



## Biomarkers to Monitor Alcohol Abstinence

**Alcohol is the most commonly abused drug, but it is also the most difficult drug to monitor abstinence.**

Measurement of alcohol in blood, breath and urine has been the standard for monitoring consumption of, and impairment from alcohol for a number of years. All three are still commonly used, but they suffer from a very short window of detection, usually less than 12-14 hours. Interpretation of alcohol levels in urine is also complicated by the possible formation of alcohol by fermentation from sugars, especially in individuals with diabetes. Measurement of breath alcohol concentration (BAC) requires special equipment and trained technologist to perform the test.

There are a number of biomarkers that are used to monitor abstinence from alcohol use. **Indirect biomarkers**, indicators of pathophysiological changes resulting from heavy use of alcohol, such as liver enzymes (AST, ALT, and GGT) and alterations in red blood cell size (MCV) have been traditionally used, but they suffer from being non-specific and not very sensitive and require the collection of blood samples. **Direct biomarkers** are metabolic byproducts of alcohol metabolism, and are currently in common use. They are generally very specific and very sensitive to the use of even very small quantities of alcohol.

**Ethylglucuronide (EtG)** and **Ethylsulfate (EtS)** have emerged as direct biomarkers that are both specific and sensitive to alcohol exposure and may be detected, depending on the frequency and quantity of consumption, in urine up to 72-96 hours after exposure to alcohol. The EtG and EtS biomarkers are extremely sensitive and may be subject to positive results from incidental exposure to common household products that contain alcohol such as hand sanitizers and mouth wash. The use of appropriate cutoff values will minimize positive results from incidental exposure.

**Norchem** has available both EIA screening and LC/MS/MS confirmatory tests for EtG and EtS. The screening test for EtG uses a recommended positive cutoff of 500 ng/mL and the confirmatory LC/MS/MS test uses a 500 ng/mL cutoff for EtG and 100 ng/mL for EtS. The probability of a positive confirmatory result from incidental exposure is extremely low when the 500/100 ng/mL cutoffs are utilized.

It should be noted that a small percentage, approximately 6-8 %, of samples that screen positive for EtG by the EIA will not confirm positive by the LC/MS/MS method. These False Positive results are related to the immunologic method used in the screening test. Because false positive results do occur with the screening test, it is **strongly recommended** that all positive screening results be confirmed with the EtG/EtS confirmatory test. There are **NO False Positive results** with the confirmatory test. False negative results are extremely rare with the EtG screening test. EtG and EtS results are legally defensible.

For further information regarding testing for alcohol biomarkers please contact **Norchem** Client Services or Dr. Bert Toivola, Scientific Director.