Micropathology Ltd
Tel 24hrs: +44 (0) 24 - 76 – 323222
Fax / Ans: +44 (0) 24 - 76 - 323333
University of Warwick Science Park, Venture Centre, Sir William Lyons Road, Coventry CV4 7EZ
Website: www.micropathology.com E-mail: info@micropathology.com

Brucella genus

The *Brucella* species (canonical nomenclature) form a genus of Gram-negative flagellated coccobacilli which include the causative agent of brucellosis (undulant fever, Mediterranean fever, Malta fever). These organisms are zoonotically transmitted from contaminated food and milk/milk derivates or by contact with infected animals (sheep, goats, cattle, pigs and dogs) and their carcasses. People working with animals are most at risk so it is considered an occupational disease however the risk of surgical exposure and laboratory-acquired infection is also high. Transmission from human to human via sexual intercourse or from mother to child is also possible although extremely rare.

Many *Brucella* species can be found in various animals. So called 'smooth *Brucella* strains' which contain intact O-polysaccharide are considered more pathogenic to humans, including *B. melitensis* (sheep and goats), *B. abortus* (cattle) and *B. suis* (pigs). However, 'rough strains' (lack O-polysaccharide) e.g. *Brucella canis* (dogs) can also cause disease, particularly in immunocompromised patients. Two *Brucella* species, *B. ceti* and *B. pinnipedialis*, have also been isolated from marine mammals, (dolphins seals and sea lions) and a few human cases have been reported with naturally acquired infection from these marine species.

Disease symptoms caused by *Brucella* can vary from mild fever to severe complications with the nervous system, musculoskeletal system, and heart which may be fatal. Sequelae are also variable and includes granulomatous hepatitis, anaemia, leucopenia, thrombocytopenia, meningitis, uveitis and optic neuritis. Infection in pregnancy is associated with abortion, premature delivery and intrauterine infection with foetal disease.

Although Brucellosis is the most common bacterial zoonosis worldwide, in the UK brucellosis is rare and non-endemic owing to vaccination of farm animals, the routine slaughter of infected herds, and milk undergoing pasteurisation. Globally, the disease is still a major burden particularly in parts of Middle East, Asia, South and Central America, Africa, Eastern Europe, and countries by the Mediterranean Sea.

Typically, most patients in the UK have been exposed to infection in a Mediterranean or Middle Eastern country, but the range of countries with a higher risk is constantly changing. On average there are ten diagnosed cases per year in England and Wales almost always acquired from travel abroad, from products imported illegally or in recent years from imported pet dogs.

Diagnosis of Brucellosis may utilise detection of both total IgG, IgM and specific IgG and/or IgM *Brucella* antibodies in serum. Although this is a sensitive test, if there is strong clinical suspicion and the initial test is negative, serology should be repeated after a six-week period. Prior exposure, specificity issues or early infection can make interpretation of results difficult therefore it is desirable to confirmed positive serology with a PCR where possible.

Alternatively, isolation of *Brucella* bacteria is commonly by blood culture. This technique may require prolonged incubation as this organism is a slow grower and isolation of *Brucella* bacteria is resource-intensive as it requires level 3 biocontainment facilities and highly skilled technical personnel to handle samples and live bacteria for eventual identification and biotyping.

Detection by PCR therefore offers a practical solution to these diagnostic issues and can provide a confirmatory step.

Our assay:

At Micropathology we use a UKAS accredited assay utilising end-point PCR with visualisation using ethidium bromide agarose gel for the qualitative detection of *Brucella* species. *Brucella* spp. detected by this assay include (but are not limited to): *B. melitensis, B. abortus, B. canis, B. neotomae, B. ovis* and *B. suis.* UKAS accredited samples for this assay include EDTA whole blood and CSF specimens. Although serum and tissue specimens are validated sample types, they are not covered by UKAS accreditation. Other sample types may be tested and are reported alongside a caveat to state the assay is not UKAS accredited for testing alternate sample types. The minimum sample volume required for testing is 200 µL for liquid samples; and for tissues, a specimen at least the size of a matchstick head is acceptable.

Please note, we <u>DO NOT</u> accept cultures for safety reasons.