Serology Encyclopedia Article

Serology

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Serology

Serology is the study of antigen-antibody reactions outside of a living organism (i.e., *in vitro*, in a laboratory setting). The basis of serology is the recognition of an **antigen** by immune mechanisms, with the subsequent production of an **antibody**.

In medical terminology, serology refers to a blood test to detect the presence of antibodies against a microorganism. The detection of antibodies can be qualitative (i.e., determining whether the antibodies are present) or quantitative (i.e., determining the quantity of an antibody produced). Some **microorganisms** can stimulate the production of antibodies that persist in a person's blood for a long time. Thus, in a qualitative assay the detection of a particular antibody does not mean that the person has a current infection. However, it does mean that it is likely that at some time that person was infected with the particular microbial pathogen. Serology assays can be performed at various times and the level of antibody determined. If the antibody level rises, it usually is indicative of a response to an infection. The body produces elevated amounts of the antibody to help fight the challenging antigen.

Serology as a science began in 1901. Austrian American immunologist **Karl Landsteiner** (1868-1943) identified groups of red blood cells as A, B, and O. From that discovery came the recognition that cells of all types, including blood cells, cells of the body, and microorganisms carry proteins and other molecules on their surface that are recognized by cells of the **immune system**. There can be many different antigens on the surface of a microorganism, with many different antibodies being produced.

When the antigen and the antibody are in suspension together, they react together. The reaction can be a visible one, such as the formation of a precipitate made up of a complex of the antigen and the antibody. Other serology techniques are agglutination, complement-fixation and the detection of an antigen by the use of antibodies that have been complexed with a fluorescent compound.

Serological techniques are used in basic research, for example, to decipher the response of immune systems and to detect the presence of a specific target molecule. In the clinical setting, serology is used to confirm infections and to type the blood from a patient. Serology has also proven to be very useful in the area of forensics, where blood typing can be vital to establishing the guilt or innocence of a suspect or the identity of a victim.