

HIGH-YIELD Q&A: BRUCELLA, LEPTOSPIRA, COXIELLA & ABDOMINAL TB

ELL (Brucellosis / Undulant fever / Malta fever)	
QUESTION	ANSWER
1. What are Brucellae?	Obligate intracellular Gram-negative coccobacilli that are parasites of animals and humans. [2]
2. Main species and animal hosts?	<ul style="list-style-type: none"> <i>B. melitensis</i> – goats (most common in Middle East) <i>B. suis</i> – swine <i>B. abortus</i> – cattle <i>B. canis</i> – dogs. [2]
3. Routes of human infection?	Ingestion of unpasteurized milk/dairy, contact with infected animals or tissues, inhalation of aerosols, or inoculation through broken skin/mucosa. [5]
4. Incubation period?	1–4 weeks. [7]
5. Major clinical features?	Undulant fever (rises in afternoon, sweats at night), malaise, weakness, arthralgia/myalgia, headache, enlarged spleen and liver; may involve bones, joints, CNS, endocardium. [7]
6. Complications?	Osteomyelitis (esp. spine), arthritis, spondylitis, epididymo-orchitis, endocarditis, meningitis, cholecystitis. [6]

LABORATORY DIAGNOSIS – CULTURE
<ul style="list-style-type: none"> Specimens: blood (best), bone marrow, tissue biopsy (lymph node, bone), etc. [8] Culture media: trypticase-soy agar/broth with 5% sheep blood, brain–heart infusion, chocolate agar. [8] Incubation: 35–37°C in 8–10% CO₂; observe up to 3 weeks (slow growth). [8] Small, smooth, convex colonies in Ziehl–Neelsen. Gram stain: tiny Gram-negative coccobacilli; catalase positive, oxidase positive; urease positive. [8] <i>B. abortus</i> requires CO₂ for growth.

LABORATORY DIAGNOSIS – SEROLOGY
<ul style="list-style-type: none"> Mainstay of diagnosis. IgM ↑ in first week, peaks ~3 months. IgG ↑ ~3 weeks after onset, peaks 6–8 weeks, remains high in chronic disease. Tests: Standard Agglutination Test (SAT), Rose Bengal test (screening), Coombs test, ELISA. [9] Four-fold rise in titer in paired sera is diagnostic.

ANTIGENIC STRUCTURE & LAB FEATURES
<ul style="list-style-type: none"> Smooth LPS with O antigen; rough strains (R) lack O antigen. Moderately sensitive to heat and acidity; killed by pasteurization. [4] Hydrogen sulfide produced by many strains. Complex nutritional requirements (intracellular growth). [3]

TREATMENT & PREVENTION
<ul style="list-style-type: none"> Treatment: Doxycycline + Rifampin for 6 weeks (± Streptomycin for severe disease). [9] Prevention: Pasteurize milk, avoid raw dairy products, use gloves and protective clothing with animals, vaccinate animals (S19/RB51). [5]

LEPTOSPIRA (Leptospirosis)	
QUESTION	ANSWER
1. What is Leptospira?	Thin, spiral-shaped, motile spirochetes with hooked ends. [2]
2. Reservoir & transmission?	Rodents (main); shed in urine. Infection via skin abrasions or mucous membranes through contaminated water/soil. [2]
3. Incubation period?	2–26 days (usually 7–14 days). [2]
4. Clinical features?	Biphasic illness: <ul style="list-style-type: none"> Septicemic phase: fever, chills, myalgia (calf), headache, conjunctival suffusion. Immune phase (Weil's disease): jaundice, renal failure, hemorrhage, meningitis, pulmonary hemorrhage. [2]
5. Lab diagnosis?	<ul style="list-style-type: none"> Microscopy: Dark-field (during first week). Serology: IgM ELISA or MAT (Microscopic Agglutination Test). PCR in early disease; culture in EMJH medium. [2]
6. Treatment?	Doxycycline (mild) or Penicillin G (severe); supportive care. [2]
7. Prevention?	Avoid contaminated water, protective clothing, rodent control. [2]

COXIELLA BURNETII (Q Fever)	
QUESTION	ANSWER
1. What is Q fever?	Zoonotic disease caused by <i>C. burnetii</i> , an obligate intracellular Gram-negative coccobacillus. [2]
2. Reservoir & transmission?	Domestic animals (cattle, sheep, goats); aerosols from birth products, urine, feces, milk, or ticks. [2]
3. Incubation period?	2–3 weeks (range 1–6 weeks). [2]
4. Clinical features?	<ul style="list-style-type: none"> Acute: fever, severe headache, myalgia, atypical pneumonia, hepatitis. Chronic: endocarditis, vascular infection, osteomyelitis. [2]
5. Lab diagnosis?	<ul style="list-style-type: none"> Serology: Phase II IgM/IgG by IFA (acute) or high Phase I IgG (chronic). PCR or culture (requires BSL-3). [2]
6. Treatment?	Doxycycline for acute (14 days); doxycycline + hydroxychloroquine for chronic (≥18 months). [2]
7. Prevention?	Avoid aerosol exposure, proper disposal of animal products, pasteurize milk, control ticks. [2]

