoid
 - “Diphtheroids” incapable of toxin are common in normal flora
- World-wide
 - before vaccine, the major killer 2-14 yr olds in Canada & U.S.--1922>200,000 cases
 - Today rare in U.S.
 - less than 5 per year
 - Annually kills millions elsewhere
 - former USSR
 - Humans only infected
 - droplet & skin**
 - Vaccine against toxin, not bacteria (toxoid)

Incidence and Case Fatality Rates for Diphtheria. Figure 19.12 (T)



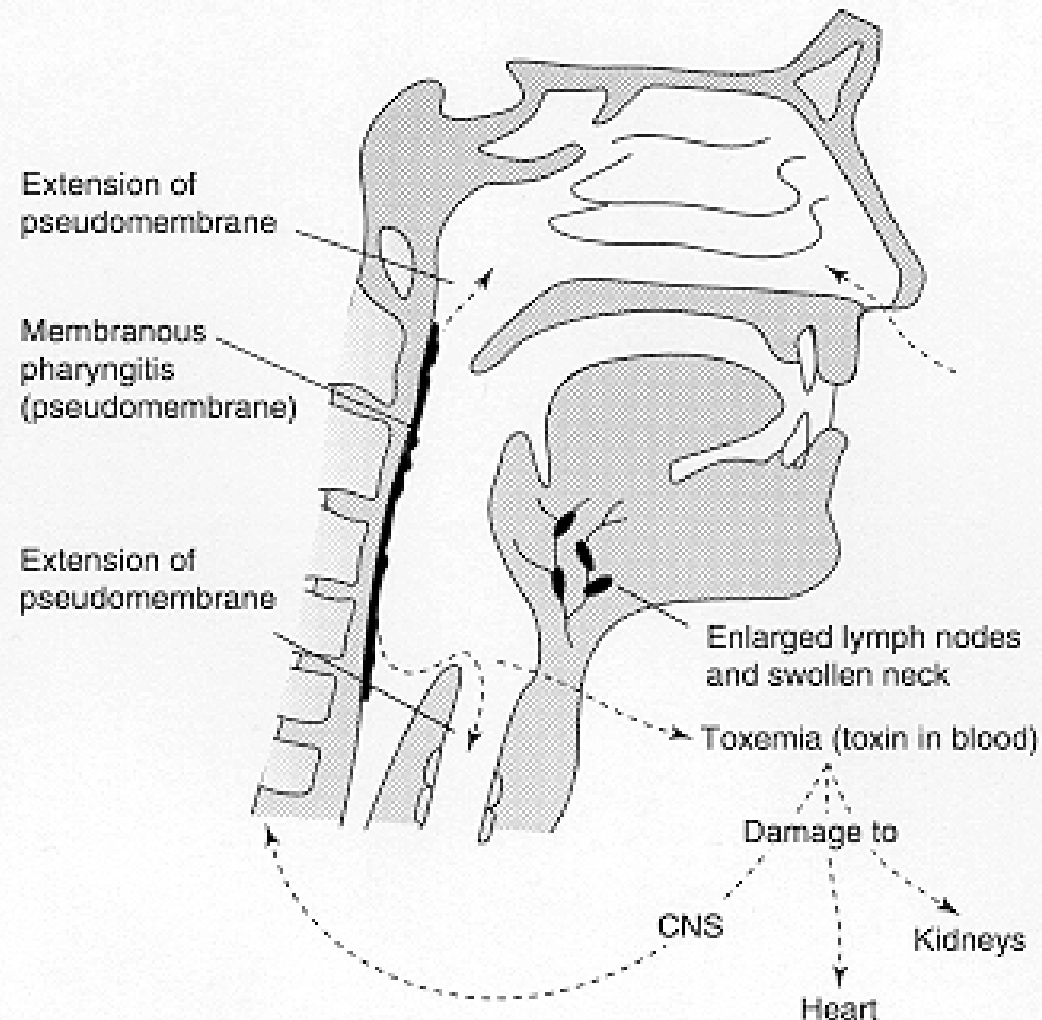


Diphtheria in the former Soviet Union, after vaccination ceased

Pathogenesis of diphtheria

- Diphtheria toxin:
 - lysogenic phage
 - Classical A/B toxin
 - binds to epidermal growth factors
 - blocks protein synthesis
 - mostly in heart, nerves & kidneys
 - Pseudomembrane
 - respiratory collapse
 - Myocarditis
 - Renal Failure
 - Suffocation

Figure 19-3 Pathogenesis of diphtheria.



Clinical features of diphtheria

- **Respiratory:**

- sore throat, malaise,
- Pseudomembrane:
 - White/gray membrane
 - fibrin-rich exudate and necrotic tissue
 - cervical nodes greatly enlarged (bull-neck)
 - Labored breathing
 - dyspnea
 - accessory muscles
 - cyanosis
 - anxiety
 - suffocation without lymphadenopathy
- tracheostomy or intubation



Pseudomen

**“Bull neck”
and tracheal
intubation**

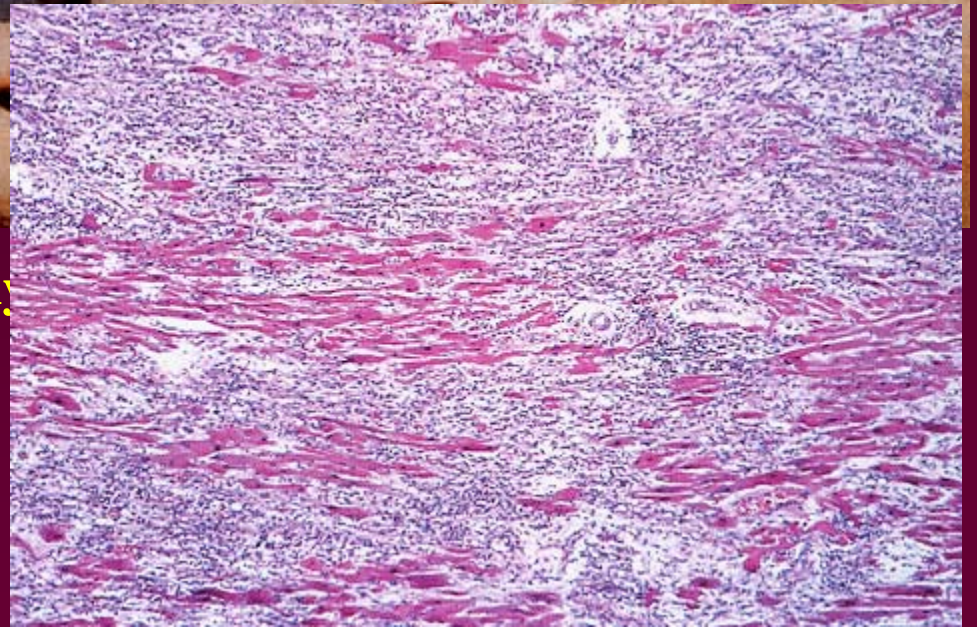


Clinical features of diphtheria

- **Extra-Respiratory:**
 - Pseudomembrane of eyes (bloody tears)
- **Toxemia:**
 - Cardiac & Neural
 - 10-25% cardiac like congestive heart failure
 - Neuropathy--paralysis of pharynx
 - affects breathing
 - Mortality due to myocarditis and asphyxia
- DPT vaccine & Penicillin



