NORDIC BIOMARKER

Optical Interferences – and How to Reduce Them

Many substances in the human plasma sample to be analyzed can interfere with the actual analysis and cause false results. Some interfering substances act by binding specifically to the some part of the measurement system (e.g. antigen or antibody), whereas other interfering substances change the optical signal non-specifically without any binding.

The most common optically interfering substances in latex immunoassays are hemoglobin, bilirubin and lipids. These are well known because they often exist in patient plasma samples in concentrations high enough to cause a problem. They interfere with the measurement simply by obstructing the optical system of the instrument used. As these substances absorb light at the same wavelengths that coagulation and clinical instrument often use, the increase absorbance may cause false negatives, false positives, or just decreased system precision; the exact effect will depend on how the instrument is designed.

There are some ways to reduce the problems arising these from interfering substances. The first is to design latex immunoassays that only use a very small portion of plasma in the measuring cuvette; this may be possible if the natural concentration of the analyte is high. If the sample volume is low, the amount of interfering substances brought into the cuvette will also be low.

Another way to reduce the problem is to use higher wavelengths. Hemoglobin, bilirubin and lipids all absorb more at lower wavelengths (400–600 nm). Therefore, if you have an instrument with multiple wavelengths, use higher wavelengths (600–800 nm).

A third way to reduce the problem is to at least get a warning from the instrument, if the absorbance it too high. This is possible with many newer instruments.