

# *MYCOPLASMA SYNOVIAE* INFECTION

Slide study set #12

Prepared by:

**Ziv Raviv, DVM, PhD, Dipl. ACPV**

Department Of Veterinary Preventive Medicine

College of Veterinary Medicine

The Ohio State University

1920 Coffey Road

Columbus, OH 43210

Of: (614) 292-7205

Fx: (614) 292-4142

E-mail: raviv.2@osu.edu

and

**David H. Ley, DVM, PhD, Dipl. ACVM, Dipl. ACPV**

Department of Population Health and Pathobiology

College of Veterinary Medicine

North Carolina State University

1060 William Moore Drive

Raleigh, NC 27607 USA

Of: (919) 513-6269

Fx: (919) 513-6464

E-mail: david\_ley@ncsu.edu

**This slide study set was originally created in 1985 by Dr. HARRY W. YODER, JR. and Dr. NORMAN O. OLSON and was updated in 2011.**

## ***MYCOPLASMA SYNOVIAE* INFECTION**

By: Ziv Raviv and David H. Ley

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*Mycoplasma synoviae* (MS) is a pathogen of chickens and turkeys, causing significant economic losses to poultry producers worldwide. Infection can be associated with upper respiratory disease, airsacculitis, synovitis, tenosynovitis, and bursitis. Disease severity has been influenced by other respiratory pathogens (e.g., Newcastle disease virus, infectious bronchitis virus), more virulent MS strains, and host species predilection (turkeys more susceptible than chickens).

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American Association of Avian Pathologists, Inc.  
12627 San Jose Blvd., Suite 202  
Jacksonville, FL 32213

[aaap@aaap.info](mailto:aaap@aaap.info)  
[www.aaap.info](http://www.aaap.info)

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**History, Distribution, and Incidence.** Infectious synovitis was first described and associated with mycoplasma infection by Olson *et al.*, during the early 1950's. The causative organism was designated as Avian Mycoplasma Serotype S by Dierks et al., in 1967 and subsequently confirmed as a separate species, *Mycoplasma synoviae*, by Jordan *et al.*, in 1982. Soon after its identification MS appeared to have worldwide distribution. During the 1950's and 1960's the synovitis form of the disease was observed primarily in growing meat-type chickens (broilers), while since the 1970's the respiratory form of the disease has been seen more frequently. Flocks of laying chickens are commonly infected with MS with mild or subclinical signs. The disease usually appears in turkey flocks 10 to 20 weeks of age, primarily in multiage farms and in endemically MS infected areas. The outcome of infection is significantly affected by management factors, other respiratory pathogens (e.g., Newcastle disease virus, infectious bronchitis virus), virulence of the involved MS strains, and the host species (turkeys more susceptible than chickens).

**Etiology.** MS is the classic cause of infectious synovitis of chickens and turkeys. MS more frequently produces a persistent infection of the upper respiratory tract which sometimes is involved with airsacculitis. MS is a very fastidious cell wall-less bacterium requiring a protein-rich medium with 10-15% swine serum, and specifically requires the addition of nicotinamide adenine dinucleotide (NAD). Updated specifications for MS culture follows.

