

A GUIDE TO SEROLOGICAL TESTING

There have been some significant advances in the use of diagnostic serology recently. The acute phase of infectious diseases can now be diagnosed using a single (*as opposed to paired*) IgM titre. Mucosal immunity can be estimated by measuring IgA and the in vitro diagnosis of allergy has been revolutionised by the FC epsilon receptor detection system for IgE. More sophisticated antigen detection systems for the presence of a pathogen are also available. Assays of IgG remain the mainstay of serological diagnosis and interpretation follows the traditional principles of documenting exposure to a pathogen followed by demonstrating a rising titre to confirm active infection. In the presence of a convincing pattern of clinical signs and data, a high IgG titre to a specific pathogen is usually enough to make a sound clinical diagnosis.

The following tests listed in our price list primarily detect IgG:

Rabies, distemper IgG, parvovirus antibody, adenovirus, ANA, aspergillus, coronavirus, histoplasma, leishmaniasis, Lyme disease, RF, anti-ACH-R antibodies, anti 2M muscle fibre antibodies, toxoplasma IgG, neospora, ehrlichia, chlamydia antibodies, FIV antibodies, FIP/coronavirus antibodies, panleukopenia virus, heartworm (*D. immitis*) antibody (cats), equine herpes virus, influenza, rhinovirus, viral arteritis, parainfluenza 3, IBR, BVD antibody, L, hardjo, RSV, lung worm serology, sarcoptes, caprine arthritis and encephalitis and poultry serology.

Assays of IgM are available for distemper and Toxoplasma:

Significant positive IgM titres to either pathogen indicate active disease or very recent infection. In the case of Toxoplasma, an IFA IgM titre of 1/64 reflects active toxoplasmosis. Interpretation of Toxo IgM titres has reached a high level of sophistication in recent years - the following guidelines may be helpful:

1. Specific IgM titres develop in the serum of approx 80% of infected cats within 2-4 weeks of experimental infection. Most IgM titres become negative within 12 weeks of infection making them useful in the evaluation of clinically ill animals.
2. In FIV infected cats IgM titres may persist for longer than 12 weeks.
3. Chronically infected cats which periodically release antigen from tissue cysts may have reactivation of IgM production periodically.
4. IgM titre should therefore always be interpreted in the light of the whole clinical picture.

Distemper IgM becomes positive up to 1 week before an IgG titre is evident. Assays which employ microscopic serum agglutination as an end-point eg., tests for *Leptospira* serovars (*except L.Hardjo*) tend to identify agglutinating antibodies (*usually IgM*) and consequently should be interpreted more as IgM assays than IgG. It is interesting to note that these titres become negative 3-6 months after vaccination despite the continuing presence of immunity (*IgG*) to challenge. A significant positive from one of these tests suggests active leptospirosis.

Notes on specific serological tests

1. FELV and FIV. We use screening tests for the P27 antigen of FELV and antibodies to FIV. A positive FELV screening test therefore indicates presence of viral antigen (*viraemia*) whereas a positive FIV test indicates seroconversion to the virus. FIV titres of ++ (*moderate*) and +++ (*high*) are diagnostic of seroconversion while the + (*low*) titre may be non-specific and sometimes becomes negative within a few weeks. False negatives do occur in a low percentage of both tests. In the case of FELV this is usually associated with bone marrow/latent FELV infection. In the case of FIV this may be because the animal has seroconverted to a different cell-expressed antigen of FIV than the antigen used in the screening assay. Confirmation of seropositivity to FIV can be achieved using an IFA test in which binding of cat serum to cells expressing FIV infection confirms seroconversion. This test has the advantage of identifying all possible antibodies to cell expressed antigens of the FIV virus. A similar principle applies when western blotting is used to determine FIV seroconversion in particularly occult/complicated cases. Whereas confirmation of seroconversion to FIV confirms infection with the virus, a positive FELV antigen test could be associated with transient infection. Consequently in healthy cats which are FELV positive a further FELV test 4-5 weeks later is necessary to confirm persistent infection. This applies whether the initial test is a positive antigen test, positive PCR or positive virus isolation.

2. Coronavirus/FIP. FIP is a mutant coronavirus with pathogenicity. Most FIP antibody tests identify seroconversion to the coronavirus group but not necessarily FIP specifically. In a competitive validation study our coronavirus/FIP assay was shown to have some degree of specificity to FIP as opposed to more generic coronavirus antibody assays. Thus a high titre to FIP/coronaviruses using our assay gives good support to the diagnosis of FIP when interpreted in the context of other clinical pathological data and clinical signs. This is the principle behind our FIP profile which evaluates a series of important parameters for confirming FIP including the FIP/coronavirus titre, for a fixed cost.

3. Cryptococcus antigen. Cryptococcus is a heavily encapsulated fungal pathogen. The capsule renders the organism poorly immunogenic. Consequently looking for antibodies to cryptococcus in serum is of little diagnostic value. Detection of capsular antigens, however, is a useful diagnostic test for confirmation infection. Consequently we offer a cryptococcus antigen test.

4. Sensitive and specific antigen tests are available for detecting parvo virus antigens in faeces and chlamydia antigens (*Chlamydia psittaci*) in faeces, oculonasal discharges and tonsillar swabs. The chlamydia antigen test can be used in cats and psittacines.

5. BVD antibodies and antigen tests. The BVD antibody test detects IgG and identifies exposure to BVD virus.

The BVD antigen test is used for detecting seronegative carriers of the virus. These animals tend to have been infected in utero and consequently are tolerant of the virus which thrives in their tissues. They act as a reservoir of infection for other members of the herd. A percentage of these persistently viraemic animals go on to develop mucosal disease.