Cholera

- A life-threatening secretory diarrhea induced by enterotoxin secreted by V. cholerae
- Water-borne illness caused by ingesting water/food contaminated by copepods infected by V. cholerae
- An enterotoxic enteropathy (a non-invasive diarrheal disease)
- A major epidemic disease

V. cholerae

- Transmitted by fecal-oral route
- Endemic in areas of poor sanitation (India and Bangladesh)
- May persist in shellfish or plankton
- 7 pandemics since 1817 – first 6 from Classical strains, 7th from El Tor
- 1993: Cholera in Bengal caused by O139 – may be cause of 8th pandemic

Profile of *vibrio cholerae*

- Gram-negative
- Highly motile; polar flagellum
- Brackish rivers, coastal waters
  - Associate with plankton and algae
- Proliferate in summers
- Produce Cholera toxin
- Pathogenic and nonpathogenic strains
  - 206 serogroups

Transmission

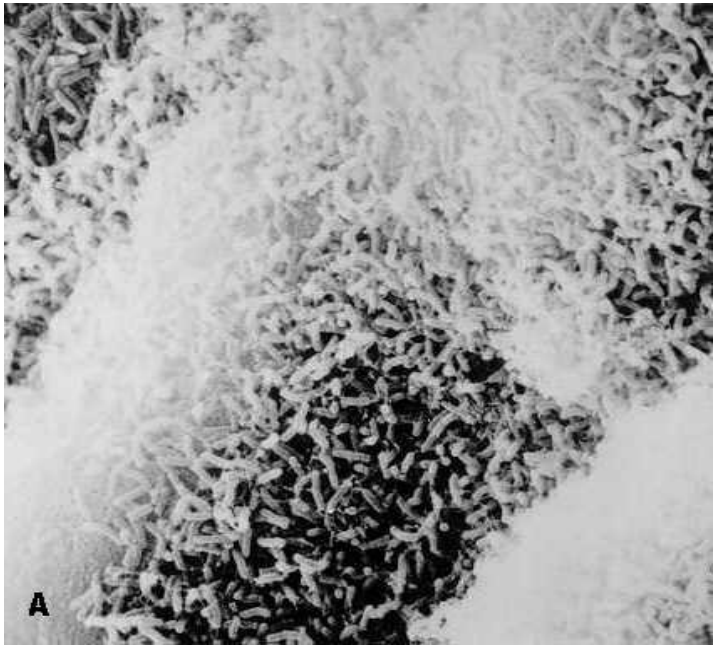
- Contaminated food or water
  - Inadequate sewage treatment
  - Lack of water treatment
  - Improperly cooked shellfish
- Transmission by casual contact unlikely

People Most at Risk

- People with low gastric acid levels
  - Children: 10x more susceptible than adults
  - Elderly
- Blood types
  - O more risk to infection>> B > A > AB less

Incubation

- Ranges from a few hours to 5 days
- Average is 1-3 days
- Shorter incubation period:
  - High gastric pH (from use of antacids)
  - Consumption of high dosage of cholera



How Does Cholera Toxin Work?

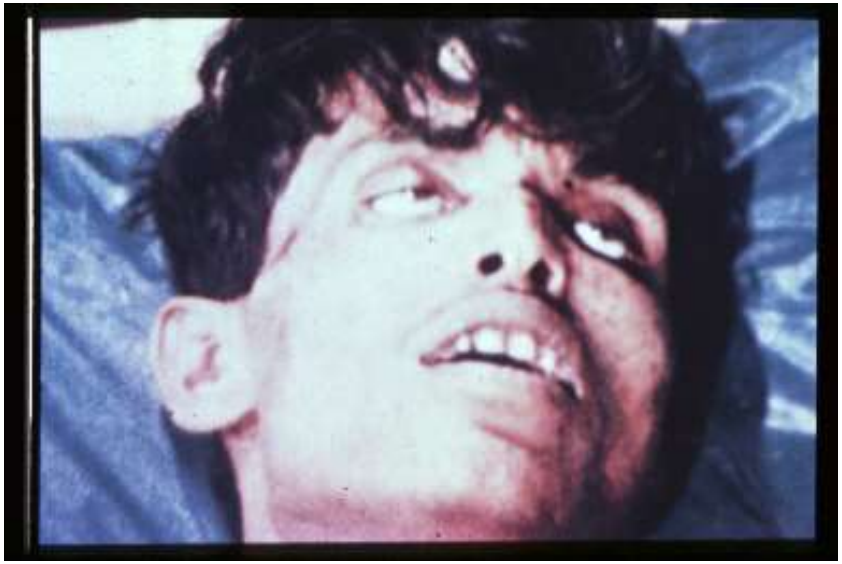
- G proteins stuck in “On” position
- 100 fold increase in cAMP
- Activation of ion channels
- Ions flow out and water follows
- animation

