

Mycoplasmas and other “tiny bacteria”

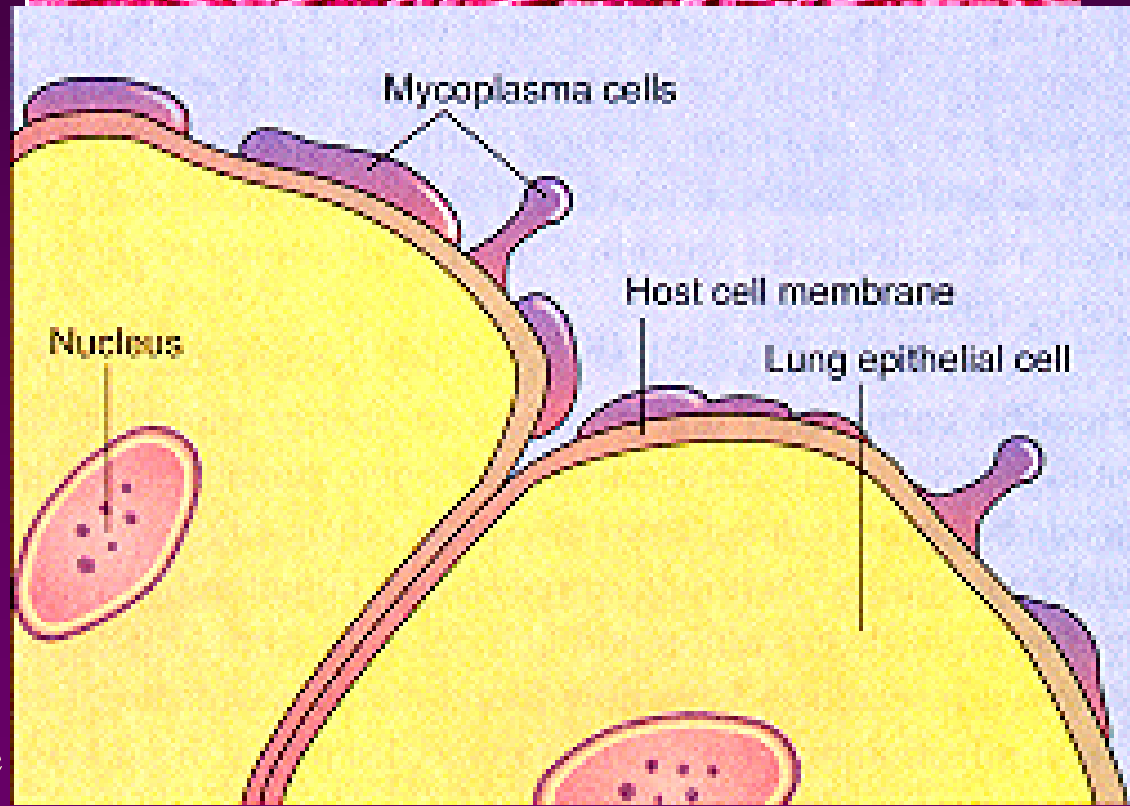
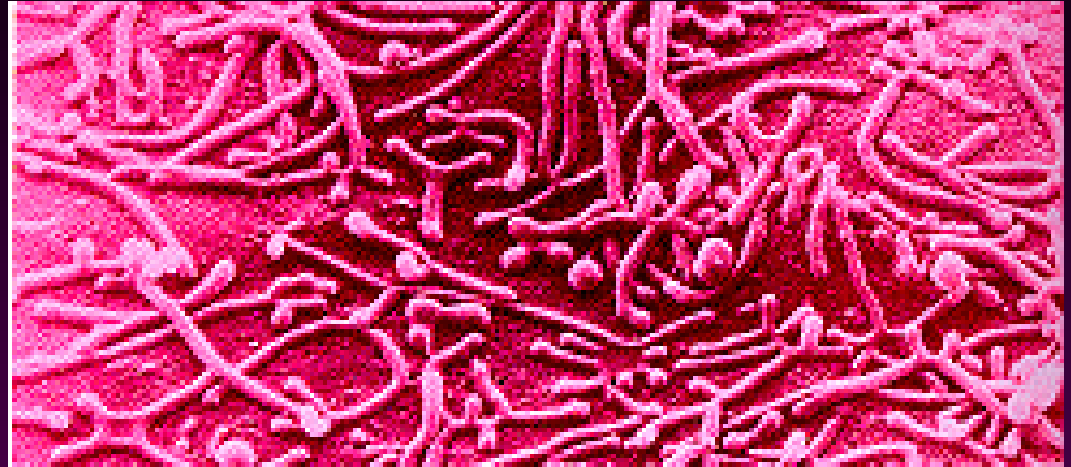
Some are disease agents, several have only been recognized over the past few years

