Clinical Background

The genus *Yersinia* includes three different gram-negative coccobacilli species that are pathogenic to humans: *Y. enterocolitica*, *Y. pseudotuberculosis*, and *Y. pestis*. Infections with *Y. enterocolitica* are transmitted primarily to humans through soil, water, animals, and food. Infection with *Y. enterocolitica* occurs most often in young children. The infection manifests in the gastrointestinal tract causing symptoms of diarrhea; loose, watery, or bloody stools; abdominal pain; and fever. *Y. pseudotuberculosis* is the least pathogenic of the *Yersinia* species and causes a zoonotic disease with symptoms similar to those of *Y. enterocolitica*. Infections with *Y. enterocolitica* and *Y. pseudotuberculosis* can be asymptomatic, mild, or severe, with infection resolving within a few weeks, with or without the use of antibiotics, depending on the severity of the infection. However, complications with the development of an inflammatory arthritis, known as reactive arthritis, can manifest one to four weeks post-infection, with increased risk if the individual is positive for the MHC HLA-B27 allele. *Y. pestis*, the causative agent of the bubonic and pneumonic plague, is transmitted to humans through flea bites or inhalation. There is no known association between a *Y. pestis* infection and the development of reactive arthritis.

The incidence of reactive arthritis in Scandinavia following *Y. enterocolitica* infection among adults is estimated to be 10-30 percent. The incidence is much lower in most other countries, including the United States. The most commonly affected joints are the knees and ankles, but other joints such as toes, fingers, and wrists can be involved. In most cases, two to four joints become involved sequentially and asymmetrically over a period of a few days to two weeks. Monoarticular arthritis occurs less commonly. In two-thirds of cases, the acute arthritis persists for one to four months. Chronic joint disease or ankylosing spondylitis occurs rarely. Less common nonsuppurative sequelae of reactive arthritis include reactive uveitis, iritis, conjunctivitis, and urethritis. Reiter’s syndrome (arthritis, conjunctivitis, and urethritis) is seen in only 5 to 10 percent of patients with *Yersinia*-induced arthritis.

Serologic tests can be used to support a diagnosis of yersiniosis. Since *Yersinia* can crossreact with other bacteria (e.g., *Bartonella henselae*, *Borrelia burgdorferi*, *Brucella*, *Chlamydia pneumoniae*, *Francisella tularensis*, *Rickettsia rickettsii*, and *Vibrio* species) and with serum from some patients with Graves disease, results should be interpreted with caution. With yersiniosis, antibody levels begin to rise within the first week of illness, peak in the second week, and then return to normal within three to six months. Antibodies may remain detectable for several years. PCR tests to detect yersinial DNA in clinical specimens are experimental at this time.

In *Yersinia*-induced reactive arthritis, the synovial fluid is sterile. The white blood cell count of the synovial fluid ranges from a few hundred to 60,000/µL, with a majority being neutrophils. Antinuclear antibodies and rheumatoid factor are usually absent. *Yersinia* antibodies. It is recommended that IgG and IgA antibodies be tested in cases of acute and chronic reactive arthritis.

Indications for Use

This test detects IgG and IgA antibodies against *Yersinia* in serum samples.

Methodology

Samples are assayed using Western blot methodology. Diluted serum is incubated with nitrocellulose strips that contain the purified *Yersinia* outer membrane protein antigens. If antibodies against *Yersinia* are present in the serum, they bind to the immobilized antigens on the strip. Following the incubation period, the strips are washed with a diluted wash buffer to remove any unbound material. Next, the strips are incubated for 15 minutes with a diluted alkaline-phosphatase conjugated anti-human immunoglobulin (IgA and IgG specific). The conjugate binds to the antigen-antibody complexes that formed during the first incubation. The strips are then washed to remove any unbound conjugate. Finally, a chromogen substrate solution is incubated with the strips for five to 15 minutes. During this time, the chromogen substrate causes a reaction with the bound alkaline phosphatase of the conjugate to develop a color band on the blots. The color development is terminated by washing in deionized or distilled water. The intensity of each band on each strip is compared to the 35 kDa cut-off band on the cut-off strip. Antibodies against the pathogenic strains of *Y. enterocolitica* and *Y. pseudotuberculosis* will be detected with the *Yersinia* Western blot. Further studies are currently being performed to indicate whether the *Yersinia* Western blot will detect specific antibodies to *Y. pestis*.

For specific collection, transport, and testing information, refer to *Yersian* Species Antibodies, IgA & IgG by Western Blot (0051230) the ARUP Web site at www.aruplab.com.