Symptoms

- Occur 2-3 days after consumption of contaminated food/water
- Usually mild, or no symptoms at all
  - 75% asymptomatic
  - 20% mild disease
  - 2-5% severe
- Vomiting
- Cramps
- Watery diarrhea (1L/hour)
- Without treatment, death in 18 hours-several days

Consequences of Severe Dehydration

- Intravascular volume depletion
- Severe metabolic acidosis
- Hypokalemia
- Cardiac and renal failure
- Sunken eyes
- Almost no urine production



Mortality Rate

- Causes 120,000 deaths/year worldwide
- With prompt rehydration: <1%
- Without treatment: 50%-60%

Treatment

Even before identifying cause of disease, rehydration therapy must begin Immediately because death can occur within hours

- Oral rehydration
- Intravenous rehydration
- Antimicrobial therapy

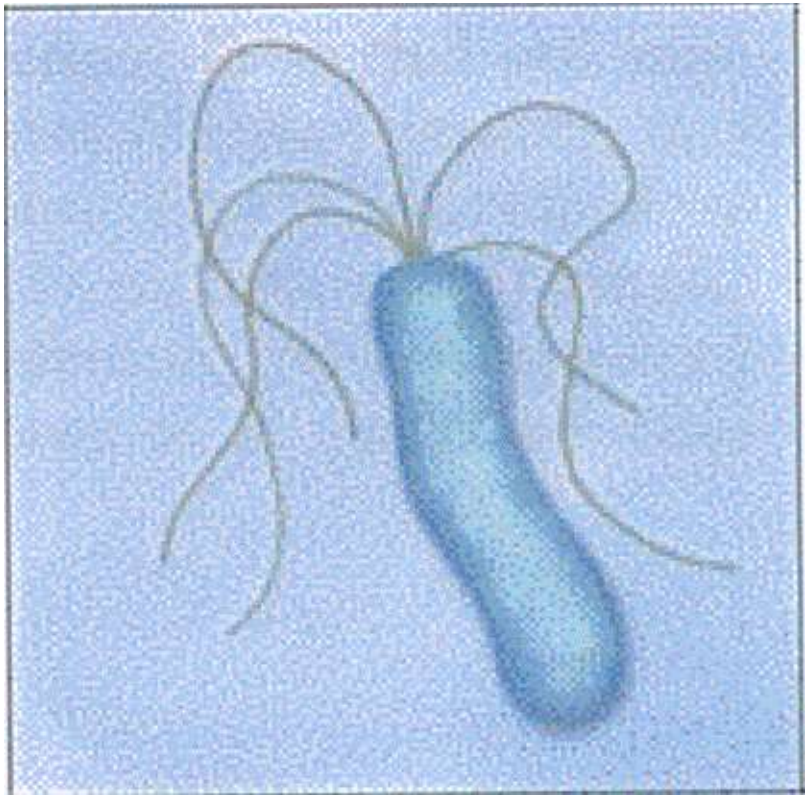
Helicobacter pylori

Abdulelah A Almayah

Helicobacter pylori

History

- **In 1982 ,spiral-shaped bacterium from gastric biopsies of patients with gastritis was isolated**
- **The discovery was by Dr.Robin Warren and Dr.Barry Marshall**



