Q- Fever (Coxiellosis)

Q stands for *Query or Queensland

* Some thing you are uncertain about

- Query (Q) fever (or Coxiellosis) is an infectious zoonotic disease caused by the obligate intracellular bacteria known as *Coxiella burnetii*. It is world wide in distribution(except New Zealand).

- *C. burnetii* is a highly infective bacteria.
- A single bacterium can cause disease.
- Because this microorganism is classified as a Group 3 pathogen,
- Handling viable *C. burnetii* must be done in biosafety level 3 facilities

- Epidemiology
- Animals shed bacteria in their feces, milk, urine, vaginal secretions, and semen
- The bacteria can contaminate the environment, such as animal bedding and soil
- Survives well in the environment (e.g., dried barnyard dust); can be carried in the wind (miles)

ANIMAL SHEDDING:

C. burnetii can localize in:

- mammary glands
- Supramammary lymph nodes
- amniotic fluid, Placenta
- Uterus
- Shedding is usually highest during 1st & 2nd pregnancies. Can continue after birthing for several weeks or possibly months

- Some forms of *Coxiella burnetii*. can survive extracellularly and even accumulate in the environment.
- *C. burnetii* is adapted to thrive within the phagolysosome of the phagocyte.

Transmission

- Inhalation of desiccated aerosol particles, and through contact with infected animals, their reproductive tissues or other animal products.
- Ingestion has been often suggested, particularly through the consumption of dairy products derived from contaminated raw milk, but no good evidence has shown a significant transmission to humans by food.
- Ticks are reservoirs of infection.

- Vertical transmission in women; *C. burnetii* infection of pregnant women can provoke placentitis and leads to premature birth, growth restriction, spontaneous abortion or fetal death.

- Domestic ruminants are considered the main reservoirs for *C. burnetii, but cats, dogs, rabbits, birds, ticks, etc., have also* been reported to be implicated in human disease/infection.

Clinical signs in ruminants

- It is usually subclinical.
- in cows, ewes and goats, Q fever has been associated mostly with late abortion and reproductive disorders such as premature birth, dead or weak offspring. Q fever is mostly associated with sporadic abortions or outbreaks of abortions followed by recovery without complications.

- *C. burnetii* might be associated with metritis and infertility in cattle.
- Subclinical mastitis in dairy cattle.
- *Coxiella burnetii* infection persists for several years, and is probably lifelong. Sheep, goats and cows are mainly subclinical carriers, but can shed bacteria in various secretions and excreta.

Lab. diagnosis

- **In the context of serial abortions and/or** stillbirths, samples can be taken from the:

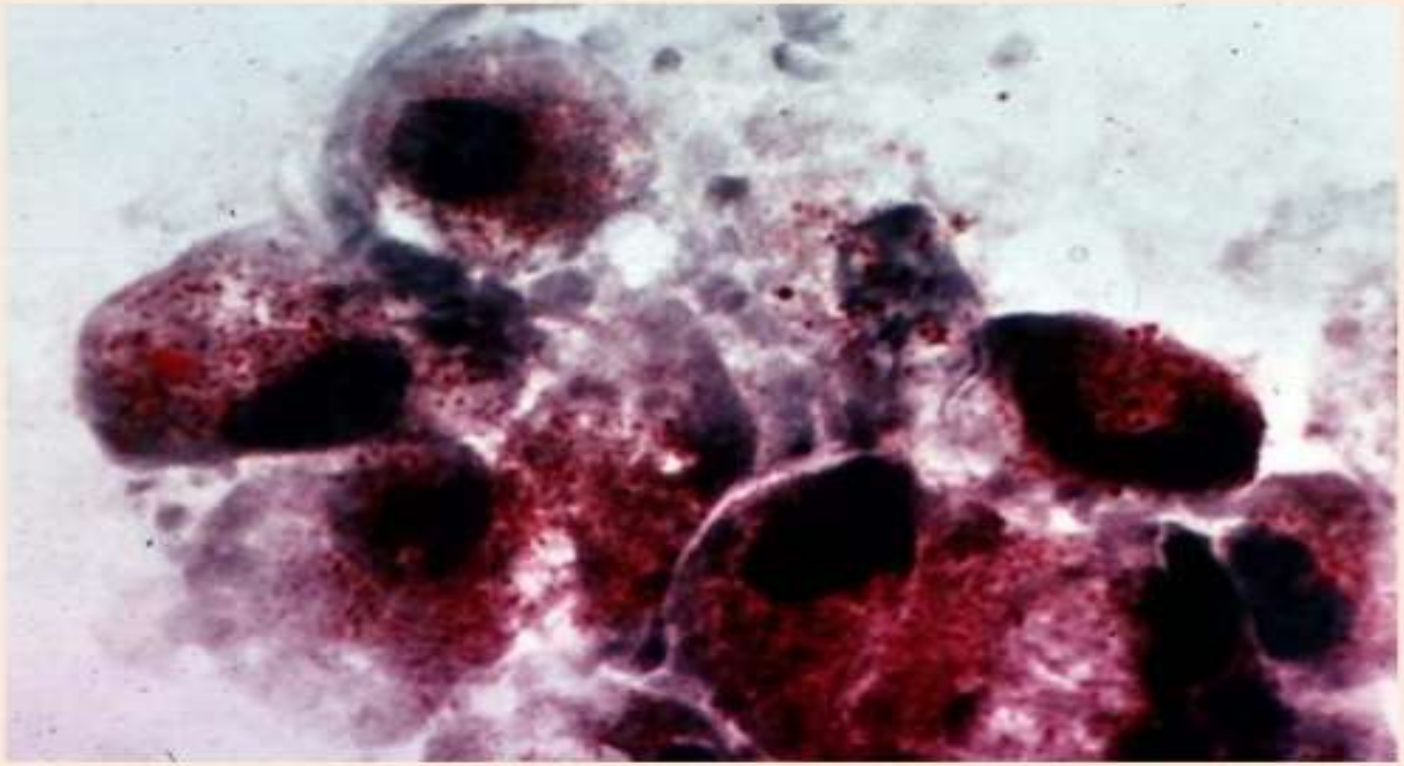
  placenta, vaginal discharges and tissues of aborted fetuses (liver, lung or stomach content).

- For investigation of bacterial shedding, samples can be taken from vagina, milk, colostrum and faeces.

