

The diagnostics of *Mycoplasma pneumoniae*

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INTRODUCTION

Mycoplasma pneumoniae is a bacterium that can cause respiratory infections in humans. It is a common pathogen responsible for a range of respiratory illnesses, the most notable being atypical pneumonia. *Mycoplasma pneumoniae* is a member of the mollicutes class, a class of bacteria lacking a cell wall. The absence of a cell wall makes them resistant to many common antibiotics that target bacterial cell walls. This is why proper diagnostics is fundamental for ensuring the right treatment for the patients. As per any microbiology test, the preanalytical phase (from the collection of the samples through the sample transport, from the sample management to the preparation in the lab) is paramount to assure reliable and robust results.

CLINICAL PRESENTATION

Mycoplasma pneumoniae primarily infects the respiratory tract, causing infections such as bronchitis and pneumonia. It is a leading cause of atypical pneumonia, characterized by milder symptoms than typical bacterial pneumonia. The symptoms of *Mycoplasma pneumoniae* infection can include fever, cough, sore throat, and fatigue. It often presents with a gradual onset of symptoms, and patients may not appear as ill as those with other types of pneumonia. While *Mycoplasma pneumoniae* infections are usually mild and self-limiting, complications can occur, especially in severe cases. Complications may include respiratory failure, neurological issues, and extrapulmonary manifestations.

Mycoplasma pneumoniae infections are more common in younger individuals, particularly school-aged children and young adults. Outbreaks can occur in crowded settings such as schools and military barracks.

DIAGNOSIS

The standard diagnosis of *Mycoplasma pneumoniae* is performed by nucleic acid amplification techniques (NAAT), serology, and culture.

Culture of *Mycoplasma pneumoniae* is a very long process that requires specific culture media, and negative results confirmation may take up to 6 weeks, while positive samples are reported within 7 days⁸. Even if culture is not routinely used, it is still fundamental, especially in reference centers for genotyping and antibiotic resistance monitoring. SAMPLE TYPES FOR CULTURE: preferably oropharyngeal swab and/or nasopharyngeal swab in UTM

Serology was routinely used until commercially validated NAAT assays were available, as they are fast and easy to run. Despite this, the serology tests don't measure the direct presence of the pathogen, but the immunological response of the host. Due to this, serology tests may have a substantial lack of specificity due to cross-reactivity with other pathogens Ab, as well as a lack of sensitivity due to the needs of the seroconversion time.

NAAT test, which are now commercially available, allows to deliver results quickly, with high sensitivity and specificity. Results can be obtained in time to guide treatment decisions. NAAT tests are available from different manufacturers as singleplex assays, or inserted in multiplex respiratory syndromic panels.

SAMPLE TYPES FOR NAAT: preferably oropharyngeal swab and/or nasopharyngeal swab. CDC guidelines specifically mention the use of flocked swabs. Acceptable also or tracheal aspirates, bronchial washing, sputum, bronchoalveolar lavage (BAL), endotracheal tube (ETT) washing/aspirate, fresh lung tissue, and cerebrospinal fluid (CSF).¹

COPAN PRODUCTS FOR MYCOPLASMA PNEUMONIAE SAMPLE COLLECTION AND TRANSPORT

For the collection of samples for *Mycoplasma pneumoniae* diagnostics, the most suitable product in Copan portfolio is UTM. UTM® is Copan’s Hanks’ Balanced Salt Solution, ideal for the collection, transport, and long-term freeze storage of viruses, chlamydia, mycoplasma, and ureaplasma. UTM® is compatible with viral

culture, antigen detection, and molecular assays. UTM is available in a broad range of volumes, and is available as transport media tube alone, and in a kit in combination with different FLOQSwabs geometries.

UTM was used extensively for *Mycoplasma pneumoniae* diagnostics, either by PCR-based tests²⁻⁶ as well as culture⁷.

Manufacturer	Test name	Test type	Sample type	Copan suitable product
Meridian Bioscience	Alethia Mycoplasma Direct	LAMP - singulex	Throat swab - Rayon, Flocked Nylon, or Polyester - Place swab(s) in a non-nutritive transport medium (e.g. Liquid Amies, without charcoal; Liquid Stuart	Transystem Liquid Amies or Stuart 140C.USE 141C.USE
BIOMÉRIEUX	BIOFIRE® Respiratory Panel	qPCR - multiplex	Nasopharyngeal Swab (NPS) collected according to standard technique and immediately placed in up to 3 mL of transport media o	UTM + NP FLOQswabs
Qiagen	QIAstat-Dx® Respiratory SARS-CoV-2 Panel	qPCR - multiplex	nasopharyngeal swab - placed into transport medium	UTM + NP FLOQswabs
Seegene	Allplex™ PneumoBacter Assay	qPCR - multiplex	Nasopharyngeal swab Sputum Nasopharyngeal aspirate Bronchoalveolar lavage	UTM + NP FLOQswabs
Seegene	Allplex™ Respiratory Panel 4	qPCR - multiplex	Nasopharyngeal swab Sputum Nasopharyngeal aspirate Bronchoalveolar lavage	UTM + NP FLOQswabs
GeneProof	Mycoplasma pneumoniae PCR Kit	qPCR - singulex	Swab, BAL, sputum,	UTM + NP FLOQswabs

Table 1: selection of NAAT test for *Mycoplasma pneumoniae* detection. Copan products compatibility was checked on the available IFUs on 28/11/2023. Always refer to the latest IFU version provided with the kit for the final compatibility check.

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