Epidemiology

- **Infection occurs worldwide**
- **Overall *prevalence* strongly correlates with socio-economic conditions**
- **In Middleaged adults in developing countries prevalence is 80%, in industralised countries 20-50% (rate of acquistion decreasing)**
- ***Acquisition*:Oral Ingestion of the bacterium**
- ***Transmission*:Within families in early childhood, not isolated from water etc, e**

Pathogenesis

- ***H. pylori*** **is found only on gastric epithelium where the organisms tend to cluster around the junctions between cells and virtually never penetrate the cells themselves.**
- ***H. pylori*** **is able to survive in the gastric environment which is hostile to growth of most bacteria.**

Standard triple therapy-Eradication therapy, which is probably the most widely used treatment for eradication of *H. pylori for* 7days minimal

Proton pump inhibitor **B.D. (e/g Lansoprazole 30 mg BD)**
+
Clarithromycin 500mg **B.D.**
+
Amoxycillin 1g **B.D.**
Or If penicillin allergic
Proton pump inhibitor **B.D. (e/g Lansoprazole 30 mg)**
Clarithromycin 500mg B.D.
Metronidazole 400 mg B.D
If treatment failure refer to Gasterenterologist

BRUCELLOSIS

Etiology

- *Brucella:*
- *Brucella abortus*(infect Cattle),

Brucella melitensis (infect Sheep,Goat)

- *Brucella suis*(Swin),Canins(Dog)

Brucella are

- G-ve Coccobacilli
- Aerobic, Non-spore forming
- Non motile
- Grown on Blood or Chocolate agar

Clinical Manifestations

- GIT : anorexia, abd. pain, vomiting, diarrhea,constipation, hepatosplenomegaly.

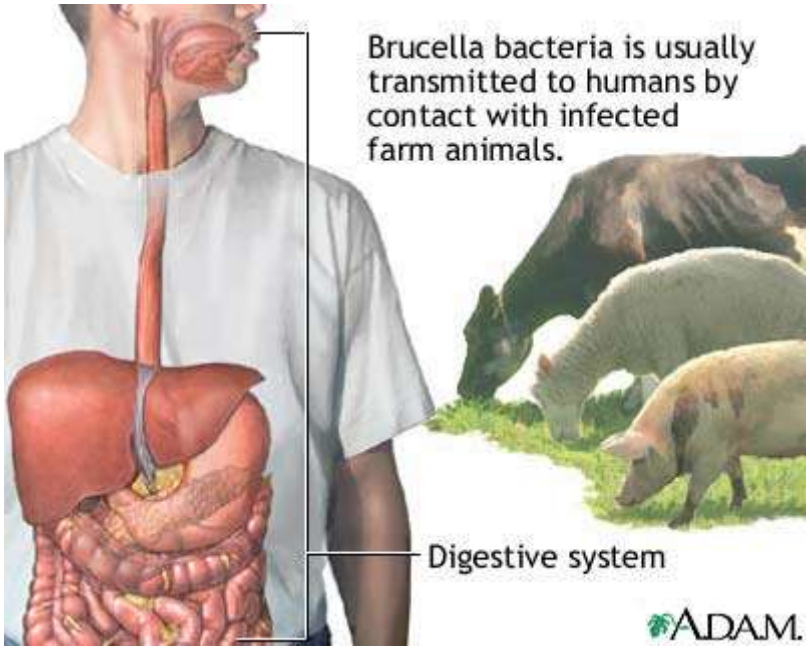
- LIVER : Involved in most cases .
  - granulomas (*B. abortus*).
  - hepatitis (*B.melitensis).*
  - abscesses (*B.suis)*.

