

Bordetella pertussis Antibodies by Immunoblot

FOR THE QUALITATIVE AND SEMI-QUANTITATIVE DETECTION OF ANTI-BORDETELLA PERTUSSIS ANTIBODIES

Test Highlights

- This assay is used to detect IgG, IgA, and IgM antibodies against *Bordetella pertussis*.
- The PT-100 band in the IgG immunoblot can be used to help diagnose acute infection or recent vaccination.

Disease Overview

- Pertussis (whooping cough) is a highly transmittable respiratory infection caused by acute infection of the tracheal epithelial cilia by the slow-growing, gram-negative coccobacillus *Bordetella pertussis*.
- Pertussis symptoms in unvaccinated individuals include fits of coughing, inspiratory whoop, and posttussive vomiting.
- Individuals with partial immunity may have milder cold-like symptoms and chronic cough.

Epidemiology

- In the 1940s, a whole-cell pertussis vaccine was introduced, which has caused the number of pertussis cases to drop dramatically. However, there are still a significant number of cases in the United States, with 25,616 cases reported in 2005.
- The World Health Organization (WHO) estimates that 50 million cases and 300,000 deaths occur every year due to *Bordetella pertussis* infections.

Indications for ordering

- The immunoblot assay should be ordered for adults and children if the following pertussis symptoms exist: a cough lasting more than 14 days, paroxysmal coughing, inspiratory whoop, and posttussive vomiting.
- Infants should be tested if the following pertussis symptoms exist: a cough lasting longer than 14 days, possibly an inspiratory whoop, gagging, gasping, cyanosis, or apnea.
- Additional testing by nasopharyngeal culture is also recommended.

Methodology

- This assay utilizes a *B. pertussis*-specific protein, pertussis toxin (PT), and a Bordetella-specific protein, filamentous hemagglutinin (FHA).
- The *B. pertussis* IgG immunoblot differs from the IgA and IgM immunoblot in that it contains two pertussis toxin (PT) bands calibrated with the international WHO standards for PT in international units (IU/mL). The PT-100 IgG band and the PT IgG correlate with 100 IU/mL and 8 IU/mL, respectively. These two calibrated bands allow the differentiation of high- and low-level specific PT IgG antibody, and are useful in the differentiation of recent infection or vaccination from past infection or vaccination.

Interpretation

- A positive PT-100 IgG band indicates a significantly high level of anti-PT IgG antibodies that correlates with either acute *B. pertussis* infection or recent *B. pertussis* vaccination (<36 months). A positive PT IgG band (without a positive PT-100 band) indicates a lower level of anti-PT antibodies that is consistent with past *B. pertussis* infection or past vaccination.
- *B. pertussis* specific IgA or IgM antibodies are detected if the respective PT band is positive.
- *Bordetella* IgG, IgA, or IgM antibodies are detected if the respective FHA band is positive.
- All other results are considered negative, and no *B. pertussis*-specific IgG, IgA, or IgM antibodies are detectable.

Limitations

- This test has been validated for serum and plasma samples only; no other sample types may be used.
- As with all serological assays for pertussis, interpretation of results must be used in conjunction with the patient's clinical symptoms, medical history, and other clinical and/or laboratory findings to produce an overall clinical diagnosis.

References

1. Centers for Disease Control. Prevention of pertussis, tetanus, and diphtheria among pregnant and postpartum women and their infants. *MMWR* 2008; 57:1–47.
2. Mandell GL, Bennett JE, Dolin R. 2010. *Mandell, Douglas, and Bennett's principles and practice of infectious diseases*, 7th ed. Philadelphia, PA: Churchill Livingstone Elsevier.
3. Melker HE, et al. Specificity and sensitivity of high levels of immunoglobulin G antibodies against pertussis toxin in a single serum sample for diagnosis of infection with *Bordetella pertussis*. *J Clin Micro* 2000;38(2):800–6.

Test Information

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Bordetella pertussis Antibodies, IgA, IgG, & IgM by Immunoblot

For specific collection, transport, and testing information, refer to the ARUP website at www.aruplab.com.

For information on test selection, ordering, and interpretation, refer to ARUP Consult® at www.arupconsult.com.