

ANTIBIOTIC SENSITIVITY TEST (AST)

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Q.What is an antibiotic sensitivity test?

i)Antibiotics are medicines used to fight bacterial infections. There are different types of antibiotics. Each type is only effective against certain bacteria. An antibiotic sensitivity test can help find out which antibiotic will be most effective in treating your infection.

ii)The test can also be helpful in finding a treatment for antibiotic-resistant infections.

iii)Antibiotic resistance happens when standard antibiotics become less effective or ineffective against certain bacteria.

iv)Antibiotic resistance can turn once easily treatable diseases into serious, even life-threatening illnesses.

Other names: antibiotic susceptibility test, sensitivity testing, antimicrobial susceptibility test.

Antibiotic sensitivity tests are performed to determine the susceptibility of pathogens to certain types of antibiotics. The result of these tests is called an **antibiogram** which enables the clinician to choose the optimal active antibiotic for chemotherapy and to discard antibiotic which is resistant to pathogens. The sensitivity of pathogens can be determined using the disc diffusion test, dilution test (to determine MIC), E-test, and the break point test. The disc diffusion test is preferred for bacteria that can produce obvious growth after an overnight incubation. Meanwhile, the dilution test is mostly conducted to determine an organism's ability to grow under a certain concentration of antibiotics in a liquid or solid medium. The Etest is read by noting the lowest concentration of antibiotic which prevents the growth. The break point test uses dilution test to determine which strain is resistant or sensitive.

v)Sensitivity testing usually occurs in a medical laboratory, and may be based on culture methods that expose bacteria to antibiotics, or genetic methods that test to see if bacteria have genes that confer resistance.

vi)Culture methods often involve measuring the diameter of areas without bacterial growth, called zones of inhibition, around paper discs containing antibiotics on agar culture dishes that have been evenly inoculated with bacteria.

vii)The minimum inhibitory concentration, which is the lowest concentration of the antibiotic that stops the growth of bacteria, can be estimated from the size of the zone of inhibition.

viii)Antibiotic susceptibility testing has occurred since the discovery of the beta-lactam antibiotic penicillin. Initial methods were phenotypic, and involved culture or dilution.

ix)The test, **an antibiotic impregnated strip**, has been available since the 1980s, and genetic methods such as polymerase chain reaction (PCR) testing have been available since the early 2000s. Research is ongoing into improving current methods by making them faster or more accurate, as well as developing new methods for testing, such as microfluidics.

Q.What is it used for?

i)An antibiotic sensitivity test is used to help find the best treatment for a bacterial infection. It may also be used to find out which treatment will work best on certain fungal infections.

ii)One needs this test if the infection that has been shown to have antibiotic resistance or is otherwise hard to treat. These include tuberculosis, MRSA (Methicillin-resistant *Staphylococcus aureus* infection is caused by a type of staph bacteria that's become resistant to many of the antibiotics used to treat ordinary staph infections), and *C. diff* (*Clostridium difficile* (klos-TRID-e-um dif-uh-SEEL), also known as Clostridioides difficile and often referred to as *C. difficile* or *C. diff*, is a bacterium that can cause symptoms ranging from diarrhea to life-threatening inflammation of the colon.).

iii)One may also need this test for bacterial or fungal infection that is not responding to standard treatments.

In clinical medicine, antibiotics are most frequently prescribed on the basis of a person's symptoms and medical guidelines. This method of antibiotic selection is called empiric therapy, and it is based on knowledge about what