Clinical Manifestations

- Neurologic
  - Meningitis, encephalitis, radiculopathy & peripheral neuropathy, intracerebral abscesses
  - Meningitis
    - acute or chronic
    - neck rigidity < 50%

Epidemiology

- Unpasteurized milk
- Occupational events



Pertussis

(Whooping Cough or Hundred Day Cough)

Epidemiology of Pertussis

Mode of transmission

- Person to person via
  - Aerosolized droplets from cough or sneeze
  - Direct contact with secretions from respiratory tract of infectious person

- 80% - secondary attack rate

- Older children and adults are important sources of disease for infants and young children

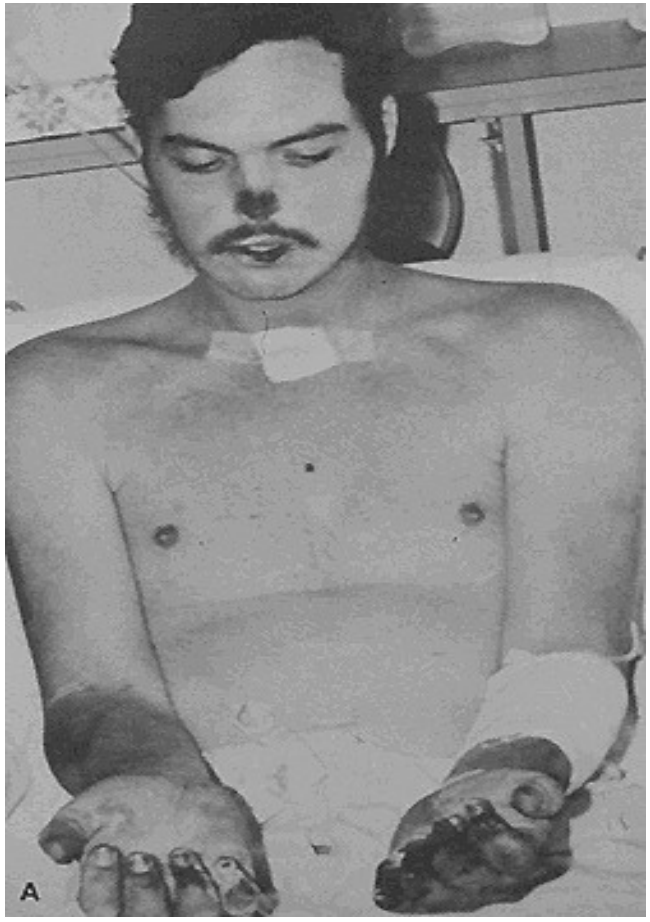
- Infants <12 months of age greatest risk for complications and death

-

Epidemiology of Pertussis

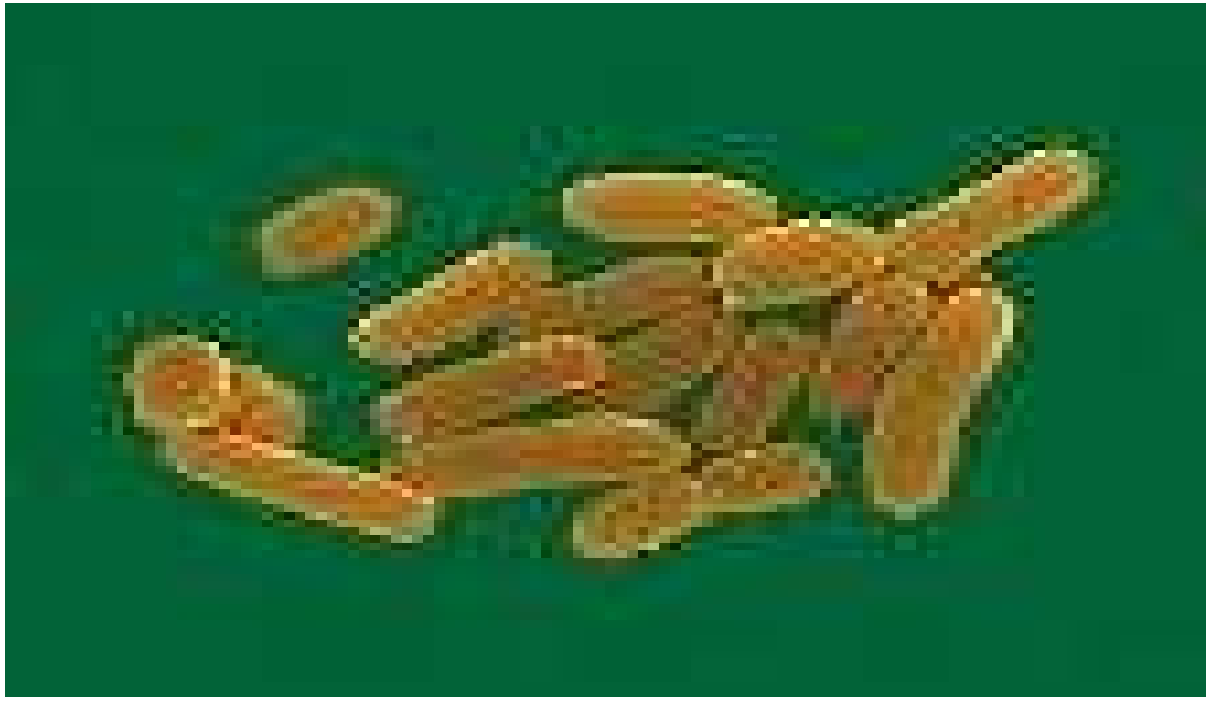
- Reservoir - Humans
- Incubation period – 7-10 days (5-21 days).
- Infectious period – Most contagious during the first 2 weeks after cough onset
- Duration of illness:
  - Children: 6-10 wks.
  - ~ ½ of Adolescents: 10 wks or longer