Bloody



Myocardio-necrosis from D-toxin

Anthrax

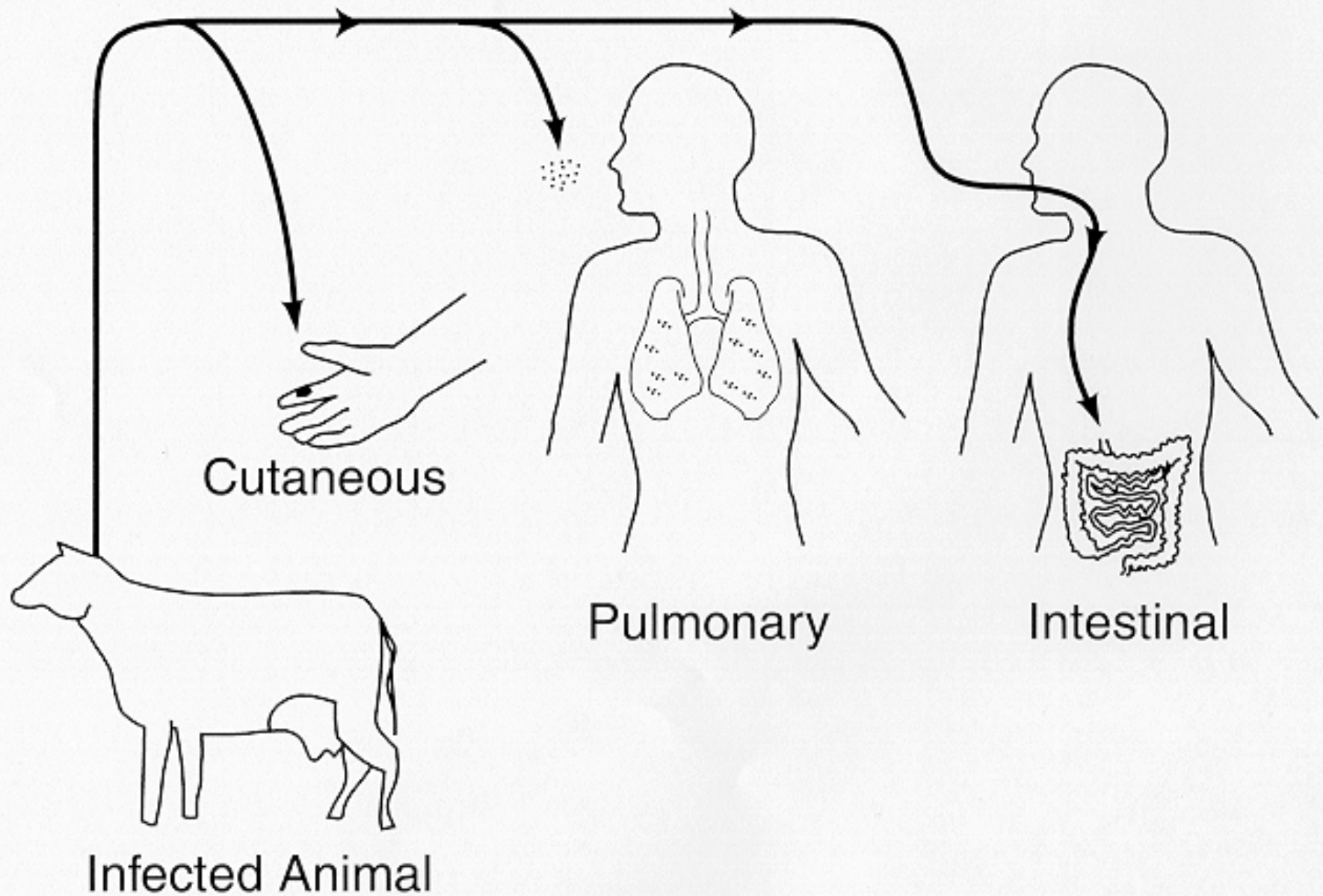
A large, dense pile of human skulls, some appearing damaged or with holes, set against a dark blue background. The skulls are arranged in a chaotic, overlapping manner, filling most of the frame. The lighting is dramatic, highlighting the textures and colors of the skulls.