ABDOMINAL TUBERCULOSIS (TB)	
QUESTION	ANSWER
1. How does it occur?	Ingestion of <i>M. tuberculosis</i> in sputum or milk (primary) or hematogenous spread from pulmonary focus. Common sites: ileocecal region, peritoneum, lymph nodes. [2]
2. Clinical features?	Chronic abdominal pain, low-grade fever, weight loss, night sweats, abdominal distension, diarrhea/constipation, ascites, or intestinal obstruction. [2]
3. Diagnosis – specimens?	Stool (AFB), ascitic fluid, biopsy (intestinal or lymph node), gastric aspirate. [2]
4. Diagnosis – tests?	<ul style="list-style-type: none"> AFB smear (low sensitivity) and culture (gold standard). NAAT (PCR) for <i>M. tuberculosis</i>. Tuberculin skin test or IGRA supportive. [2]
5. Treatment?	Standard anti-TB therapy: 2 months HRZE followed by 4 months HR (total 6 months). Surgery for complications only. [2]
6. Prevention?	Control pulmonary TB, BCG vaccination (partial protection), good nutrition. [2]

QUICK COMPARISON				
Feature	Brucella	Leptospira	C. burnetii (Q fever)	Abdominal TB
Organism	Gram-negative coccobacillus (intracellular)	Spiral spirochete (with hooked ends)	Gram-negative coccobacillus (intracellular)	Acid-fast bacillus (intracellular)
Reservoir	Goats, sheep, cattle, pigs, dogs	Rodents, livestock	Cattle, sheep, goats, ticks	Humans (sputum), cattle (milk)
Transmission	Ingestion, contact, aerosols	Contaminated water/soil via skin or mucosa	Aerosols from animal products, ticks	Ingestion of infected material or blood spread
Key Test	Blood culture, Serology (SAT)	Dark-field, MAT, IgM ELISA	IFA (Phase II IgM acute, Phase I IgG chronic)	AFB culture, PCR, Biopsy
Treatment	Doxycycline + Rifampin	Doxycycline or Penicillin	Doxycycline ± Hydroxychloroquine	RIPE regimen (6 months)



- Brucella:** undulant fever, risk from unpasteurized dairy; diagnosis by culture & serology; treat with Doxy + Rifampin.
- Leptospira:** Weil's disease with jaundice & renal failure; diagnose early with serology/PCR; prevent by avoiding contaminated water.
- Coxiella:** Q fever from animal aerosols; acute = Phase II IgM; chronic = Phase I IgG; treat with Doxy ± HCQ.
- Abdominal TB:** chronic abdominal illness with ascites or ileocecal involvement; diagnose with culture/PCR/biopsy; treat with standard RIPE.

Brucella

1. Q: What type of bacteria is Brucella?

A: Gram-negative coccobacilli, facultative intracellular pathogen.

2. Q: What is the main route of transmission?

A: Ingestion of unpasteurized dairy products, direct contact with infected animals.

3. Q: What is the classic clinical presentation?

A: Fever (undulant), night sweats, malaise, arthralgia.

4. Q: How is Brucella diagnosed?

A: Blood cultures, serology (standard agglutination test), PCR.

5. Q: First-line treatment?

A: Doxycycline + Rifampicin for 6 weeks (WHO recommended).

Leptospira

1. Q: What type of bacteria is Leptospira?

A: Spirochete, thin, motile, Gram-negative.

2. Q: What is the common source of infection?

A: Contact with water contaminated with urine of infected animals.

3. Q: Typical clinical features?

A: Biphase illness:

* Phase 1: Fever, myalgia (especially calf muscles), conjunctival suffusion

* Phase 2 (Weil's disease): Jaundice, renal failure, hemorrhage

4. Q: Diagnosis?

A: Serology (MAT), PCR, culture (slow, not commonly used).

5. Q: Treatment?

A: Mild: Doxycycline or Amoxicillin

Severe: IV Penicillin or Ceftriaxone

Coxiella burnetii (Q fever)

1. Q: What is Coxiella burnetii?

A: Gram-negative obligate intracellular bacterium.

2. Q: Transmission?

A: Aerosolized particles from birth products of infected animals (sheep, goats, cattle).

3. Q: Clinical features?

A: Acute: Fever, headache, pneumonia

Chronic: Endocarditis (especially in preexisting valvular disease)

4. Q: Diagnosis?

A: Serology (phase I and II antibodies), PCR.

5. Q: Treatment?

A: Doxycycline for acute; chronic: Doxycycline + Hydroxychloroquine for 18 months.

Abdominal Tuberculosis

1. Q: What causes abdominal TB?

A: Mycobacterium tuberculosis infecting the gastrointestinal tract, peritoneum, or lymph nodes.

2. Q: Common routes of infection?

A: Hematogenous spread, ingestion of infected sputum, direct spread from adjacent organs.

3. Q: Clinical features?

A: Chronic abdominal pain, fever, weight loss, ascites, diarrhea or constipation.

4. Q: Diagnosis?

A: Imaging (CT/MRI), histopathology, PCR, culture of ascitic fluid or tissue.

5. Q: Treatment?

A: Standard anti-TB therapy (2 months HRZE, 4 months HR).