

# **Mycoplasma**

## **Characteristic features of Mycoplasma**

Mycoplasma lack a cell wall therefore Mycoplasma stain poorly by the Gram stain due to their lack of a cell wall. Dienes stain is a commonly used to Mycoplasma which give blue color. Mycoplasma are generally slow growing and often require 3–10 days of incubation before colonies are apparent on agar. *In vitro* growth is generally best at 33–38 °C in an atmosphere of increased CO<sub>2</sub>. Mycoplasmas need serum for their growth. Mycoplasma colonies are small and difficult to visualize with the unaided eye. Colony sizes vary from 0.01 to 1.0 mm. When observed with a dissecting microscope exhibit a “fried egg” morphology.

## **Mycoplasma in poultry**

In poultry, vertical transmission through hatching eggs is an important means of spread for many of Mycoplasma. Transmission occurs predominately by spread from animal to animal through direct contact and is mediated by aerosolization of respiratory secretions.

*M. gallisepticum* causes a chronic respiratory disease in chickens and infectious sinusitis in turkeys, and infects a number of other domestic avian species.

*Mycoplasma synoviae* also infects a wide range of avian species. Synovitis resulting in lameness, swelling of joints and tendon sheaths, and retarded growth are common presentations.

## **Laboratory Diagnosis**

ELISA, plate agglutination, and hemagglutination inhibition tests are routinely used to detect flock infections with *Mycoplasma*. A number of PCR methods have

been described for identification of pathogenic species directly from clinical material that bypasses the need for culture.

## **Fungi**

Fungus is categorized as mold or yeast based upon the microscopic appearance in tissue or on routine culture media. Microscopically, if hyphal structures are observed, the fungus is termed a mold; if single-celled, budding structures are observed, the fungus is termed a yeast. On routine culture media, molds will have a “fuzzy” or wooly appearance, and a yeast will be bacteria-like in its colonial morphology and consistency. Some pathogenic fungi will produce either hyphal like structures or yeast-like structures, depending upon the conditions in which they are growing. Such fungi are called dimorphic fungi.

### ***Candidia albicans***

*C. albicans* is yeast, which inhabits mucous membranes of most mammals and birds. Disease produced by *C. albicans* usually occurs in an immunocompromised host. Overuse of antibiotics and prolonged use of steroids leading to candidiasis in animals and humans. *C. albicans* typically grows as oval budding yeast cells. Under certain conditions yeast cells produce germ tubes. *Candida* can be visualized under light microscopy when stained with Wright’s and Giemsa stains. Cell wall glycoproteins have endotoxin-like activity. Virulence factors such as phospholipases and proteases have been demonstrated in *C. albicans*. These enzymes seem to promote tissue invasion and adherence of yeasts to host cells.

**Growth Characteristics.** *C. albicans*, an obligate aerobe, grows on blood or Sabouraud’s agar. At 25–30 °C, creamy white colonies appear in 24–48 h. On epithelial surfaces, candidiasis forms whitish to yellow or gray plaques, marking areas of ulceration with varying degree of inflammation.

**Avian candidiasis** affects chickens, turkeys, pigeons, and other birds. Crop mycosis (thrush) in avian species is caused by *C. albicans*. The existing digestive tract of birds can be affected; and mortality is very high with this disease condition.

### **Laboratory Diagnosis**

In exudate, *Candida* appears as yeast cells by fixed smears stained with Wright's and Giemsa stains. Incubation at 37 °C for  $\geq 2$  h of a lightly inoculated tube of serum will produce germ tubes if the isolate is *C. albicans*. *C. albicans* grows well on blood or Sabouraud's agar. Yeast identification kits are commercially available.

### *Aspergillus fumigatus*

*Aspergillus* is mold. Aspergillosis is acquired from environmental sources, generally by inhalation or ingestion. *Aspergillus* produces a number of enzymes that have the potential to function *in vivo* to break down host tissue. These include elastase, proteases, and phospholipases. Following their deposition in tissue or on a surface, recognition by phagocytic cells triggers an inflammatory response. Inflammation, along with release of fungal elastase, proteases, and phospholipases, results in tissue damage. Lesions in avian lungs are caseous nodules. On serous membranes, caseous foci are covered by macroscopic mold colonies, accompanied by thickening of the membranes (e.g., air sacs). The cellular response is acute suppurative to chronic granulomatous.

**Avian aspergillosis**, which affects many species of birds, sometimes in epidemics, reflects heavy exposure or severe stress on domestic flocks or pet bird operations. The disease is usually a respiratory tract infection, sometimes with hematogenous dissemination. The bird acquires the disease by inhaling a massive dose of spores. Signs are inappetence, listlessness, weight loss, dyspnea, sometimes diarrhea, and abnormal behavior and posture. The eyes are often affected. Mortality may

approach 50%, especially in young birds. In mild cases, only gasping and hyperpnea may be seen. The course varies from a day to several weeks.

### **Laboratory Diagnosis**

Hyphae and conidia (spores) can often be demonstrated in samples either in wet mounts in 10% KOH or with calcofluor white. For fixed stained smears, fungal stains (periodic acid Schiff, Gridley, or Gomori methenamine silver) are best and Wright's and Giemsa stains are satisfactory. Septate branching hyphae constitute strong evidence of aspergillosis.