

Pseudotuberculosis

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Pseudotuberculosis, caused by *Yersinia pseudotuberculosis*, is a zoonosis which can be transmitted to man through skin contact with infected animals, contaminated water, or by the consumption of contaminated food or vegetables. *Y.pseudotuberculosis* is a small oval Gram-negative bacillus, and is thought to be the ancestral species from which the other pathogenic *Yersinia* (*Y.pestis* and *Y.enterocolitica*) are thought to have evolved; and like *Y.pestis*, Gram-staining occurs in a bipolar pattern, at either end of the bacillus. *Y.pseudotuberculosis* causes an acute mesenteric adenitis (pseudotuberculosis), which can simulate appendicitis. Pseudotuberculosis, as the name implies, can cause TB-like symptoms which can affect the liver, spleen and lymph nodes, causing tissue necrosis and granulomas, accompanied by fever and abdominal pain. Occasionally, *Y.pseudotuberculosis* can give rise to severe systemic disease which has a high fatality rate.

The strains of *Y.pseudotuberculosis* can be classified into 6 serotypes, based on a number of heat-stable somatic antigens and thermolabile flagellar antigens which are present in cultures grown at 18–26°C. Like *Y.pestis*, *Y.pseudotuberculosis* expresses a **truncated form of surface lipopolysaccharide** ('rough' LPS) which allows it to **evade TLR4 recognition** in the host, whilst the **flagellar antigens deter phagocytosis**.

As with the other *Yersinia*, *Y.pseudotuberculosis* also harbours the pYV plasmid encoding for **type-three secretion** (T3S), the V antigen, and other *Yersinia* outer proteins. The V antigen regulates T3S and is also anti-inflammatory. The T3S enables *Y.pseudotuberculosis* to produce a hollow needle-like projection on close contact with a host cell *in vivo*, through which effector proteins are translocated directly into the host cell. These effectors are variously cytotoxic, anti-phagocytic or anti-inflammatory, and generally promote the apoptosis of host cells and thus the survival of bacteria in the host. By all these means, *Y.pseudotuberculosis* counters innate immune defences and achieves dissemination in the host to establish a potentially serious bacteremia. The V antigen from *Y.pseudotuberculosis* has the V03 sequence and is homologous to that secreted by *Y.pestis*. This is significant because the V antigen is a major protective antigen for vaccination against plague and so some cross-protection with *Y.pseudotuberculosis* may be possible.

Y.pseudotuberculosis is susceptible to a wide range of antibiotics including penicillin, ampicillin and tetracycline.