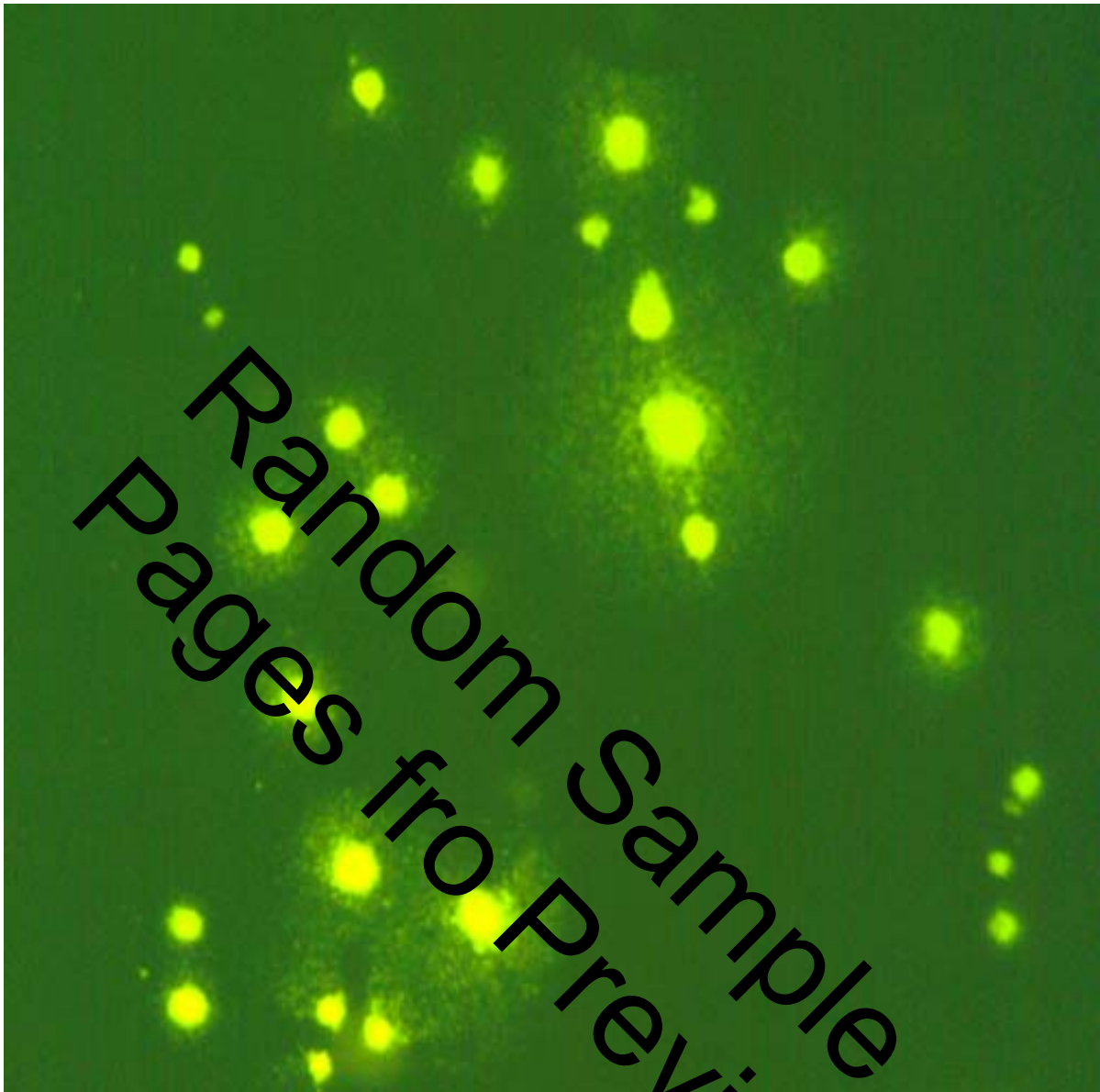
#### MYCOPLASMA MODIFIED FREY'S BROTH MEDIUM

	<b>Per Liter</b>
Deionized distilled water	880.0 ml
Thallium acetate (10% sol.)	5.0 ml
Potassium penicillin G (aqueous)	500,000 units
Mycoplasma Frey's broth base	22.5 g
Swine serum (heated 56 C for 30 min)	120.0 ml
Dextrose	3.0 g
Phenol Red (1% sol.)	.5 ml
NAD (1% sol.)	12.5 ml
Cysteine hydrochloride (1%-sol.)	12.5 ml

Adjust to pH 7.8 with 20% NaOH and filter Sterilize.

Add thallium acetate to the water first to avoid precipitation of proteins of media and serum. Horse serum is adequate for MG, but swine serum is best for MS. Cysteine hydrochloride is added to reduce the NAD (beta nicotinamide adenine dinucleotide) which is required for the growth of MS. For agar plates 1.5% agar is used. For potentially contaminated specimens, an extra 20 ml of 1% thallium acetate and 2,000,000 units of penicillin per liter may be added. Ampicillin (from 200-1000mg/l) may be substituted for penicillin.

**Colony morphology.** Colonies on solid media are best observed with a dissecting microscope at 30X magnification using indirect lighting. They appear as raised, round,



**SLIDE 4.** Mycoplasma cultures isolated from trachea swabs of air-sac lesions must be speciated. *M. synoviae* and *M. gallisepticum* are only 2 of over 20 possible species of avian mycoplasma. This slide shows the greenish glow of colonies that are positive in the immunofluorescence (IF) test using species-specific antibodies (Slide courtesy of Dr. Stanley H. Kleven).



**SLIDE 5.** Chicken with its tongue pulled aside to position the larynx for insertion of a swab to obtain tracheal exudate for cultivation of most avian mycoplasma, including MS. (Slide courtesy of Dr. Stanley H. Kleven).



**SLIDE 6.** Normal air-sac membranes are so thin and clear that they are almost invisible. The air sacs are primarily paired extensions (thoracic, abdominal, etc.) of the air passages from the bronchioles on out beyond the lungs into various body cavity spaces. Some are within hollow bones. This slide shows a moderately inflamed air sac as noted by slight thickening of the membrane, some cloudy exudate, and increasing flecks of yellowish caseous exudate as the process continues.