SLO Public Health Laboratory Bulletin

May 2008

Pertussis Laboratory Diagnosis—a changing world

Culture: The advent of new molecular methods for the detection of ***Bordetella pertussis*** DNA has demonstrated the relatively low sensitivity of culture in today's laboratory settings. ***B. pertussis*** is a fastidious bacterium and is markedly sensitive to cold temperatures, demanding the most rapid transfer from patient to culture medium to allow recovery. Numerous studies comparing culture to polymerase chain reaction (PCR) and other molecular amplification methods show that culture is at best 45-60% sensitive, indicating that only one out of two true pertussis cases will be culture positive in the best of circumstances. For these reasons, the SLO Public Health Laboratory is no longer offering pertussis culture on a routine basis.

Direct Fluorescent Antibody (DFA): For decades, the immunoserologic method of direct fluorescence antibody staining has been used to confirm culture isolates, and to directly stain nasopharyngeal swab smears to diagnose infection. However, the fluorescent stain antibodies that are used for this technique are usually polyclonal, not monoclonal or produced with modern recombinant molecular techniques. As such DFA for B. pertussis is sensitive, but not very specific, being burdened with a false positive rate of 10-30%.

Serology: Various methods have been used over the past few decades to use serology to detect specific antibody to ***B. pertussis***., However, the methods used to produce the antibody re typically based on whole-cell immunogens, similar to method used to produce DFA reagents. This always creates a problem of non-specific cross reactivity with antibodies elicted by other bacteria. The Centers for Disease Control and Prevention (CDC) has recognized the failure of conventional serology to accurately diagnose pertussis infections in the setting of a presumptive case with negative culture results, and is partnering with the FDA and ten state public health laboratories to compare culture, PCR and a new enzyme immunoassay (EIA) that will detect antibody to the pertussis toxin. When complete this study will prove the first truly accurate pertussis serologic method.

PCR: Polymerase Chain Reaction (PCR) testing for the DNA insertion sequence IS481, usually present in the ***B. pertussis*** genome in multiple copies, has been show to be a highly sensitive (90-95%)and specific method. Most PCR methods also will detect the specific insertion sequence IS1001 that is carried by ***B parapertussis***. Numerous studies have now been published demonstrated the superiority of PCR to the older methods. In view of the resurgence of pertussis cases in the US over the past decade, probably due the failure to use new isolates in vaccine production, accurate laboratory diagnosis of pertussis in children and adults is needed. The SLO Public Health Laboratory is now receiving nasopharyngeal specimens from suspected human cases of infection due to ***Bordetella pertussis.*** Optimal specimen is a nasopharyngeal wash, but NP swabs are accepted.. The assay used by the SLO Public Health Laboratory will also detect ***B parapertussis.*** Fee is $71.00, all insurances can be billed by the SLO Public Health Laboratory.

Ordering Tests from the SLO PH Laboratory:

<u>Customers can submit multiple specimens with a single requisition!</u>

Example : Record the patient name and date of collection on a serum tube, and oral fluid tube, and a urine amplication cup and fill out completely a <u>single</u> requisition, with the multiple test orders checked or written on that single requisition. Enclose all specimens and the requisition <u>in a single bag, placing the requisition in the outside pocket.</u> It is NOT necessary to fill out separate requisitions for each specimen/test order!

Call for more information 781-5507.

J Beebe 5-7-08