Mycoplasma biology

- Tiny, filamentous, pleomorphic, aerobic and anaerobic
- Filterable through a 0.45u filters*
- They have no cell walls
 - not affected by *B*-lactam antibiotics
- Smallest prokaryotes capable of self-replication
 - smallest pathogen
- First discovered as an infectious agent in bovine pneumonia
- Generally part of human normal flora
- Surface pathogen that does not invade
 - attach to respiratory, gastrointestinal and urogenital mucosae
 - “cold agglutinins”
 - *Ureaplasma* split urea in urine
 - microscopic colonies

Mycoplasma pneumoniae

- Not normal flora
- Atypical pneumonia
 - radiographic images are unique
 - mild pneumonia (walking pneumonia); 10% of all
 - transmission via respiratory droplets
 - reduces alveoli size via swelling,--no pulmonary edema
 - transmission is slow, epidemics are rare
 - more common in adults*
 - Tracheobronchitis
 - mild fever, headache, wheezing, coryza, nonproductive cough,
 - erythromycin & tetracycline



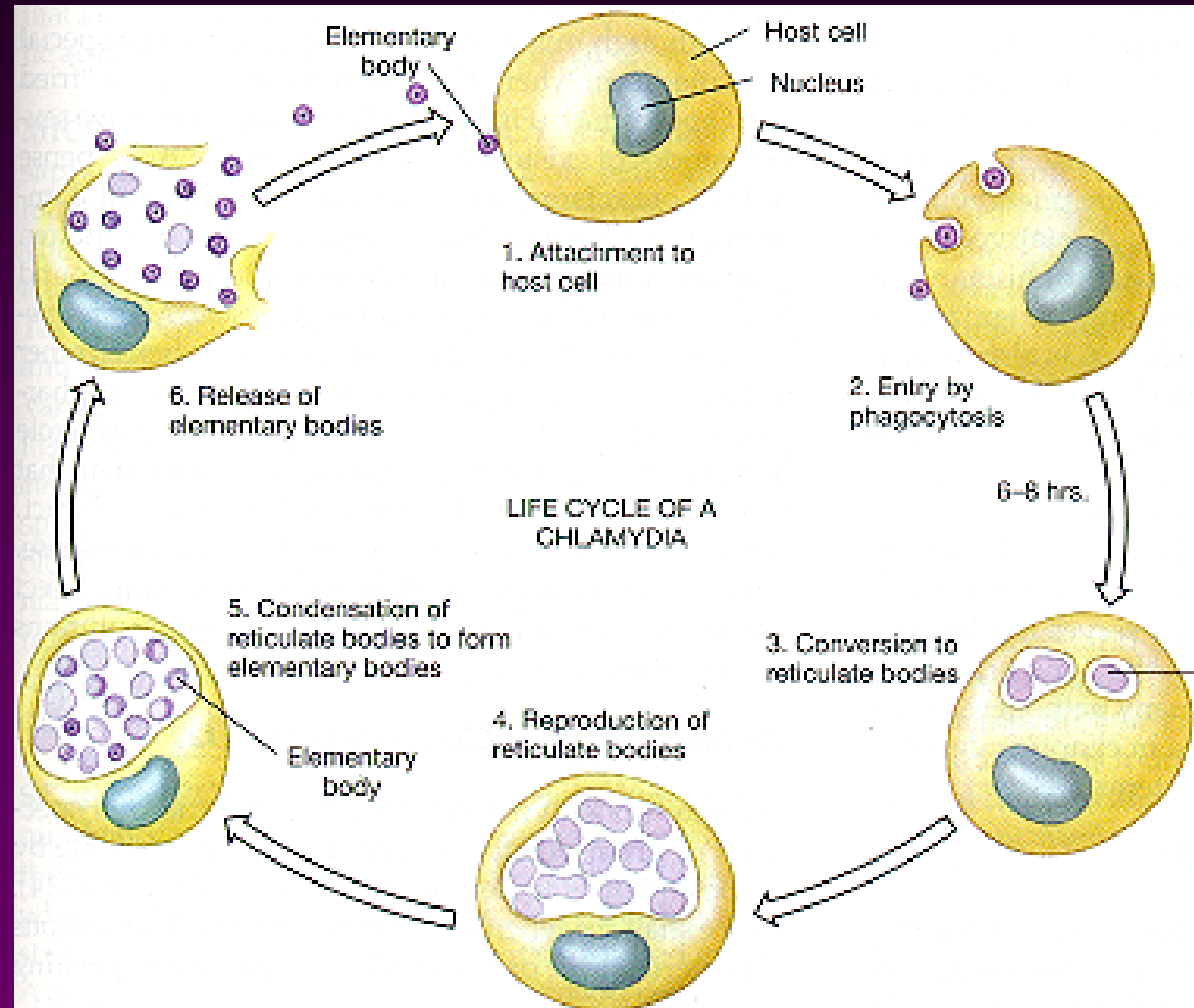
Chlamydial Biology

- Unusual life-cycle

- difficult to culture
- intracellular
- no cell walls, related to gram-- bacteria