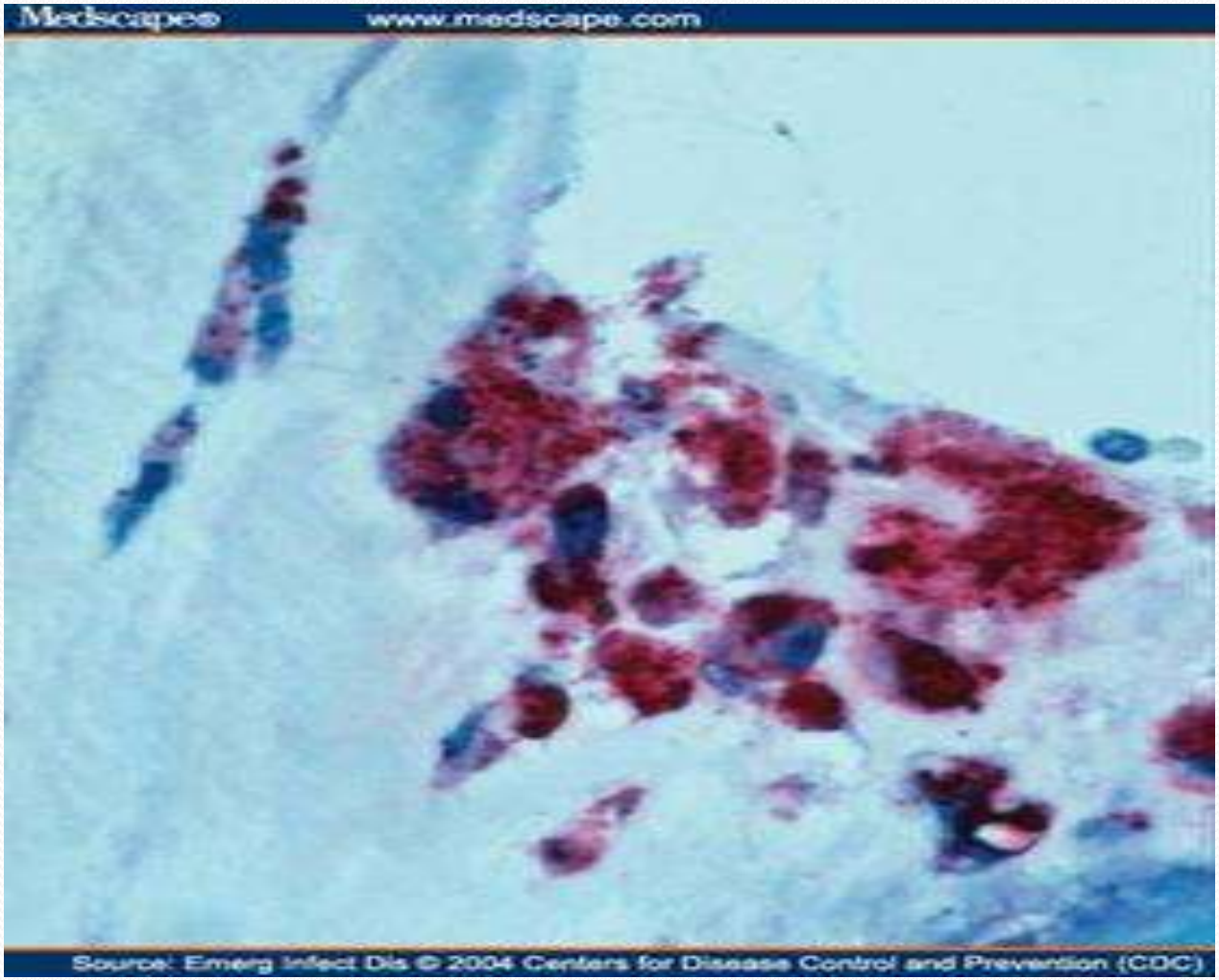
Direct smear

- stained impression smears of cotyledons or vaginal mucus smears Because it is acid resistant, the bacteria can be stained by Stamp stain (modified Ziehl–Neelsen,)
- Because of lack of specificity, a positive finding is presumptive evidence of Q fever.

- Coxiella burnetii are characterised by a very large number of thin, pink-stained coccobacillary bacteria against a blue or green background.
- They may sometimes be difficult to detect because of their small size, but this is compensated for by their large numbers; often inclusions within the host cells appear as red masses against the blue or green background.



