



An overview of ELISA and PCR

Disease prevention, control, and eradication

Protecting livestock and poultry operations starts with routine monitoring. Veterinarians and producers rely on both enzyme-linked immunosorbent assay (ELISA) and real-time polymerase chain reaction (PCR) testing for specific reasons at specific times.

Results are used to:

- Identify infected animals in eradication programs.
- Conduct surveillance of transmitting agents in transport vehicles.
- Confirm negative status of export animals.
- Select effective treatments.
- Detect emerging diseases early.
- Verify effectiveness of vaccination.

Use ELISA to:

- Confirm that herds are free from important pathogens.
- Assess the progression of a herd through pathogen elimination.
- Manage herds with endemic disease to reduce the impact of disease on health and production.

Use PCR to:

- Identify the DNA or RNA of a given disease agent.
- Determine the status of animals with clinical signs or symptoms.
- Assess the status of animals intentionally exposed to a pathogen for acclimation.

Use ELISA and PCR together to:

- Confirm exposure to a pathogen in low-prevalence herds.
- Identify DNA or RNA of disease agents when clinical signs are lacking.
- Clarify disease cause when concerned about misdiagnosis or when multiple agents are present.

Designing your programs, choosing your tests

IDEXX will work with you to design and implement your programs. Our instruments and software provide reliable results for more than 50 of the most prevalent livestock and poultry diseases. Furthermore, global distribution and manufacturing, backed by expert technical service and international regulatory expertise, ensure a prompt response wherever you do business. For a complete overview about IDEXX's diagnostic offering, please refer to the product list.

PCR testing principle

PCR is used to exponentially amplify a target DNA sequence of interest, which results in billions of copies of the target DNA in the sample (figure 1).

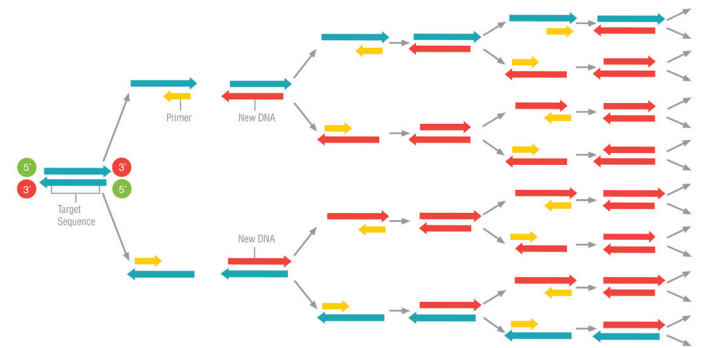


Figure 1. Illustration of DNA amplification by PCR

After each real-time PCR cycle, the fluorescence is measured from each sample well. The fluorescence curve and Ct-value indicate a positive sample, whereas a negative sample emits no fluorescence (figure 2).

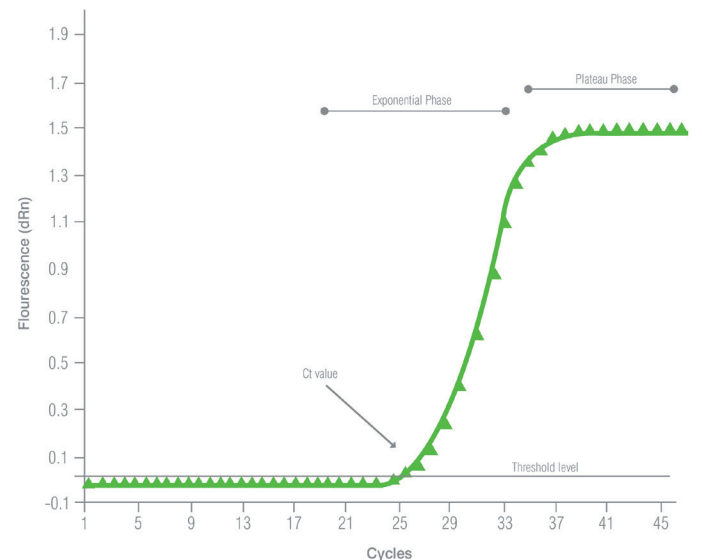


Figure 2. A positive result by PCR

ELISA formats

ELISAs are divided into three main formats—indirect, blocking (competitive), and antigen-capture (direct).

