**Neisseria gonorrhoeae**

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Order: Eubacteriales, Family: Neissericeae, Genus: Neisseria, Species: Gonorrhoeae

Bacteria: Gonococcus

**Transmission:**

Through unprotected vaginal, anal or oral sex with infected partner. Transmission can also occur from infected mother to child (1).

**Reservoirs:**

Humans (1)

**Characteristics:**

A common sexually transmitted microorganism that causes gonorrhea. Gram negative aerobic, encapsulated diplococci bacteria. This bacteria tests oxidase positive. Colonies are produced after 18-24 hours of incubation. 0.6 to 1.0 um in diameter and contains pili and membrane proteins that play a role in adherence. *N. gonorrhoeae* is an exclusively human pathogen that primarily infects the urogenital epithelia (6).

**Symptoms:**

Occurs 2-14 days after exposure. Symptoms in men can include burning and pain sensation during urination. Urination in greater frequency and urgency with pus-like discharge from penis. Swelling, pain and redness at opening of penis and testicles is also likely. Symptoms in women are less common and mild. They include discharge from vagina with pain during urination. Sore throat and pain upon sexual intercourse is also possible. Occasionally patients complain of rectal and anal pain. Often patients are asymptomatic that may lead to more serious complications (4).

**Virulence Factors:**

Primarily infects columnar or cuboidal epithelium. The pili on the outer membrane aide in adhesion to the mucosal surfaces. Proteins on the outer membrane facilitate adhesion and promote invasion of cells (9). Endocytosis allows bacteria to enter the cell, enter the submucosa and cause infection. Bacterial lipoooligosaccharides on the outer membrane causes cell damage and triggers the inflammatory response. Antibody production is low even after repeated infections therefore an effective immune response or successful vaccination is not available. The neutrophil response to infection cause shedding of dead cells and discharge of pus (8). Initially affecting mucosal membranes, causing urethritis and cervicitis a week or less after infection (9). Severe cases in women may lead to Pelvic Inflammatory Disease (PID) (2).
Diagnoses/Control Treatment:

Disease can be diagnosed by culture or nucleic acid amplification tests (NAAT). Polymerase chain reaction (PCR) is also being used to screen for infection. Serology is not useful in diagnosing. Sexually active women with multiple partners should test for STDs every year. *N. gonorrhoeae* has been developing resistance to antibiotic drugs that have been used for treatment (5). Monitoring resistance of antibiotics is critical as the antimicrobial susceptibility patterns of *N. gonorrhoeae* change rapidly. Resistance has commonly been seen against penicillin, tetracycline, and fluoroquinolones (3). Treatment using dual therapy of ceftriaxone and azithromycin is now the only remaining antibiotic recommended for first line of treatment. Vaccine trials against *N. gonorrhoeae* have been unsuccessful. Prevention relies strictly on safer sex practices or treatment as soon as infection is identified to avoid spread of infection (1).

Current Information:

Gonorrhoae is the second most common disease in the United States. *N. gonorrhoeae* continues to evolve and there are limited antibiotics used to treat it. In 2009, National reported rates of gonorrhea reached an extreme low of 98 (1 case per 100,000 population). Since then cases drastically increased each year. In 2015, almost 395,216 cases were reported (123.9 cases per 100,000 population) (1).

World Health Organization reported that an estimated 78 million new cases had occurred with highest prevalence in Western Pacific and African Regions. Out of the total 498.9 million global cases of sexually transmitted diseases, 106.1 million cases were *N. gonorrhoeae* (7).

Sources:


