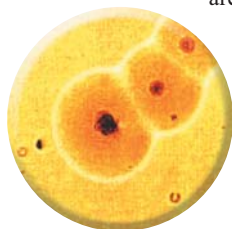
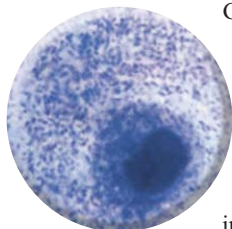




Urogenital Mycoplasmas



Genitourinary infections, including sexually transmitted diseases (STDs), are caused by a large number of diverse urogenital microbial agents and can result in considerable morbidity and mortality. While “classical” STDs like *Neisseria gonorrhoeae* and *Chlamydia trachomatis* are associated with urethritis and cervicitis, a subset of mycoplasma species is associated with an increasing incidence of nongonococcal urethritis. Mycoplasmas are small (0.2 – 0.3 nm) membrane bound organisms capable of independent self-replication. The most prevalent strains recoverable from the genital tract are *Ureaplasma urealyticum*, *Mycoplasma hominis* and *Mycoplasma genitalium*. Infants can become colonized with genital mycoplasmas during birth. *Ureaplasma urealyticum* is acquired from a colonized cervix or vagina at a rate of 18% to 55% by vertical transmission. Genital mycoplasmas are uncommon in prepubertal girls. After puberty, colonization with mycoplasmas occurs primarily through sexual contact. Genital mycoplasmas are commonly isolated from gravid women at approximately the same recovery rate as in nonpregnant women with the same degree of sexual activity.

Mycoplasmas and Ureaplasmas are strongly associated with infertility, intraamniotic infection, postpartum infection, and histologic chorioamnionitis. Specifically, *Mycoplasma genitalium* has been associated with urethritis and acute endometritis, while *M. hominis* has been linked to pyelonephritis, pelvic inflammatory disease and postpartum septicemia.

Genital mycoplasma infections are usually diagnosed by culture. However, it can take 2 to 5 days to culture *M. hominis* and up to 8 weeks to culture *M. genitalium*.

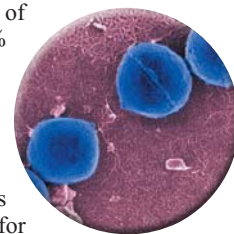
MDL has developed a highly sensitive and specific Real-Time PCR (RT-PCR) based test for the rapid diagnosis of *M. hominis* and *M. genitalium*. In this assay, we amplify regions within the *ftsY* gene and the DNA gyrase subunit for *M. hominis* and *M. genitalium*, respectively.

Subspeciation of human urogenital mycoplasma infections is paramount for a successful antimicrobial therapy due to differential antimicrobial susceptibilities. *Mycoplasma genitalium* is highly susceptible to azithromycin, but not to doxycycline, ciprofloxacin or tetracycline. *Mycoplasma hominis* is naturally resistant to macrolides, but susceptible to quinolones.

In summary, determination of the species of Mycoplasmas coupled with the appropriate antimicrobial therapy will markedly increase the treatment efficacy for urethritis and cervicitis.

Vaginal Group B Strep (GBS) Antibiotic Resistance

Group B Streptococcus (GBS) is the leading cause of neonatal bacterial infection. A reported 10% to 30% of pregnant woman are colonized vaginally and/or rectally and thus have the potential to infect their newborn upon birth. A neonate who contracts GBS from their colonized mother can result in a number of serious types of infections such as pneumonia, septicemia, and/or meningitis. Because of the serious nature of neonatal GBS infections, the Centers for Disease Control and Prevention (CDC), the American College of Obstetricians and Gynecologists (ACOG), and the American Academy of Pediatrics (AAP) suggest that all pregnant women should be tested for the presence of GBS at 35-37 weeks of gestation. Twenty-seven percent of pregnant women are administered antibiotics during labor and delivery to prevent transmission. The typical treatment for these patients is penicillin G of which there is no known resistance. However, up to 12% of the population reports allergies to penicillin. Therefore the macrolide (erythromycin) or lincosamide (clindamycin) classes of drugs need to be administered, particularly for those patients who are at high risk for anaphylactic shock. Previous reports cite an increase in resistance of GBS to erythromycin and clindamycin. For instance, in 2003, resistance to erythromycin and clindamycin was reported as high as 37% and 17% respectively.

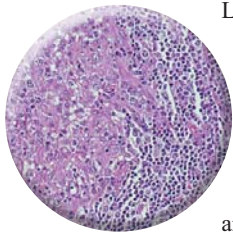


The antibiotic resistance mechanisms are most commonly caused by three genes: *ermB*, *ermTR*, and *mefA*. MDL concluded a study where both the Clinical and Laboratory Standards Institute (formerly NCCLS) 2003 “Performance Standards for Antimicrobial Susceptibility Testing” protocols and a multiplex PCR assay were used to screen for the prevalence of these genes in 222 GBS clinical isolates. These isolates were obtained from MDL’s clinical swab samples. Of the 222 GBS clinical isolates, 84 strains (38%) were resistant to erythromycin and 46 strains (21%) were resistant to clindamycin. The multiplex PCR proved to be an efficient method to identify the three major antibiotic resistance genes in GBS. With the presence of these genes on mobile genetic elements such as plasmids and/or transposons, the passing of these genes from bacteria to bacteria is likely and should be monitored to provide the physician with the vital information needed for proper patient treatment.

MDL has developed a highly sensitive and specific multiplex polymerase chain reaction to identify GBS antibiotic resistance genes from GBS clinical isolates. This new test is now available from the **OneSwab™**.



Lymphogranuloma venereum (LGV)



Lymphogranuloma venereum (LGV) is a sexually transmitted chlamydial disease that should be part of the differential diagnosis for any patient presenting with a genital ulcer and/or inguinal lymphadenopathy. Treatment involves the use of antibiotics to clear the infection and to prevent tertiary sequelae.

LGV is caused by *C. trachomatis*, serotypes L1, L2, and L3. *C. trachomatis* serovars B and D-K are associated with causing non-gonococcal urethritis and cervicitis. While these other serotypes of *C. trachomatis* are limited to superficial infection of mucus membranes, serotypes L1, L2, and L3 are more invasive and virulent, and tend to result in systemic disease. The organism travels through the lymphatic system to multiply within macrophages in regional lymph nodes. Asymptomatic women are also believed to be a source of infection.

Most acute LGV cases are in men with a male to female ratio of 5 to 1 or greater. However, long-term complications such as ulceration, genital hypertrophy and rectal strictures are most common in women. The peak range of LGV is in individuals aged 15-40 years and is more prevalent among the African-American population. In the US, only 113 cases were reported to the Centers for Disease Control and Prevention in 1997. However, the true incidence of the disease is believed to be 400-600 cases per year. Internationally, LGV is most common in Southeast Asia, Africa, Central America, and the Caribbean. LGV accounts for 2%-10% of genital ulcer disease cases in India and Africa. An outbreak of LGV consisting of 92 confirmed cases among men having sex with men was reported from April 2003 through September 2004 in Rotterdam, in the Netherlands. Historically, the Netherlands has reported less than five cases of LGV per year. Additional cases have been reported in Belgium, France, Germany, Sweden, Britain, the United States, and Canada. Like many other STD's, LGV is spread by vaginal, anal, and oral sexual contact and its transmission can be prevented by using condoms and/or other barrier methods.

LGV occurs in three distinct stages. The **first stage**, which has an incubation period of anywhere from three days to six weeks (10-14 days average), is characterized by a painless genital papule, which usually disappears after a few days. Therefore, it is rare for a patient to present with the first stage of the disease. Travel and sexual histories are important because LGV is often seen in people who have been sexually active in areas where the disease is endemic.

The onset of the **second stage** occurs two to six weeks later and often manifests as unilateral inguinal lymphadenopathy. Constitutional symptoms, such as fever, chills, malaise, myalgias, and arthralgias, are common in this stage of the disease. Women may complain of lower abdominal or back pain because they often have involvement of deep pelvic nodes. Systemic spread occasionally can result in arthritis, pneumonitis, hepatitis, or, rarely, perihepatitis.

The **third stage** may occur years after the initial infection and is termed genitoanorectal syndrome. Women are more likely to present in this stage. Symptoms include fever, pain, tenesmus, pruritus, and purulent or bloody diarrhea. These symptoms are associated with proctocolitis, abscesses, and

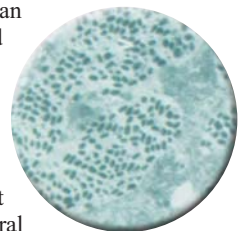
fistulas. Progression to the third stage of the disease can result in serious and sometimes permanent sequelae such as genital deformity, fistulas, and rectal strictures. Death is rare, but may be caused by complete bowel obstruction and perforation resulting from a rectal stricture.

The presentation of an LGV infection is variable which makes diagnosis solely on clinical grounds, at best, difficult. In addition, laboratory diagnosis of LGV is hampered by the difficulty in culturing the organism. The best results have been obtained using aspirates from an involved inguinal lymph node and from bacterial typing of the culture after growth. Culture requires growth in cycloheximide-treated McCoy or HeLa cells, and even under these conditions, yields of only 30%-50% are reported. Serologic tests also are available and produce a strong reaction by complement fixation. Tests typically are positive within two weeks of disease onset and have a sensitivity of 80%, but lack specificity due to cross-reaction with other *C. trachomatis* serotypes. MDL has developed a Real-Time PCR amplification with high sensitivity and specificity that can differentiate between LGV and *C. trachomatis* serotypes. In addition, differential diagnosis and screening for co-existence of STDs are highly recommended.

As recommended by the CDC, the treatment of choice for LGV is with doxycycline (100 mg orally twice a day for 21 days). An alternative regimen is erythromycin (500 mg orally four times a day for 21 days). The antibiotic treatment should be combined with aspiration of the lymph nodes, if needed. Incision and drainage may result in non-healing fistula formation, which can be minimized by draining involved lymph nodes from above the inguinal ligament. Symptomatic treatment with non-steroidal anti-inflammatory drugs (NSAIDs) and local heat for pain relief may be useful adjuncts.

Molluscum Contagiosum

Molluscum contagiosum is a viral infection that is an increasing problem in sexually active and immunocompromised individuals. It accounts for approximately 1% of all diagnosed skin disorders. Transmission requires direct physical contact with an infected individual or material.



The lesions are small, waxy, round, raised papules that measure two to six millimeters in diameter with a central umbilication and a white, firm, curd-like core. These lesions may be single at first, but may multiply into clusters. Other symptoms include itching, redness, and inflammation of the skin around lesions. The lesions caused by the virus may take six months to five years to resolve in the absence of therapeutic intervention.

In patients presenting with lesions in the anogenital region, clinicians may find it necessary to differentiate MCV infection from human papillomavirus (HPV) and HSV infections.

MDL has developed a highly sensitive and specific Real-Time PCR based test making it possible to detect MCV from swab samples of lesions actively shedding the virus. The MCV Real-Time PCR test is capable of detecting as few as ten copies of the MCV genome with high specificity, generating no cross-reactivity with a panel of over 40 bacterial, fungal, and viral pathogens, including HPV, HSV-1, HSV-2, and VZV.