Brucellosis

Microorganism

- ***Brucella*** is a genus of facultative intracellular, Gram-negative coccobacillus
- **Four species** are pathogenic to humans: ***B. melitensis***, *B. abortus*, *B. suis*, and *B. canis*
- Brucella spp. are fastidious organisms that require **prolonged incubation** for successful culture
- These bacteria can evade the host immune response by surviving and replicating within phagocytic cells. They can survive in the environment for several weeks, and are resistant to destruction by freezing
- Brucellosis remains **endemic** in the Mediterranean, Middle East, Central America, Africa, and Asia, mainly in **rural and livestock areas**.
- In France, brucellosis is a **notifiable disease.**

Transmission

- Transmission occurs primarily through **ingesting contaminated food products,** particularly unpasteurized dairy products (such as raw milk and cheese) or undercooked meat.
- Infection may also occur via direct contact with infected animals or animal products through skin abrasions or inhalation of contaminated aerosols.

Risk factors

Brucellosis is more common in people with risk factors.

Risk factors for brucellosis
• Consumption of unpasteurized dairy products • Occupations in contact with sick animals or contaminated carcasses: farmers, veterinarians, slaughterhouse workers • Laboratory staff • Immunosuppression

Incubation

- The incubation period generally ranges from **1 to 4 weeks** (sometimes more than 3 months)

Clinical presentation

Acute phase: initial invasion	• **Undulating fever with** night sweats, arthralgia, myalgia, and possible hepatomegaly and/or splenomegaly. • Paucisymptomatic or severe forms with endocarditis are possible
Secondary phase: Subacute	• Marked by single or multiple **focal attacks**: o Most often osteoarticular: arthritis, spondylodiscitis o Neuromeningeal: meningoencephalitis o Cardiovascular: endocarditis o Urogenital: orchiepididymitis o Hepatic, splenic abscess
Chronic phase	• Comes in two forms: o **Afocale**: prolonged physical and psychological asthenia o **Evolution of focal lesions**
Asymptomatic forms are possible.	

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Diagnosis

- **Means**

Blood cultures	• *Brucella* spp. cultivate in **standard blood culture bottles** • The incubation period should be **extended to 4 weeks**
Culture	• Samples are inoculated on enriched media and incubated for **4 weeks** in the presence of CO_2
Serology	• Methods: o The Wright test is no longer available o The current strategy combines 2 tests: **Rose Bengal and an ELISA** • Serology performance is lower for *B. suis* • Serology is positive from the **2nd week** after contamination, **and antibodies can persist for several years** • Cross reactions are possible
Molecular biology (PCR, etc.)	• In the event of focal organ involvement on biopsy or puncture in addition to culture
Imaging	• Systematic, to search for focal involvement

- **Strategy**
  - o **Systematics:** blood cultures and serology
  - o **Organ damage:** sample taken for culture and/or PCR

	Blood culture	Serology	Culture or PCR on sample	Imaging
Bacteremia	X	X		X
Organ damage	X	X	X	X

Treatment

- First-line therapy consists of a synergistic dual antibiotic regimen combining **doxycycline** and rifampicin.
- In pregnant women and children under 8 years of age, doxycycline is contraindicated and should be replaced with cotrimoxazole.
- Systematic **obstetric consultation** is required for pregnant patients.
- Surgical intervention should be considered in cases of abscess formation.
- Antibiotic therapy must be tailored to the clinical presentation, with attention to the site of infection, severity, and patient-specific factors.

Clinical form/context	Treatment plan	Total duration
Acute phase	• First-line : doxycycline* + rifampicin • Second-line : doxycycline* + gentamicin 7 to 10 days then doxycycline + rifampicin	6 weeks
Endocarditis	• Doxycycline* + rifampicin + cotrimoxazole	> 12 weeks
Focused attack	• Doxycycline* + rifampicin +/- gentamicin 1 to 2 weeks	6 to 12 weeks
Chronic	• No antibiotic therapy **except in cases of focal involvement**	

* **Doxycycline is contraindicated** during pregnancy and in children under 8 years of age; in such cases, it should be substituted with cotrimoxazole

- Antibiotics recommaded for the treatment of brucellosis

Antibiotic	Dosage
Doxycycline	200 mg/day in 1 to 2 doses
Rifampicin	15 mg x kg /day in 1 dose
Gentamicin	5 mg/kg/day in 1 injection
Cotrimoxazole	160 mg of trimethoprim and 800 mg of sulfamethoxazole /day in 2 doses

Follow up

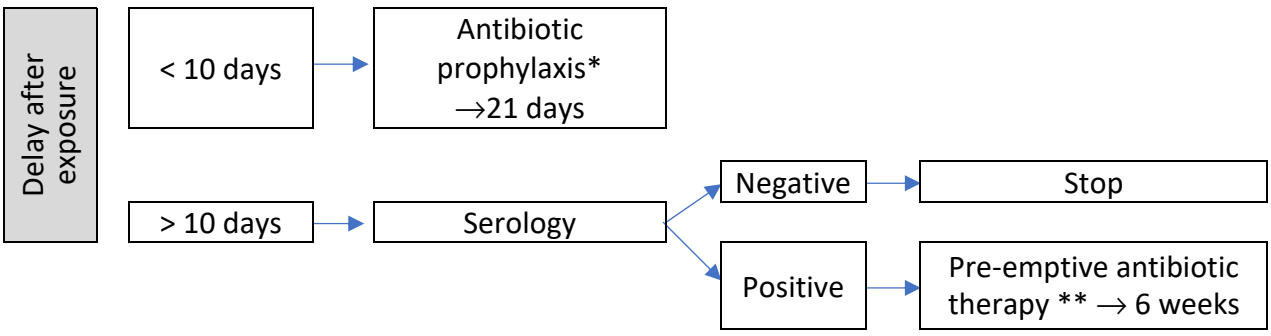
Monitoring is based on the following criteria:

- Improvement of symptoms
- **Serological testing** at 3 and 6 months: a fourfold or greater decrease in antibody titers supports the diagnosis of recovery
- Imaging studies in cases with organ involvement

Prevention

- Prevention relies on controlling brucellosis in animals, along with both collective and individual preventive measures:
  - **Hygiene and dietary measures:** avoid the consumption of unpasteurized or unsterilized dairy products and raw meat in endemic areas
  - Management of **exposed persons**: Includes monitoring, antibiotic prophylaxis, pre-emptive antibiotic treatment when indicated

What to do after a risky exposure



* Antibiotic prophylaxis: doxycycline 200 mg/day + rifampicin 600 mg/day → 21 days

** Pre-emptive antibiotic therapy: doxycycline 200 mg/day + rifampicin 600 mg/day → 6 weeks

→ If symptoms suggestive of brucellosis appear, a diagnostic workup should be promptly initiated

Definition of contacts

- Livestock professionals exposed without personal protective equipment to animals confirmed infected with by *B. melitensis* or *B. abortus*
- Consumers of unpasteurized dairy products from animals confirmed infected with *B. melitensis* or *B. abortus*
- Laboratory personnel exposed to bacterial cultures (via inhalation or skin contact) without protection, within 1.5 meters of the source or present in the room if pregnant or immunocompromised
- Individuals present in the room during breakage of a bacterial culture container, unless wearing an FFP2 or FFP3 respirator

Not considered contacts:

- Individuals handling game animals possibly infected with *B. suis* biovar 2 (unconfirmed cases)
- Travelers consuming potentially contaminated products without confirmed exposure, unless co-exposed with a confirmed case
- Individuals exposed to dogs infected with *B. canis* → clinical monitoring recommended; post-exposure prophylaxis not indicated