ELISA (enzyme-linked immunosorbent assay) is a method used to quantitatively detect an antigen within a sample. An antigen is a toxin or other foreign substance, for example a flu virus or environmental contaminant, that causes the vertebrate immune system to mount a defensive response. The range of potential antigens is vast, so ELISAs are used in many areas of research and drug discovery on a wide variety of sample types. Cell lysates, blood samples, food items, and more can be analyzed for specific substances of interest using ELISAs.

Workflow of an ELISA protocol

1. Capture antibody binds to wells
   - First, the capture antibody is bound to the bottom of the microplate well.

2. Add sample
   - Sample is added to the well and antigen within the sample binds to the capture antibody.

3. Wash microplate
   - Unbound material is washed away, leaving only the antigen of interest and minimizing the potential for high background signal.

4. Add detection antibody
   - Enzyme-conjugated detection antibody binds to a second site on the antigen of interest, providing the means to detect the antigen.

5. Wash microplate
   - Unbound antibodies are washed away, leaving only those specific for the target of interest and again minimizing the potential for background signal.

6. Add substrate
   - Substrate is converted by the enzyme on the detection antibody, producing a color change, with intensity proportional to the amount of antigen present.

7. Calculate results
   - The amount of antigen in each sample is calculated, and different samples—for example, cells subjected to different treatment conditions—can be compared.

References

Today—ELISA is used to test for antibodies of SARS-CoV-2 (COVID-19) in response to a global pandemic causing the complete shutdown of multiple countries.