Yersinia pestis

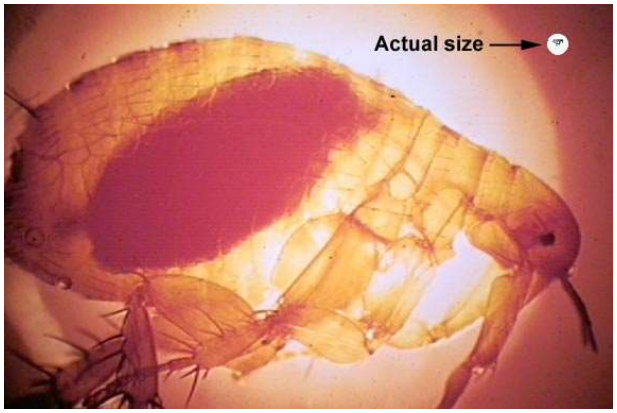


- Member of the *Enterobacteriaceae* family

Yersinia is a Gram-negative coccobacilli



Ecology and Infection Process



Y. pestis **multiply into intestinal Flea.**

Some *Y. pestis* in the flea infect next blood meal thus transferring the infection to a new host.

A few bacilli are taken up by tissue macrophages after they lose their capsular layer. Macrophages can't kill *Y. pestis* and provide protected environment for bacilli so they can re-synthesize their capsular layer.

The re-encapsulated organisms then kill the macrophage and are released into the extracellular environment where they travel to draining lymph nodes.