- Biphasic reproduction
 - Elementary body
 - Reticulate body

- 3 spp cause disease:

- *C. trachomatis*
 - ocular and genital infections
- *C. psittaci*
 - parrot fever, a form of pneumonia
- *C. pneumoniae*
 - generally mild pneumonia
 - Atherosclerosis from chronic blood-stream infections

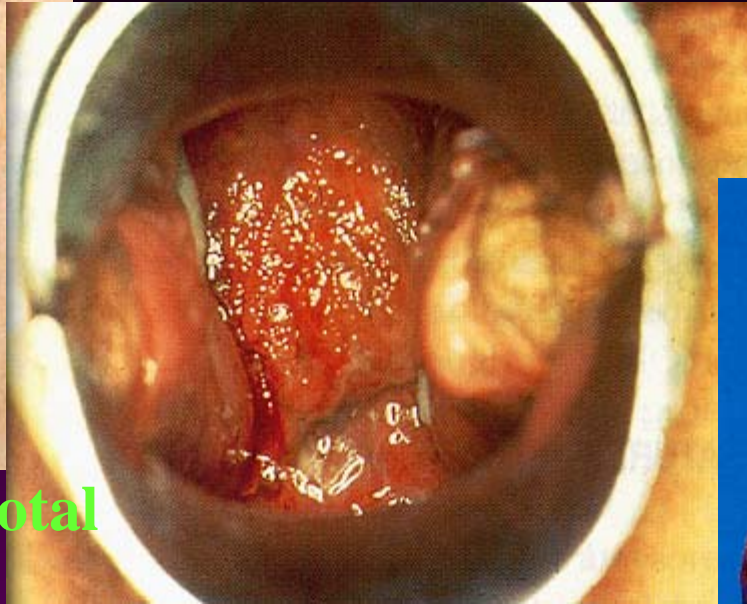


Chlamydia urethritis

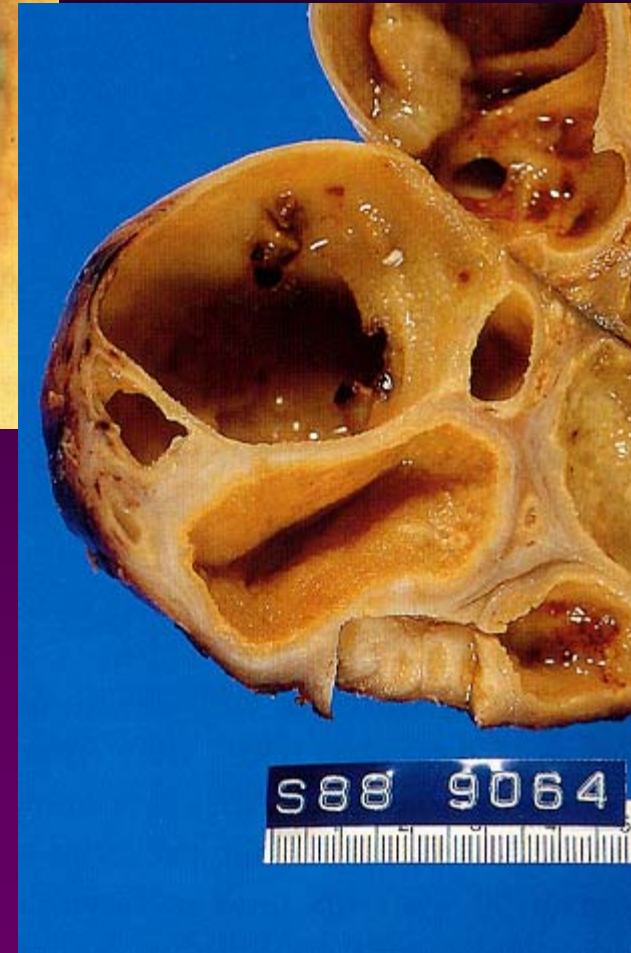
- Resembles gonorrhea
 - extensive inflammation
 - epithelial ulceration
 - scarring
- Infection sites:
 - urethra, epididymis, cervix, salpinx, ovaries, vagina
- Often asymptomatic in women
 - most common STD
 - vaginal discharge, dysuria, pelvic pain, bleeding
 - PID, more chronic & subacute than gonorrhea
 - scarring leads to tubal obstruction--infertility is often 1st sign of infection
- Recent data suggest that infected women are 6X more likely to have cervical cancer
- In men:
 - urethritis most common clinical feature
 - more symptomatic in men than women, but 30% asymptomatic
 - urethral discharge
 - itching & dysuria
 - cannot be separated from gonorrhea by symptoms
 - sperm chord inflammation, epididymitis also common