Organ : Placenta impression.
Stain : Giemsa's stain.
Disease : Chlamydial abortion .
Micro : Dark red organism are seen in trophoblasts.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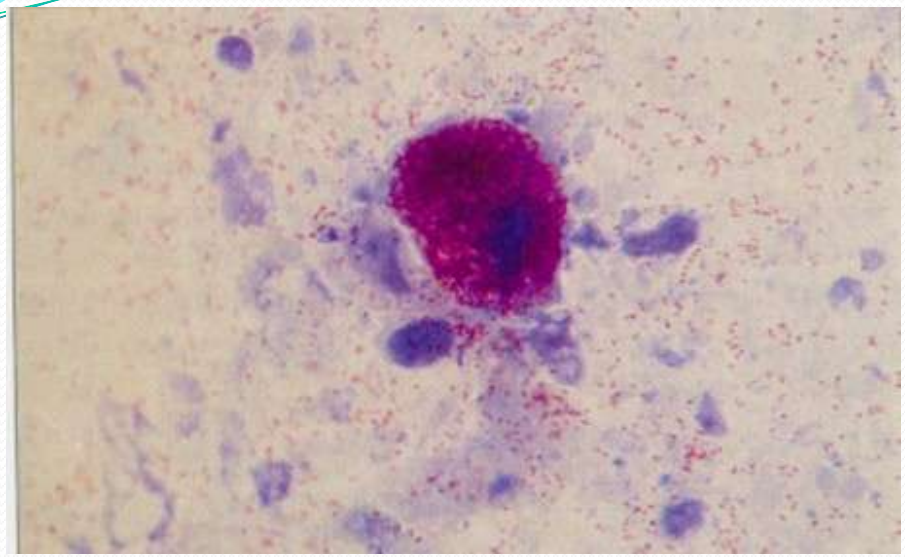
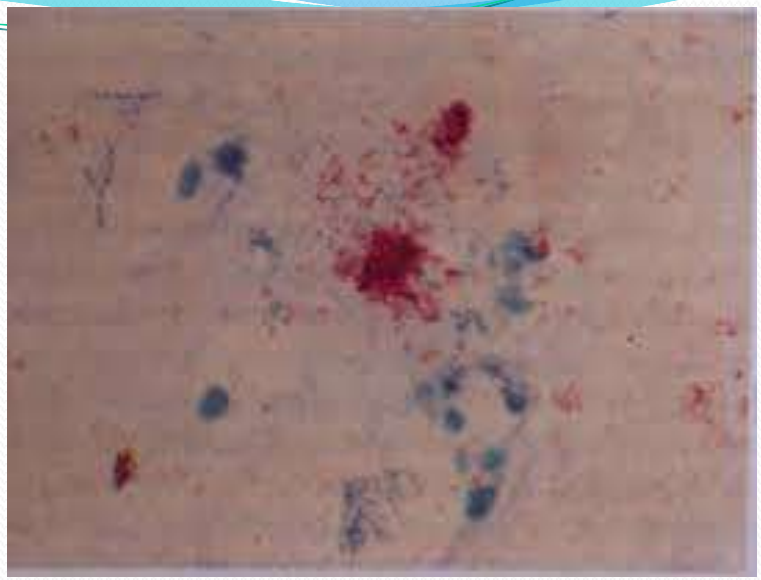
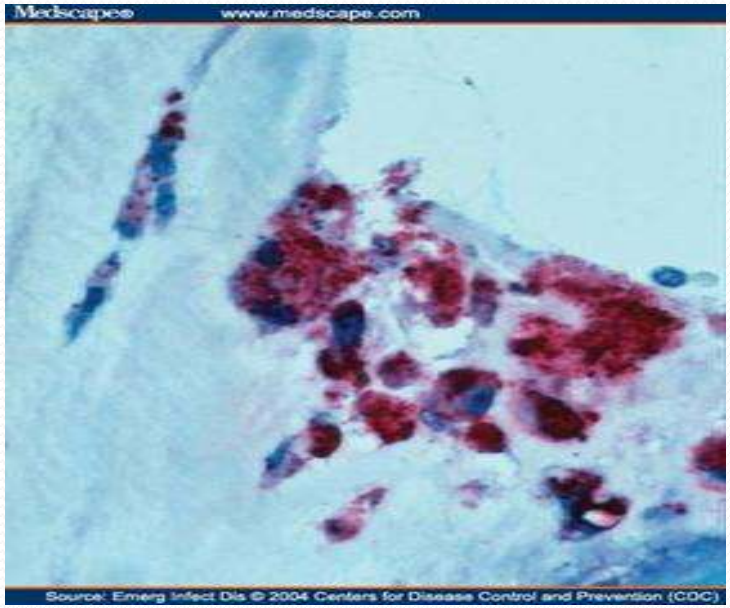
- C. burnetii can be confused with *Chlamydophila abortus* or *Brucella spp*. However, using the same staining procedure, Chlamydophila have sharper outlines, are round, small and may resemble globules.

- Brucella spp, are larger, found intra and extracellularly, more clearly defined and stain more intensely.
- Control positive slides of C. burnetii, *Chlamydophila abortus* and *Brucella* must be used for comparison.
- Diagnosis made on the basis of microscopy, coupled with positive serological results, is usually adequate for routine purposes.