Indirect format: In the indirect format (figure 3), the sample antibody is sandwiched between the antigen coated on the plate and an enzyme-labeled, anti-species globulin conjugate. The addition of an enzyme substrate-chromogen reagent causes color to develop. This color is directly proportional to the amount of bound sample antibody. The more antibody present in the sample, the stronger the color development in the test wells. This format is suitable for determining total antibody level in samples.

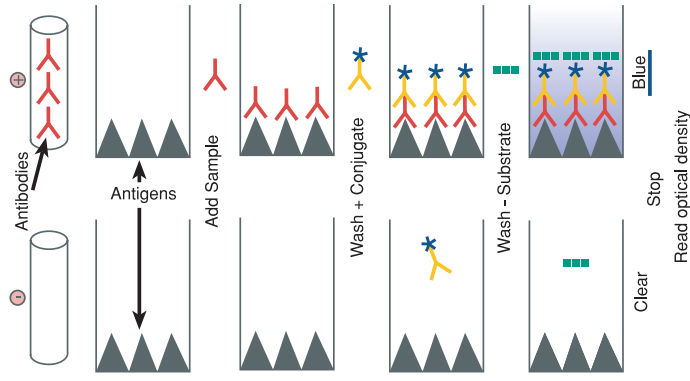


Figure 3. Steps in indirect ELISA

Blocking (competitive) format: In this format (figure 4), the specific sample antibodies compete with, or block, the enzyme-labeled, specific antibody in the conjugate. The addition of an enzyme substrate-chromogen reagent causes color to develop. This color is inversely proportional to the amount of bound sample antibody. The more antibodies present in the sample, the less color development in the test wells.

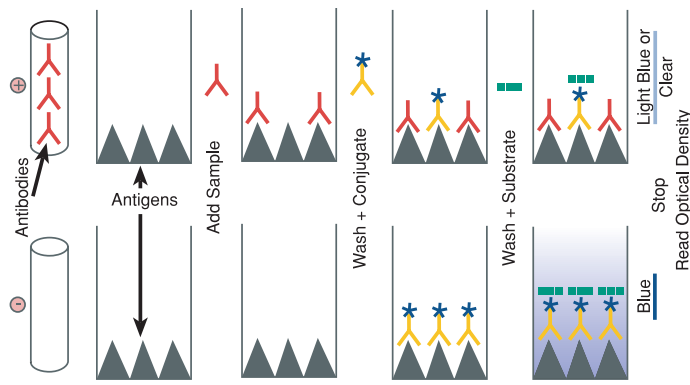


Figure 4. Steps in blocking ELISA

Antigen-capture (direct) format: In the antigen-capture format, the antigen in the sample is sandwiched between antibodies coated on the plate and an enzyme-labeled conjugate. The antibody conjugate can be either monoclonal or polyclonal. The addition of an enzyme substrate-chromogen reagent causes color to develop. This color is directly proportional to the amount of the target antigen present in the sample.

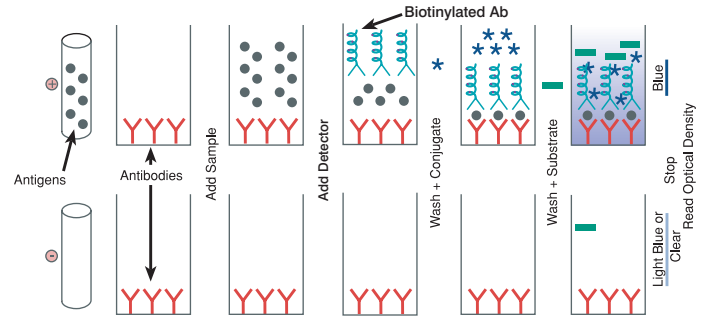


Figure 5. Steps in antigen-capture ELISA

Ask your IDEXX representative for Module 2 to learn disease-specific strategies.

Test with Confidence™