Epididymitis and scrotal edema



**Cervicitis & scar tissue
cervical cancer??**



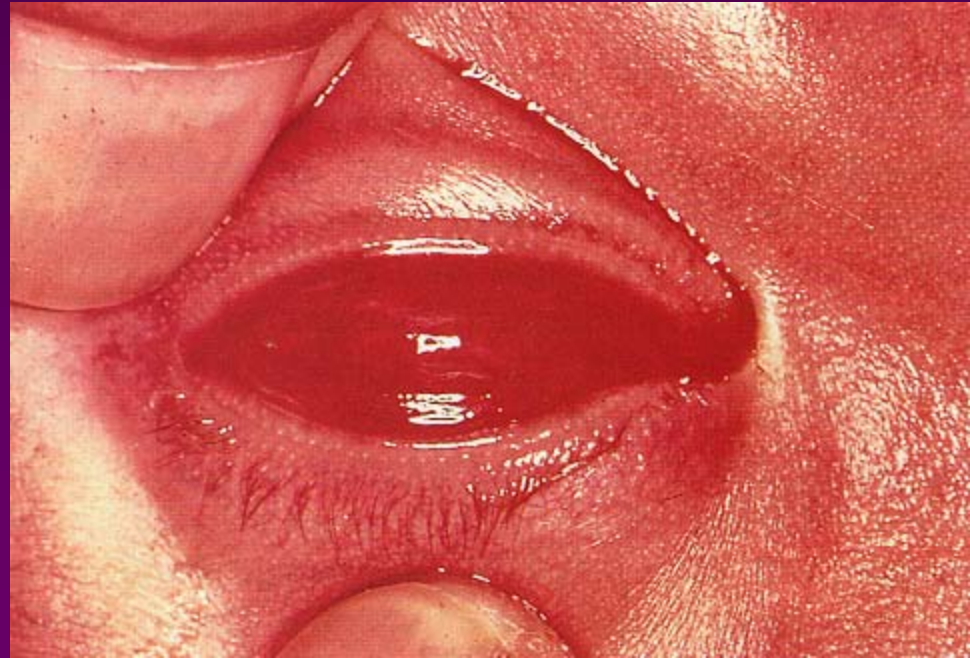
Chlamydial abscess of ovary

Chlamydial ophthalmia neonatorum



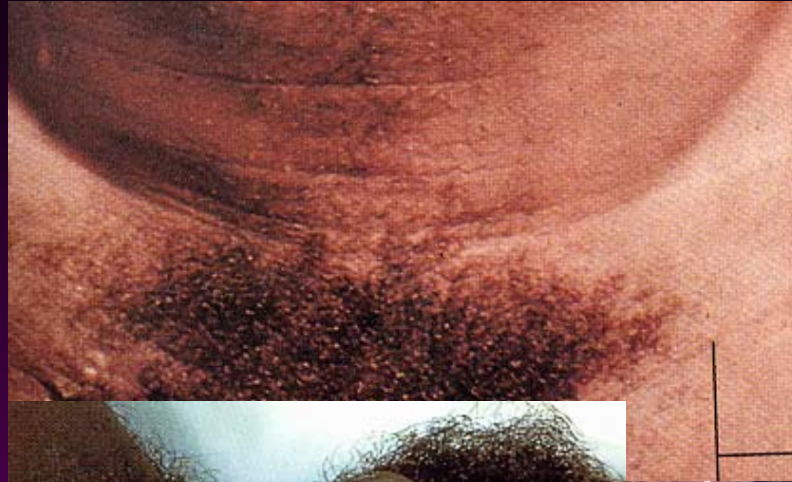
**New born whose mother
had Chlamydia**

**Severe inflammation &
bleeding due to chlamydial
ophthalmia neonatorum**



Lymphogranuloma venereum

- Rare in USA, Europe, common in Africa, India, SE Asia
- Specific biovar of Chlamydia
 - AKA “tropical bubo”
- like syphilis, has 3 stages:
 - genital sore,
 - acute lymphadenitis w/ buboes
 - genital ulcers, rectal strictures & genital elephantiasis
 - 5X more common in males than females
 - Tetracyclines for all chlamydia infections



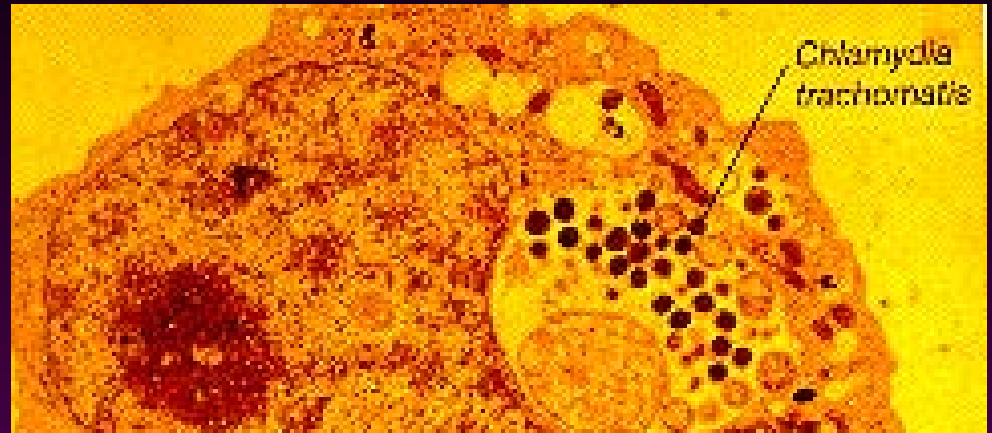
buboes



Early enlargement of vulva, chronic LGV

Trachoma

- Chronic eye infection
 - recognized anciently
- Leading cause of preventable blindness
- 500 M infected w/ 100 M visual defects
- Eye to hand to eye
 - poor hygiene, lack of water, flies, crowding
- Clinical features:
 - chronic conjunctivitis, scarring, trichiasis & corneal abrasions and vascularization



Chlamydia conjunctivitis



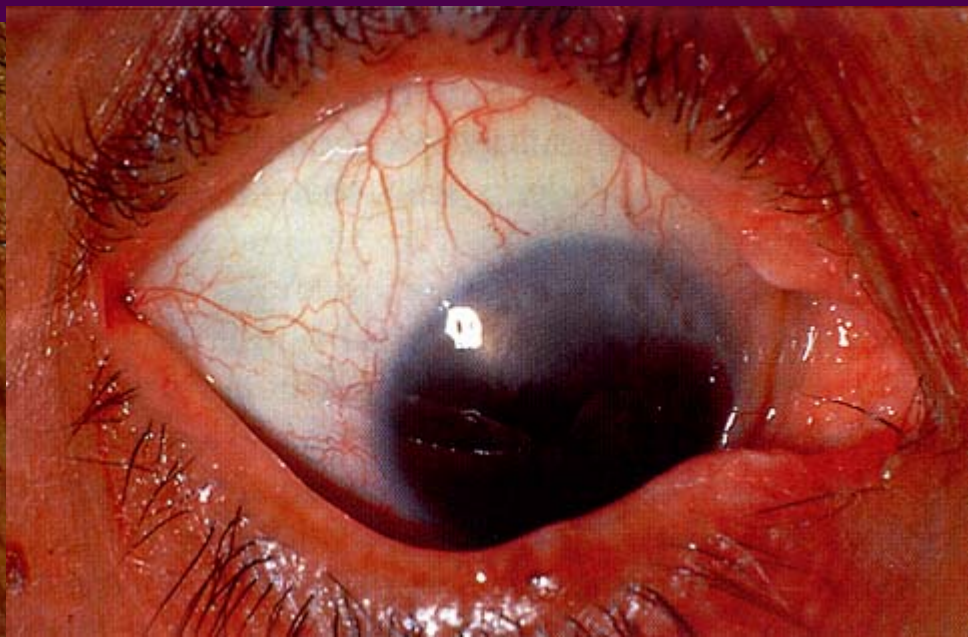
Chlamydial conjunctivitis



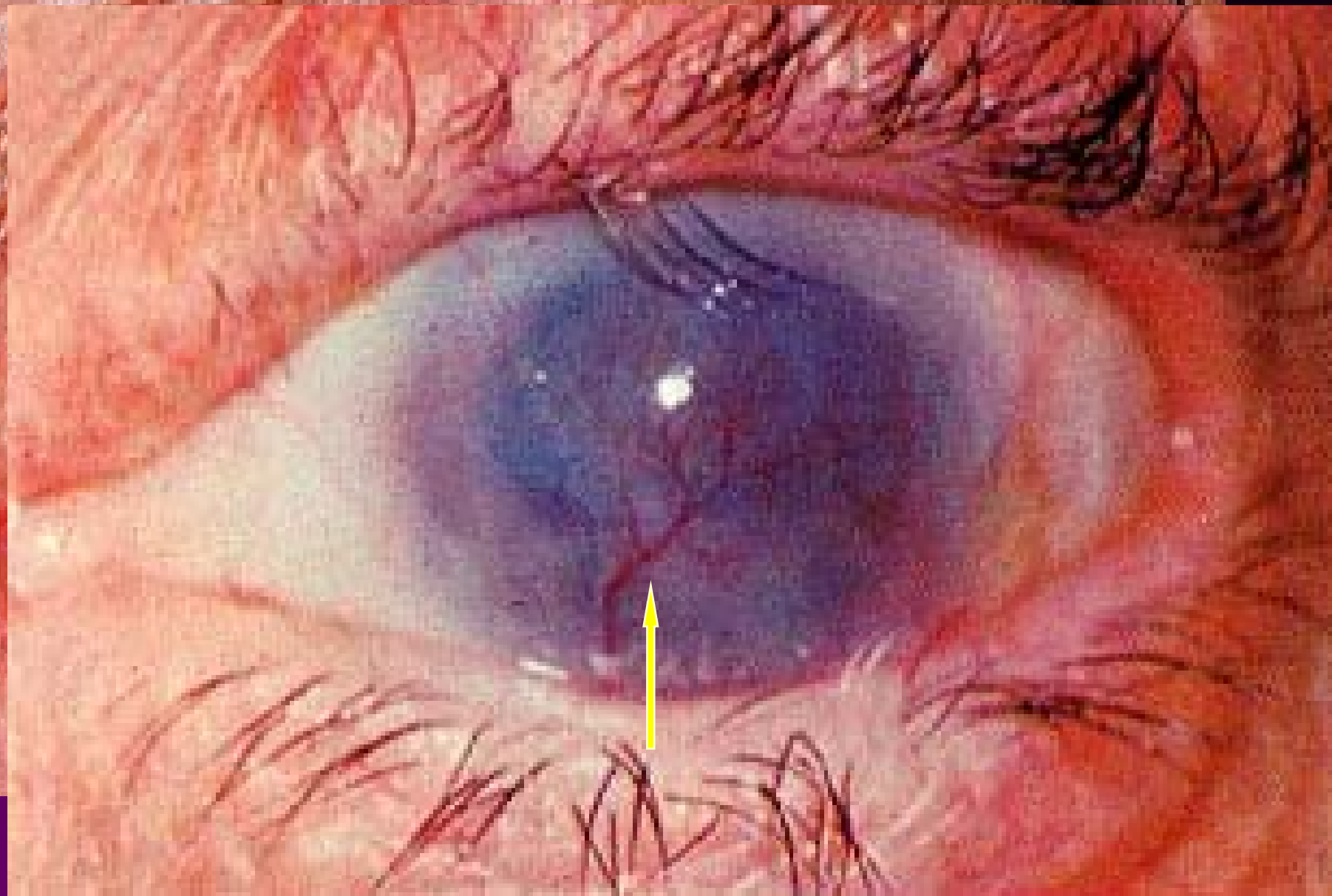
Scarring of the eyelid



Trichiasis, & corneal scarring



Corneal vascularization & scarring

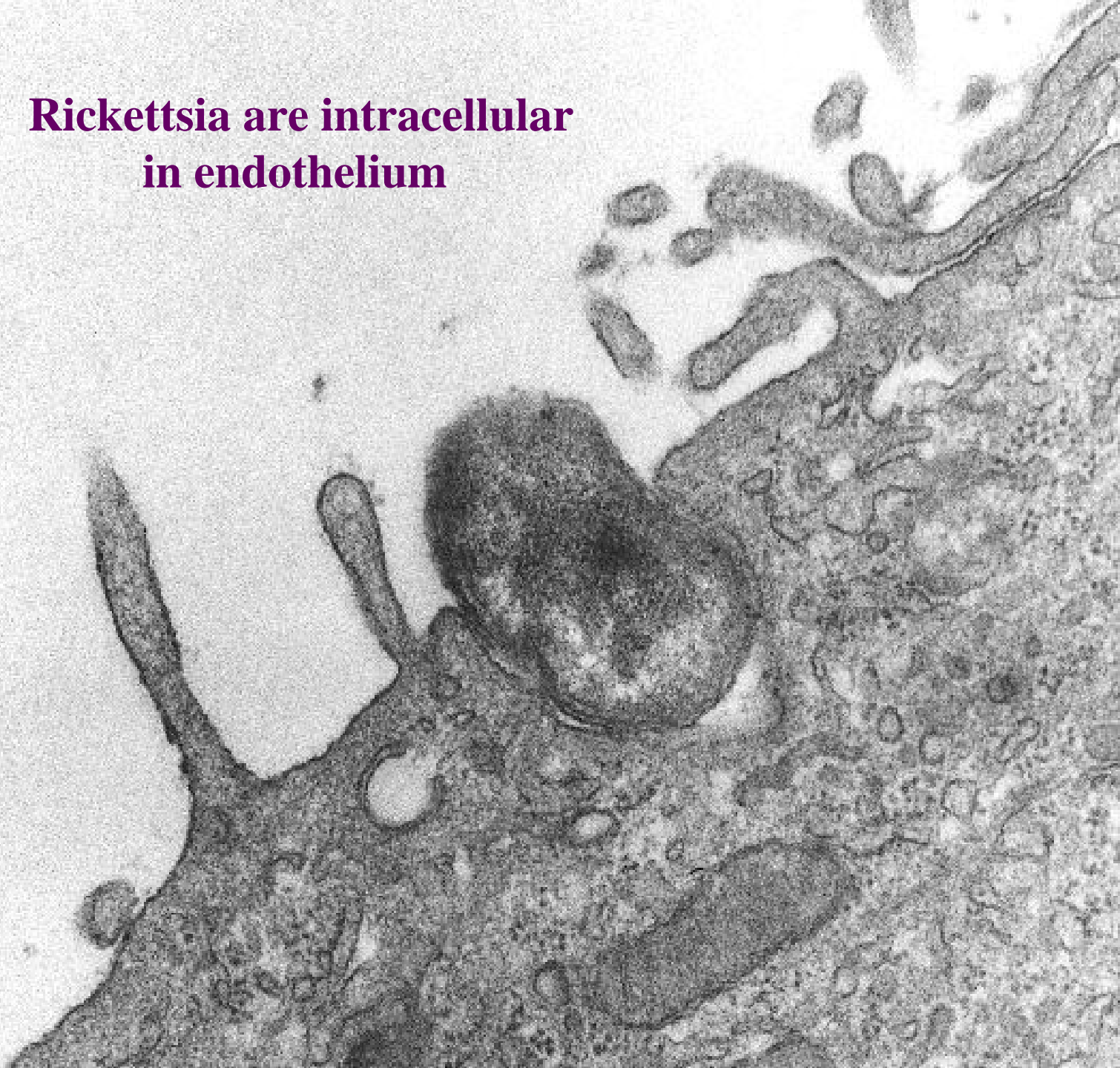


Corneal vascularization and opacities

Rickettsia

- **Intracellular Gm-- coccobacilli named after Ricketts ****
- **Organisms live in blood vessel cells causing petechiae**
 - intracellular:
 - in cytoplasm-typhus, or in nucleus-spotted fever
 - “the spots” of the spotted fevers
- **vector transmitted**
 - fleas, ticks, lice, mites
- **Except for epidemic typhus and trench fever, all are zoonotic**
 - Typhus & Spotted fevers
- All cause particular skin rashes, **necrosis of lungs, heart, brain, liver, with spleen enlargement**
- **Symptoms:**
 - fever, headache-- severe to the point of disorientation, with extreme prostration
- **Treatment is difficult**
 - chloramphenicol, tetracyclines*
 - often chronic infections

**Rickettsia are intracellular
in endothelium**





**Subdermal hemorrhages
the “spotted fevers”**

Epidemic Typhus: *Rickettsia prowazekii*

- Transmitted by infected body lice
- overcrowding, poor sanitation, wars, etc.
 - forced Napoleon to retreat from Russia
 - Infected > 30 million Russians in WW I
 - Circulatory damage leads to gangrene of feet and hands*
 - High fevers, mortality 3--40%



Gangrene of feet due to typhus

Endemic Typhus:

Rickettsia typhi

- Flea transmitted
- AKA murine typhus
 - reservoir=*Rattus* spp
 - fleas defecate while feeding
 - typical rash
 - fevers, chills and crushing headache
 - self-limiting-2 wks
 - mortality, 2%



Xenopsylla cheopis
(our old friend)

Scrub Typhus:

Orientia tsutsugamushi

Transmitted by
chigger mites

- rodent reservoir
- common in Far East
- big problem in WW II & Vietnam
- typical skin rash with lymphadenopathy
- may progress to CNS symptoms & cardiac failure, mortality=50%

Treatment: tetracycline, chloramphenicol



Chigger, or red mite



Tick-borne Rickettsia

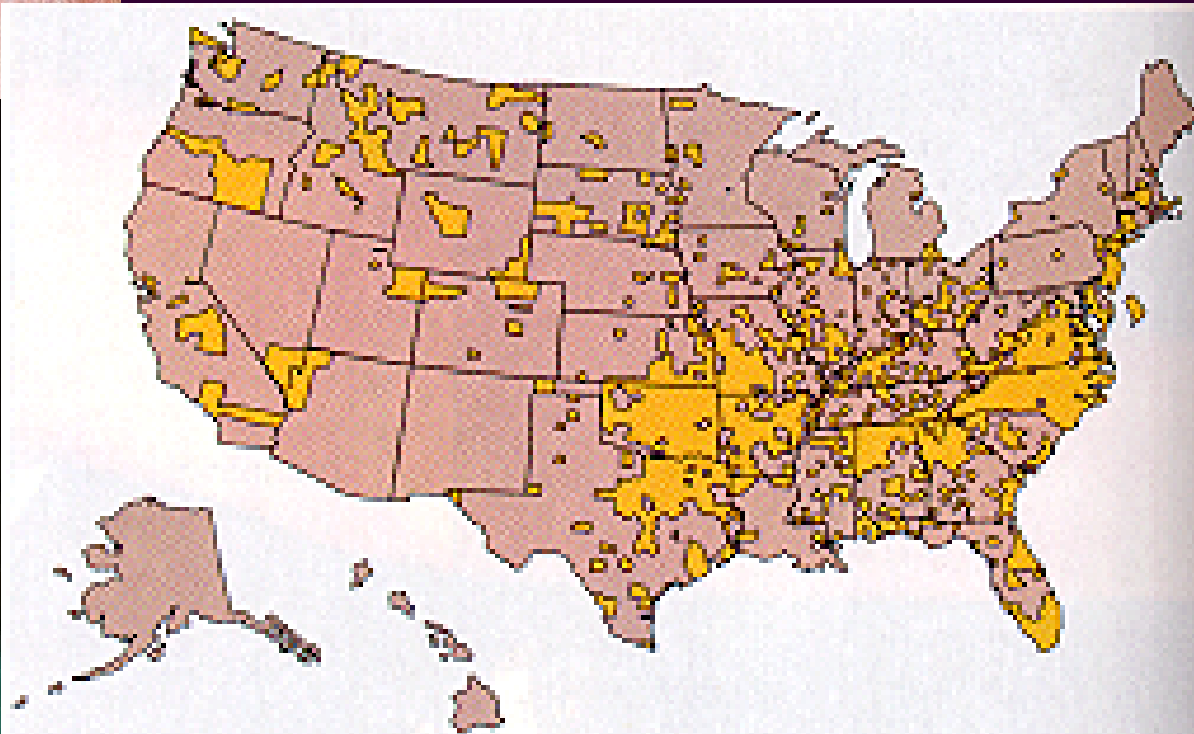
- Tick-transmitted *Rickettsia* spp
- Rocky Mt spotted fever** et al.
 - *Rickettsia rickettsii*
 - typical rash, fevers, headaches,
 - prostration
 - Eschar at site of bite
 - strain variation mortality between 5-80%, ave = 20%
 - mortality in 5 days



Eschar at site, with typical spotted rash



Rocky Mountain Spotted Fever (a misnomer)



1984-1995

 Counties reporting cases of Rocky Mountain spotted fever

Petechiae of Rky Mt Spott
Fever