Bacillus anthracis

Bacillus anthracis

- Gram +, spore-former
- Zoonotic disease (cattle, mostly)
- Noted in anciently
 - Hebrew, Roman & Greek literature
- Koch's work
- Common in farm workers
 - Woollorter's disease
- Disease produced by a variety of toxins
- Cutaneous lesions
 - eschar, black leathery necrotic lesions
 - Pulmonary (**highly fatal**)
 - capillary thrombosis
 - cardiovascular shock
 - Intestinal lesions
 - from meat
 - rare, but serious
 - Germ Warfare weapon
 - Desert Storm and Inspection problems
 - spores in warheads

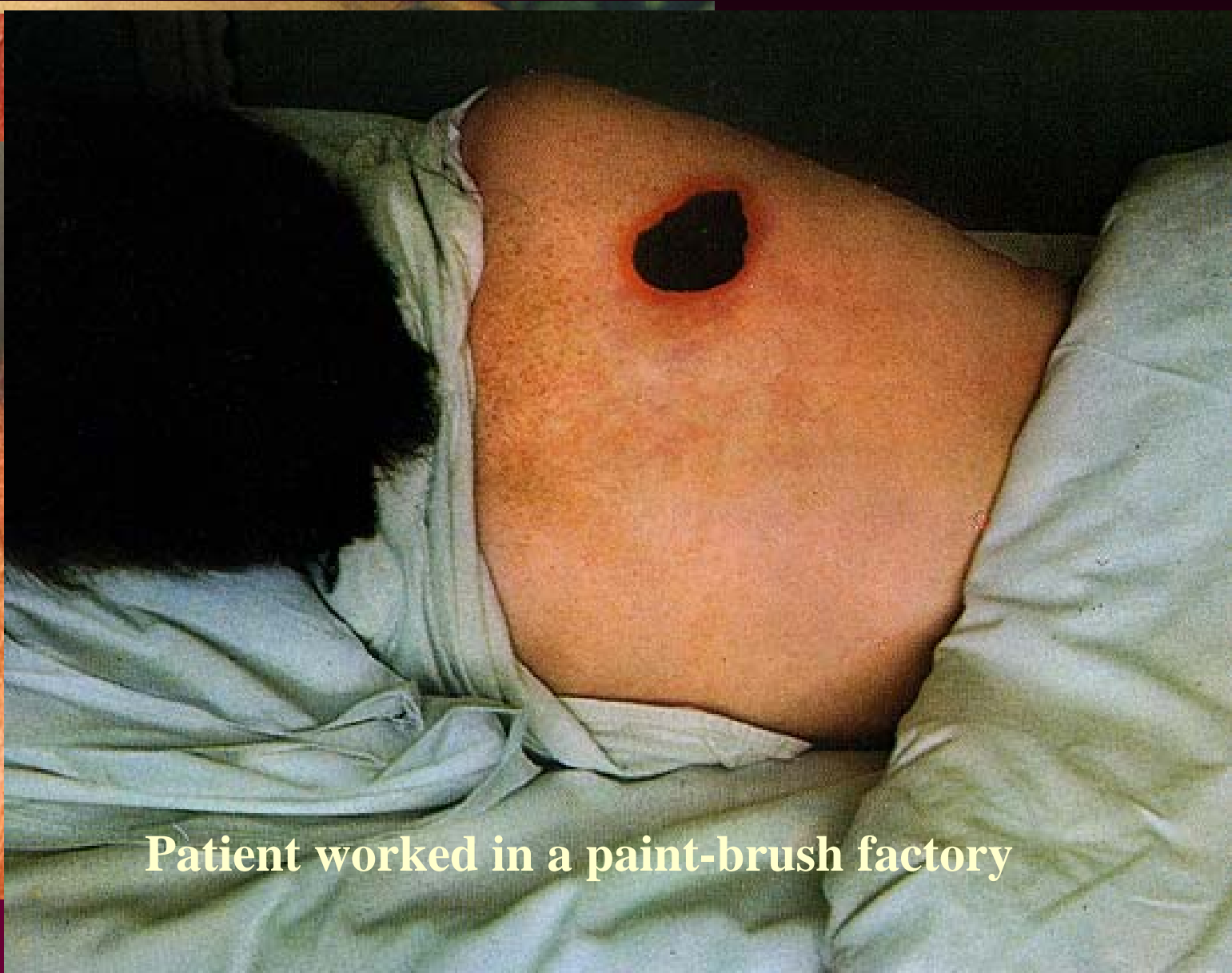
Figure 19-8 Three forms of anthrax that might be contracted by exposure to infected animal products.



