### AVIAN MYCOBACTEROSIS

<table>
<thead>
<tr>
<th>Animal Group(s) Affected</th>
<th>Transmission</th>
<th>Clinical Signs</th>
<th>Severity</th>
<th>Treatment</th>
<th>Prevention and Control</th>
<th>Zoonotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>All birds, some mammals</td>
<td>Fecal-oral, environment, inhalation</td>
<td>Emaciation, weakness, lethargy, hepatosplenomegaly</td>
<td>Variable. Severe in the individual with end stage disease</td>
<td>Not recommended as this organism is resistant to most, if not all human antimycobacterial drugs. Euthanasia may need to be considered</td>
<td>Cleaning of the environment. Decreasing load in the environment. Maintaining good immune systems and good husbandry</td>
<td>Yes, but humans have a high resistance to <em>M. avium</em> unless immune compromised. Treatment may be difficult.</td>
</tr>
</tbody>
</table>

**Fact Sheet compiled by:** Nancy Carpenter  
**Sheet completed on:** 1 February 2011; updated 1 March 2013

**Fact Sheet Reviewed by:** Erika Travis-Crook, M. Scott Echols

**Susceptible animal groups:** Birds, some mammals, such as pigs, mink and rabbits.

**Causative organism:** *Mycobacterium avium* complex (MAC) consisting of *M. avium* and *M. intercellulare*. *M. genavense* can also cause disease in birds.

**Zoonotic potential:** There is potential, however humans appear to be highly resistant unless immune compromised.

**Distribution:** Worldwide. However in North America the distribution favors the North Temperate Zone.

**Incubation period:** There is not a definitive incubation period because the resultant disease is dependant upon immune response to exposure. Exposure does not guarantee disease. Typically an animal suffering from disease caused by Mycobacteria may have had the disease for many years before signs are recognized or, more likely, it is an incidental finding on necropsy.

**Clinical signs:** Emaciation, weakness, lethargy, hepatosplenomegaly.

**Post mortem, gross, or histologic findings:** Emaciated carcasses, hepatosplenomegaly, nodular disease in affected organs. Nodules are typically white to yellow and solid to soft or crumbly in consistency. Liver, spleen, lung and intestines are most commonly affected but joints, skin, and respiratory tract may also show lesions.

**Diagnosis:** Elevated white blood cell counts >60,000 can be an indicator of mycobacteriosis. Antemortem screening can be performed via coelomoscopic examination focusing on the liver, spleen and intestines. Biopsy any plaque like lesions or the liver for histopathological screening. Diagnosis is attained through the identification or culture of acid fast organisms or histopathology as the most common route. However, acid fast staining of prepared feces can also be done but is not a definitive test since other organisms can be acid fast positive confounding results. Tuberculin testing is not recommended.  
PCR assays detect the actual disease causing organism and are considered to be the fastest, most sensitive method for detecting *M. avium*. ELISA assays detect specific antibodies for *M. avium* and help determine exposure. These assays can be performed on whole blood, feces, serum, vent and throat swabs depending upon the laboratory and the test to be run. (Feces for Zoologix; whole blood, serum, vent and throat swabs for Avian Biotech International)
**AVIAN MYCOBACTEROSIS**

**Material required for laboratory analysis:** Acid Fast staining of slides from a suspect nodule, feces or touch prep of affected tissues; formalinized tissue for histopath examination; culture swab for acid fast testing and culture (Lowenstein Jensen media required for culture). Feces for PCR by Zoologix or whole blood, serum, vent and oral swabs for Avian Biotech International for PCR or ELISA. Post mortem sampling includes liver, spleen and lungs and/or suspect areas.

**Relevant diagnostic laboratories:**
- Avian Biotech International (www.avianbiotech.com)
- Zoologix (www.zoologix.com). See the Avian and Livestock Assay Data Sheet

**Treatment:** Typically, control is more desired as treatment can be unrewarding and possibly cause further spread of the disease. Some antibiotic resistance can be expected. The ethics of treatment must be considered as treatment may be life long and may not prevent shedding.

**Prevention and control:** Try to maintain a clean environment and be diligent in screening via necropsy and testing for acid fast bacteria. Maintain a thorough quarantine protocol.

**Suggested disinfectant for housing facilities:** Cidex appears to be the product that is the standard efficacy comparison in most studies. Equivalent disinfectants include Sactimed sinald (a quaternary ammonium compound) Steris 20 (a peracetic acid compound) and Pentapon DC1 (a beta-ene compound) are equally effective. Persafe (a tertiary amine that is classified as an HLD High Level Disinfectant) is also reported to be as effective as Cidex. Virkon was NOT effective. Roccal D does not list *M. avium* as being susceptible to that product. Some of these may not be applicable for premise application. Sukusept Plus (Ecolab) is a glucoprtoamin based disinfectant and has effectiveness against all mycobacteria at 2500 ppm for 15 minutes. It is also effective against a glutaraldehyde resistant *M. chelonae* but at a concentration of 5000 ppm for 15 minutes, or at 2500 ppm for 60 minutes. Note that this product may not be available in the US. 1 Stroke Environ B (Vestal Labs), Virostat TBQ, Steris TBQ, Husky QT 814 are other premise disinfectants with efficacy against mycobacteria. During premise disinfection it is recommended that a protective face covering i.e. respirator is worn due to the route of infection for these organisms is through aerosolization.

**Notification:** Check your individual state for reporting requirements

**Measures required under the Animal Disease Surveillance Plan:** This is not one of the listed diseases as of 2013.

**Measures required for introducing animals to infected animal:** If an animal is known to be infected, euthanasia may need to be considered. It is not recommended to mix a known infected animal with a healthy animal unless the risk for infection is considered acceptable. Studies show that there is an increased incidence of disease when an animal is housed with a known positive.

**Conditions for restoring disease-free status after an outbreak:** As this bacterium is ubiquitous, this condition is unachievable. Efforts should be concentrated on decreasing the environmental load of this bacterium and enhancing the immune response for those living in the contaminated environment through good nutrition and proper husbandry. Screening of all deaths for mycobacteria, having sentinel animals in the enclosure, and periodic liver biopsies have all been done.

**Experts who may be consulted:**
- Scott Larsen, DVM, MS, Dipl ACZM
- Denver Zoo
- 2300 Steele St
- Denver, Colorado 80205
- Phone: (303) 376-4996
- Fax: (303) 376-4991
- slarsen@denverzoo.org
## AVIAN MYCOBACTERIOSIS

Jim Wellahan, DVM, MS, PhD, DACZM, DACVM  
Zoological Medicine Service  
College of Veterinary Medicine  
Gainesville, Florida 32610  
Phone: 352-392-2226  
wellahanj@ufl.edu

Shannon Ferrell, DVM  
Dept. of Companion Animals  
Atlantic Veterinary College  
UPEI, 550 University Avenue  
Charlottetown, PE C1A 4P3, Canada.  
Email: sferrell@upei.ca

Bruce Rideout, DVM, PhD  
San Diego Zoo Global, Institute for Conservation Research  
Director, Wildlife Disease Laboratories  
PO Box 120551  
San Diego, California 92112  
(619) 231-1515  
brideout@sandiegozoo.org

### References:

1. Avian Services Center. Avian Tuberculosis (Mycobacterium avium).  
AVIAN MYCOBACTEROSIS