

## Coagulase

Coagulases are enzymes that clot blood plasma by a mechanism that is similar to normal clotting. Although coagulase activity is not required for pathogenicity, this enzyme is a good indicator of the pathogenic potential of *Staphylococcus aureus*. Coagulase producing staphylococci (termed **coagulase positive**) form a fibrin clot around themselves and avoid attack by the host's defenses. The presence of coagulase can therefore be considered a virulence factor. In the coagulase test, coagulase-positive staphylococci will cause the plasma to clot by using coagulase to initiate the clotting cascade. Citrate and EDTA are usually added to blood plasma to act as anticoagulants and prevent false-positive results. Cultures should be considered **coagulase negative** if they are unclotted after 4 hours.

### Procedure:

To demonstrate the presence or absence of Coagulase activity we will use *Staphylococcus aureus* and *Staphylococcus epidermidis* as the test organisms. **Caution: *Staphylococcus aureus* is a known pathogen. Wash hands thoroughly with disinfectant soap and wipe down bench with Amphyl disinfectant immediately after use. Use proper aseptic technique when making culture transfers. Your instructor will demonstrate the coagulase test for you.**

### First Period:

#### Tube Test:

1. Add 0.5 ml of citrated rabbit plasma to two small test tubes. With a marker, label the tubes with the respective bacteria.
2. Inoculate one tube with enough *S. aureus* growth to make a cloudy suspension. Inoculate the other tube with *S. epidermidis*
3. Incubate the tubes for 1- 4 hours at 35 °C.

A positive coagulase test is represented by any degree of clotting, from a loose clot suspended in plasma to a solid clot (Fig. 6-22 of the Atlas, p. 52).

#### Slide Test:

In the slide test, bacteria are transferred to a slide containing a small amount of plasma. Clotting may be observed within one to two minutes (Fig. 6-23 of the Atlas, p. 52). A negative slide coagulase test is usually confirmed by conducting the tube coagulase test since some test strains may not react in the slide test. Each test complements the other.