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Perspective

Types of assays used for blood screening

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OVERVIEW

The main objective of blood screening is used to detect markers of infection in order to prevent the release of infected blood and blood components for clinical use. Blood screening strategies are designed to assure the safety of blood units, but should not be used for notifying blood donors of reactive test results. The appropriate confirmatory testing strategy for blood donor management should be applied before notifying donors of their infectivity status. The results of all tests performed for infection markers for TTIs and blood group serology should be evaluated when making final decisions on the release of blood units for therapeutic use.

Types

Immunoassays: Immunoassays plays an important role in various bio analytical settings, such as clinical diagnostics, biopharmaceutical analysis, environmental monitoring, security, and food testing. During 1995–2017, a wide range of IAs has been developed to provide the quantitative, semi quantitative, or qualitative detection of analyses. The precise early-stage detection of analyses is an essential requirement for all bio analytical settings to effectively monitor and manage the quality of the biopharmaceutical drugs, foods, and environment. It is even more critical to effectively diagnose, monitor, and manage the patients' health. Considering the prominent role that IAs plays in the clinical decision-making, they are indispensable for healthcare settings.

Enzyme immunoassays: Enzyme Linked Immunosorbent Assays (ELISA), also known as enzyme immunoassays, are tests designed to detect antigens or antibodies by producing an enzyme triggered colour change. All of the EIAs performed in the Diagnostic Serology Section are known as solid-phase assays.

Chemiluminescent immunoassays: Chemiluminescence immunoassay is an assay that combines chemiluminescence technique with immunochemical reactions. Similar with other labelled immunoassays (RIA, FIA, ELISA), CLIA utilize chemical probes which could generate light emission through chemical reaction to label the antibody.

Hemagglutination: Hemagglutination is used for the diagnosis of some enveloped viruses such as influenza viruses. This method relies on the specific feature of some enveloped viruses that can adsorb to Red Blood Cells (RBCs). The principle behind the hemagglutination test is that the nucleic acids of viruses encode proteins, such as hemagglutinin, that are expressed on the surface of the virus.

Rapid/simple single-use assays: Rapid/simple single-use assays are discrete, individual, disposable assays. They are used once and discarded. These assays exist in a number of different presentations.

Nucleic acid amplification technology assays: A Nucleic Acid Amplification Test, or NAAT, is a type of viral diagnostic test for SARS-CoV-2, the virus that causes COVID-19. NAATs detect genetic material (nucleic acids). NAATs for SARS-CoV-2 specifically identify the RNA (ribonucleic acid) sequences that comprise the genetic material of the virus.

NAATs for SARS-CoV-2 test specimens from either the upper or lower respiratory tract. The type of specimen collected when testing for SARS-CoV-2 is based on the test being performed and the manufacturer's instructions. See CDC's Collecting and Handling of Clinical Specimens for COVID-19 Testing.

The NAAT procedure works by first amplifying or making many copies of the virus's genetic material, if any is present in a person's specimen. Amplifying those nucleic acids enables NAATs to detect very small amounts of SARS-CoV-2 RNA in a specimen, making these tests highly sensitive for diagnosing COVID-19. In other words, NAATs can reliably detect small amounts of SARS-CoV-2 and are unlikely to return a false-negative result of SARS-CoV-2.

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