Human Immunodeficiency Virus (HIV) Diagnosis

Human immunodeficiency virus (HIV) infection is caused by an RNA retrovirus and leads to immunosuppression. Diagnosis of an HIV infection is determined by assessing a fourth-generation HIV-1/2 antigen/antibody immunoassay along with a confirmatory HIV-1/2 antibody differentiation immunoassay. HIV RNA is determined by qualitative testing with nucleic acid testing (NAT) or by quantitative testing with a viral load measurement. Viral load is also used to determine the disease progression and effectiveness of therapy for patients with HIV. In neonates, a polymerase chain reaction (PCR) test is utilized to determine the presence of HIV.



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HIV-1/2 Antigen/Antibody Immunoassay

HIV Band-AID Ant-gem/Ant-body Moon-essay

HIV-1/2 antigen/antibody immunoassay testing is performed in combination with HIV-1/2 antibody differentiation immunoassay in a patient with a suspected HIV infection. A negative result indicates an HIV infection is not present and no further testing is needed. Immunosorbent assay (ELISA) may be used as the initial test for determining HIV. However, fourth-generation HIV-1/2 antigen/antibody immunoassay testing is able to determine HIV p24 antigen as well as HIV antibodies, unlike third-generation ELISA testing which only determines HIV antibodies.

HIV-1/2 Antibody Differentiation Immunoassay

HIV Band-AID Ant-body Differentiating Moon-essays

HIV-1/2 antibody differentiation immunoassay testing confirms a positive HIV-1/2 antigen/antibody immunoassay and determines if a patient has HIV-1, HIV-2, or both. The antibody differentiation assay is preferred over Western blot for confirmatory testing which has been used in the past to confirm a positive ELISA test.

Nucleic Acid Testing (NAT)

Nuclear Acidic-lemon Test-tubes

If the HIV-1/2 antibody/antigen immunoassay is positive and the HIV-1/2 antibody differentiation immunoassay is inconclusive, a nucleic acid testing (NAT) is performed. A negative NAT test in the setting of inconclusive HIV-1/2 antibody immunoassay indicates a false positive HIV-1/2 antibody/antigen immunoassay.

Viral Load

Virus Load Tested

Viral load testing is used to determine the amount of RNA in the patient's plasma. The level of the patient's viral load helps determine the progression of HIV and effectiveness of therapy for HIV (refer to the Picmonic on "HIV Stages"). If the patient's viral load is considered "undetectable," the test is unable to report the viral load but does not indicate the virus has been eliminated.

Polymerase Chain Reaction (PCR) in Neonates

Polly-mirror with Chain Reacting to Neon-natal-baby

A pregnant woman with HIV infection may transplacentally transmit the virus to the newborn. The polymerase chain reaction (PCR) test is performed on a neonate’s blood whose mother has an HIV infection in order to determine the presence of HIV-1 DNA. This test differentiates between the mother's HIV antibodies and the actual presence of HIV-1 DNA in the newborn.

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