Symptoms

Bubonic Plague

bacteria infect lymph nodes

- Bubos

- Fever
- Headache
- Vomiting Blood

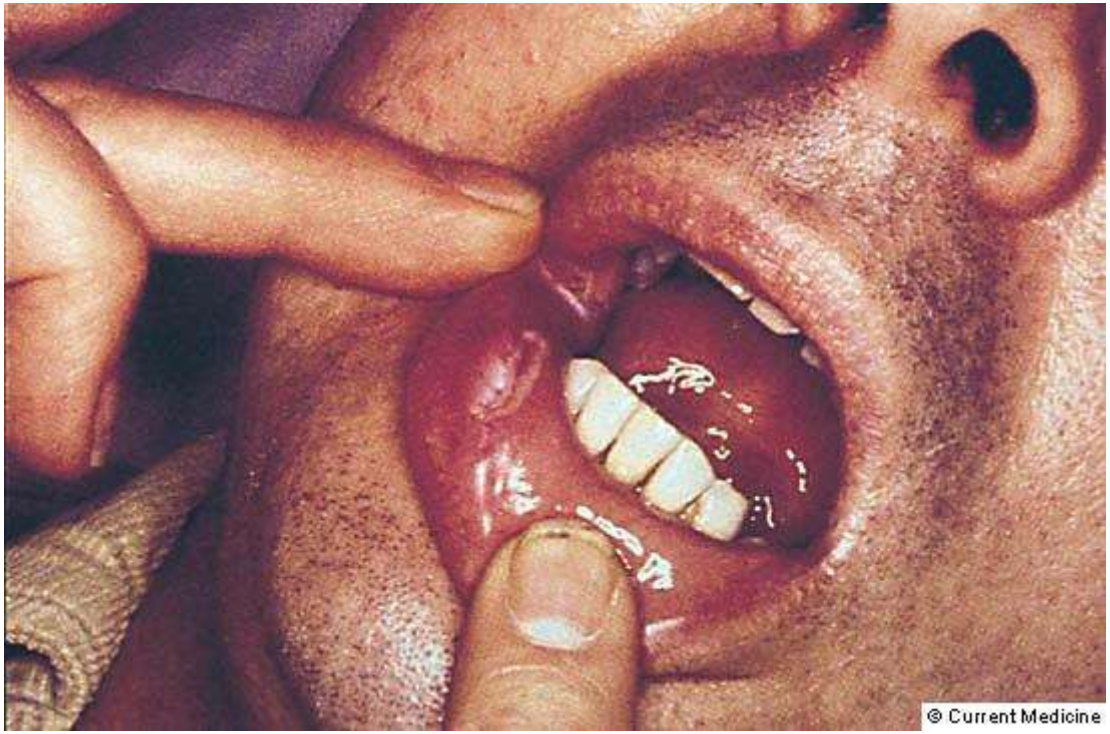
SYPHILIS

- **Caused by *Treponema pallidum*.**
- **Transmission: sexual; maternal-fetal, and rarely by other means.**
- **A dramatic increase in cases in men from 2000 to 2002 reflected syphilis in MSM.**
- **Syphilis increases the risk of both transmitting and getting infected with HIV**

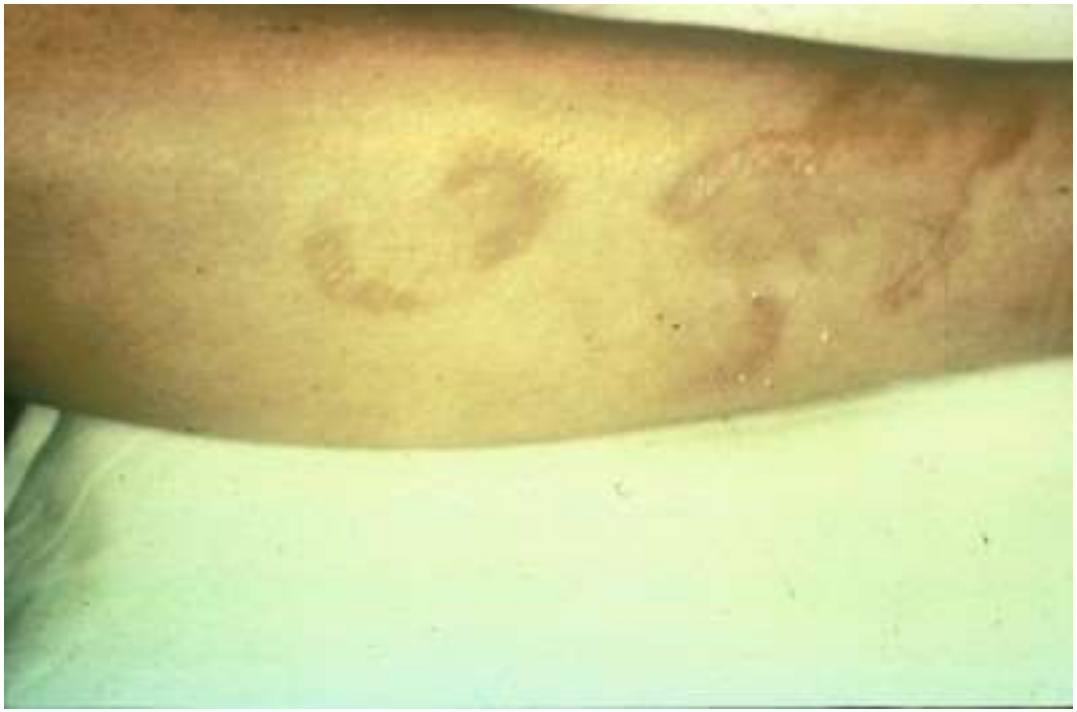
STAGES OF SYPHILIS

1. **Primary**
2. **Secondary**
3. **Latent**
    - **Early latent**
    - **Late latent**
4. **Late or tertiary**
    - **May involve any organ, but main parts are:**
        - **Neurosyphilis**
        - **Cardiovascular syphilis**
        - **Late benign (gumma)**