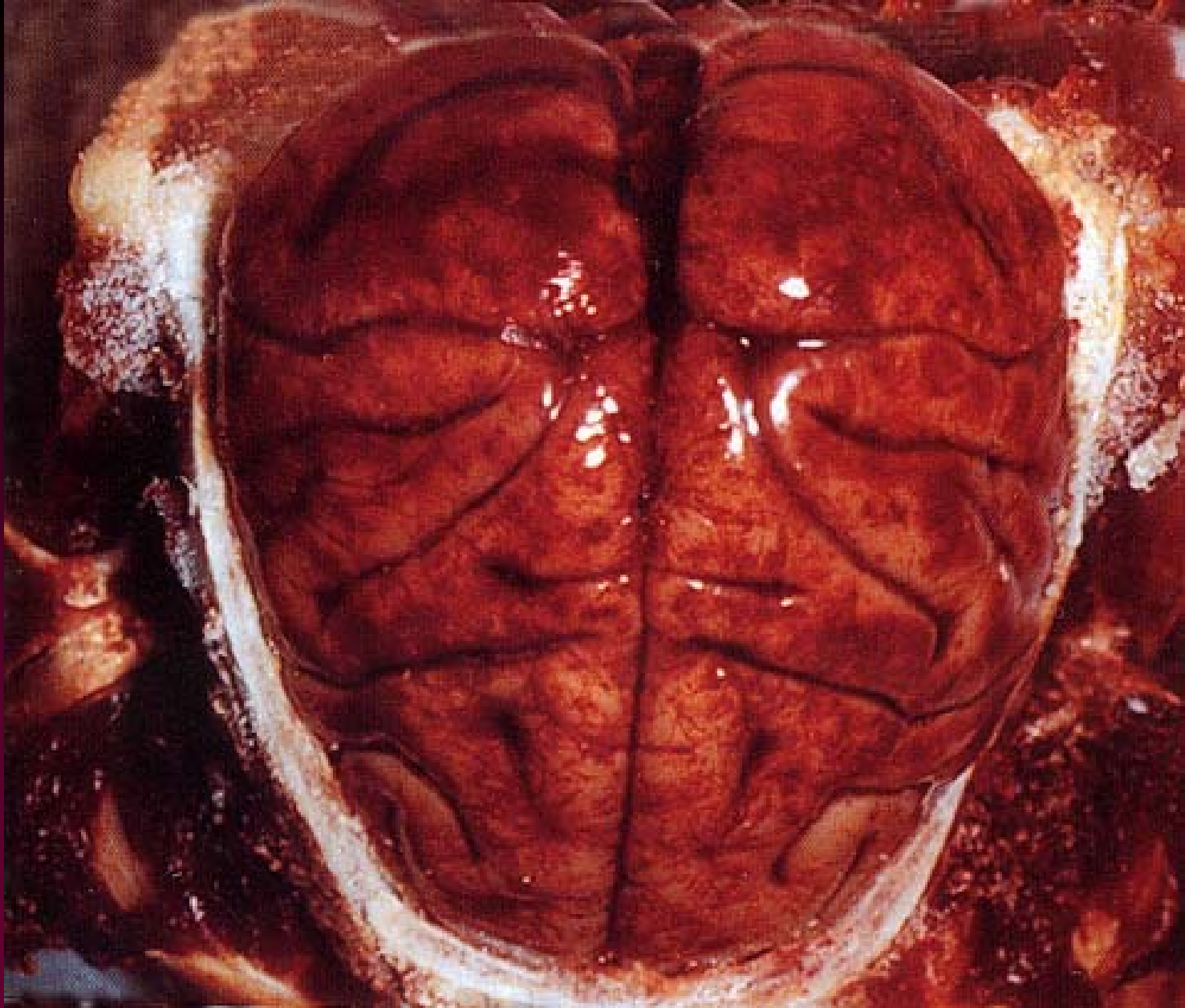
Cutaneous Anthrax lesions



Early



Patient worked in a paint-brush factory



Hemorrhagic monkey brain after experimental inhalation of anthrax spores

Hemorrhagic human brain after the inhalation of Anthrax spores

