



CLINICAL DIAGNOSIS

Coccidioides Testing

If I suspect coccidioidomycosis (Valley Fever), should I order the antigen or the antibody test?

- If choosing between the two, sensitivity is highest when both antibody tests are run [1].
 - MVista® IgG: 86%
 - Agar gel immunodiffusion (AGID) CF (IgG): 73%
 - **MVista® IgG EIA + AGID CF (IgG): 96%**

What is the preferred specimen for the antigen test?

- Serum is more sensitive than urine, but best results are achieved by testing both.
 - MVista® serum antigen: 36%
 - MVista® urine antigen: 28%
 - **MVista® serum + urine antigen: 46%**
- In rare instances, urine antigen may be positive with negative serum antigen.
- CSF, BAL fluid and other pipettable body fluids may also be tested.
- Antigen testing may be useful as a follow-up if the baseline test is positive.

How can I achieve highest sensitivity?

- In a recent study, sensitivity of 100% was achieved in proven cases of coccidioidomycosis when tested in the antigen EIA, antibody EIA, and agar gel immunodiffusion (AGID)[1]. Highest sensitivity is achieved by testing the following:
 - MVista® *Coccidioides* Quantitative antigen EIA in serum
 - MVista® *Coccidioides* Quantitative antigen EIA in urine

- MVista® *Coccidioides* Canine IgG Antibody
- *Coccidioides* AGID Antibody

- Serum and urine can be sent, requesting antibody testing by AGID and MVista® IgG EIA. Indicate on the requisition that if antibody results are positive, no further testing is needed. If results are negative, request antigen testing to be run.

What is the difference between the antibody methods?

- The *Coccidioides* AGID has historically been the most commonly employed antibody detection method for dogs. This method involves visual assessment of the gel for a band of precipitation between the patient serum and F (IgG) and TP (IgM) antigens. If the F antigen is positive, follow-up testing is performed to provide the titer.
 - Each test requires 3 days to obtain a result, so at least 3 days will be required to determine if the AGID is positive and 6 days will be required to report the titer. Presence of an F (IgG) or TP (IgM) band are considered positive.
 - The AGID method is less sensitive in proven cases than the MVista® IgG Antibody EIA, 73% and 86% respectively.
 - EIA and AGID should be performed to achieve 96% sensitivity.
- The MVista® *Coccidioides* Canine IgG EIA is an enzyme immunoassay specific for canine IgG.
 - Results are reported from 10 to >80 EIA units (EU), with an indeterminate range of 7.0 – 9.9 EU. Indeterminate results may represent past infections or recent infections. Follow-up testing a month later may distinguish past from recent: Levels should remain stable in past and increase in recent infection.

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- The test is performed twice weekly and results are reported the next day.
- Specificity of both *Coccidioides* antibody assays is similar, about 91% in healthy dogs from the enzootic area.
 - The positive results in dogs without clinical findings for coccidioidomycosis are usually < 20 units and are presumed to represent subclinical infection that occurred in the past few years.
 - Clinical assessment usually helps determine if the result represents active or past infection.
- **Is there cross reactivity between the *Coccidioides* and other enzootic fungi in antigen tests?**
 - Yes, cross reactivity between *Coccidioides*, *Blastomyces*, *Histoplasma* antigen occurs in about 10% of patients, usually those with very high concentrations.
 - Disease can be differentiated by antibody testing for histoplasmosis and blastomycosis if the patient is from a geographic area with overlapping enzooticity or if the patient has travelled to a geographic region where cross-reactive fungal species are enzootic.
 - Typically for a coccidioidomycosis case, the antigen result will be much higher in the *Coccidioides* antigen assay compared to the other antigen assays.
- **My patient has a low *Coccidioides* AGID titer or a *Coccidioides* IgG level (7-20 units). How should this be interpreted?**
 - 5-20% of dogs residing in the enzootic area (desert areas of CA, AZ, NM and west TX) will retain a low AGID titer (undiluted to 1:8) or IgG level between 7 and 20 units following exposure [2]. The duration antibodies remain positive is unknown but is presumed to be between 1 and 3 years.
 - An AGID titer of 1:16 or higher or an IgG level of >20 units is supportive of active infection but also may represent prior infection.
 - Lower levels may represent prior or active infection and require further clinical assessment to rule out other differential diagnoses.

Test name	Test Code
MVista® <i>Coccidioides</i> Quantitative antigen EIA in serum	Test Code 315
MVista® <i>Coccidioides</i> Quantitative antigen EIA in urine	Test Code 315
<i>Coccidioides</i> Agar Gel Immunodiffusion	Test Code 320
MVista® <i>Coccidioides</i> Canine IgG Antibody	Test Code 329

**If you have questions, please call for a consult.
317-856-2681**

REFERENCE LIST:

1. Holbrook, E.D., et al., *Novel canine anti-Coccidioides immunoglobulin G enzyme immunoassay aids in diagnosis of coccidioidomycosis in dogs.* Med Mycol. 2019.
2. Shubitz, L.E., et al., *Incidence of coccidioides infection among dogs residing in a region in which the organism is endemic.* J Am Vet. Med Assoc, 2005. **226**(11): p. 1846-1850.

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