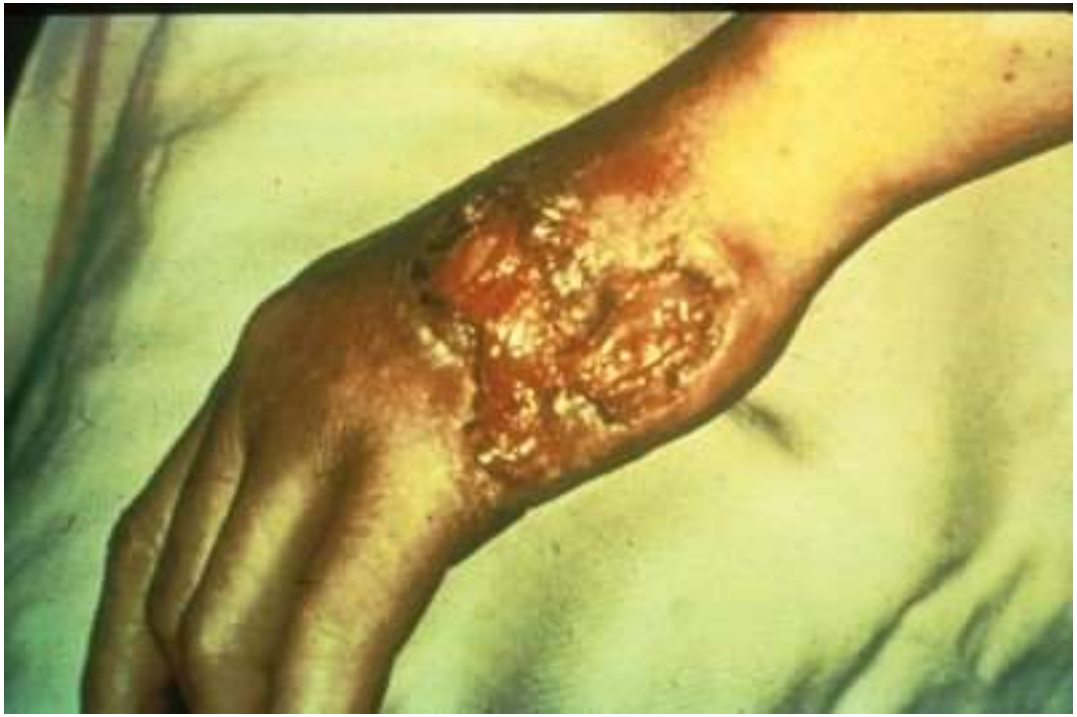
Oral chancres in primary syphilis

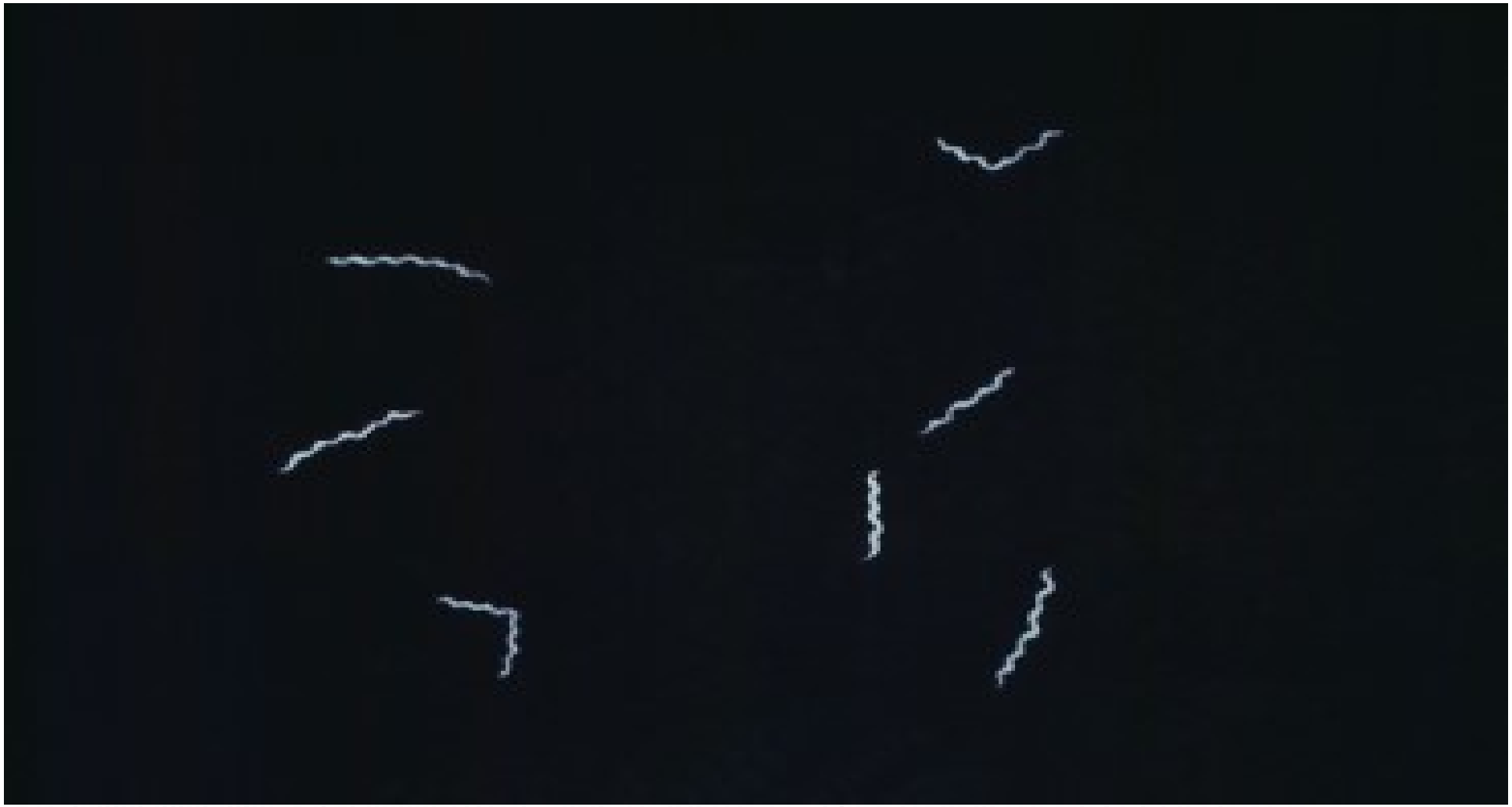


Late syphilis - serpiginous gummata of forearm



Late syphilis - ulcerating gumma





Treponema pallidum Dark field examination of exudate from a penile ulcer (x1000) in a patient with syphilis. The spirochete Treponema pallidum, which is too small to be seen using ordinary microscopy, appears as a delicate spiral rod when dark field illumination is employed. Courtesy of Harriet Provine.