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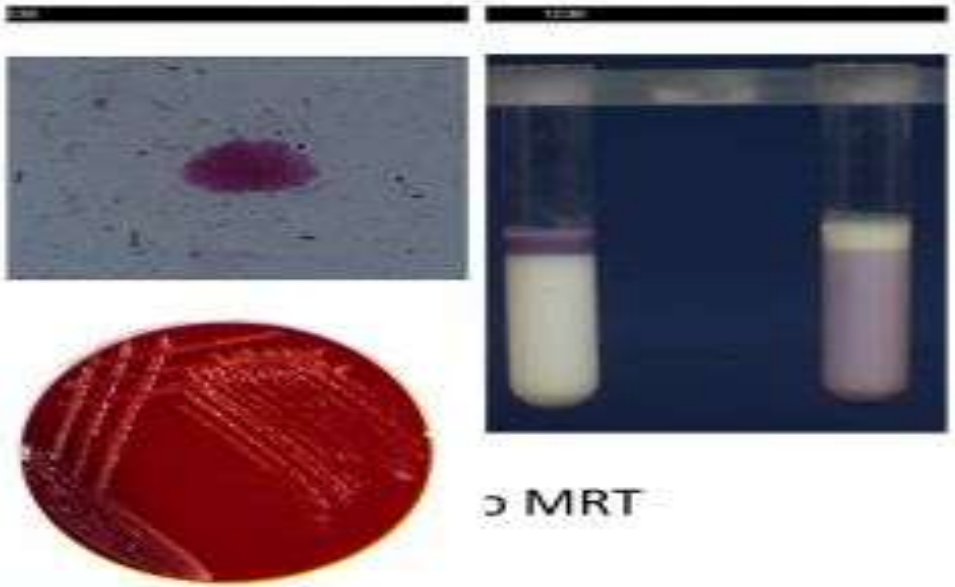
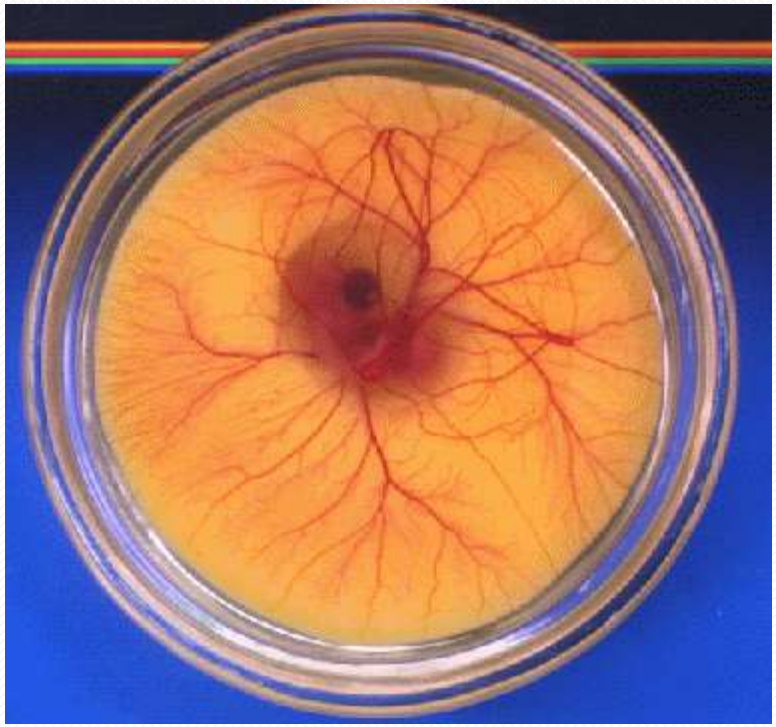

MRT

- Demonstration of the agent by
- immunohistochemical staining,
- polymerase chain reaction (PCR) has proven to be more specific and sensitive than classical staining methods.
- PCR kits are proposed for ruminants and can be used easily in suitably equipped laboratories.

Culture

- Grows well in yolk sac of chick embryos and in various cell cultures .



Serological tests:

- indirect immunofluorescence (IFA) test.

-the enzyme-linked immunosorbent assay (ELISA), -

-complement fixation test (CFT).

Lesions:Abnormal placental findings (placentitis)Leathery and thickened appearance of placenta

- Abnormal amniotic birth fluid Creamy, white-yellow pus
- Edges of placental-fetal attachments (cotyledons) abnormal.

- Aborted fetus; Non-specific lesions

- Abortion rates can range from 3 to 80%

Clinical case

- Nova Scotia, Canada (1985)
- Q fever associated with exposure to a cat.
- Cat had 2 stillborn kittens followed by vaginal /discharge

  - 33 people got sick with Q fever Included neighbors in other apartment buildings near the apartment building where the cat lived. Most did not have exposure to cattle, sheep or goats

- 17 people developed cough
- 14 people developed pneumonia

- Cat tested positive for *C. burnetii*

- Epidemiology: Two major patterns of transmission;

1. The organism circulate between wild animal and their ectoparasites mainly ticks.

2. In domestic ruminants, independent of the wild animal cycle.

The disease is enzootic in most areas where cattle sheep and goats are kept.

DIFFERENTIAL DIAGNOSIS

- differentiating it from other abortive diseases, traditionally has been made on the basis of microscopy on clinical samples, coupled with positive serological results.
- At present, direct detection and quantification by PCR and serological ELISA (enzyme-linked immunosorbent assay) should be considered as methods of choice for clinical diagnosis

TREATMENT (ANIMALS)

Antibiotics, such as oral Tetracycline, prior to parturition or for 2-4 weeks.

Vaccine has been developed for man and animals , but is not commercially availa