



## $\beta$ -Hydroxybutyrate

Effective June 14, 2017, Laboratory Alliance of Central New York will offer serum and plasma  $\beta$ -Hydroxybutyrate testing in our rapid response laboratories. This test replaces the serum and plasma ketones test currently available, which detects primarily acetoacetic acid.

Ketone values provide information about impending or present ketoacidosis and ketotic states due to diabetes, alcohol poisoning, or other conditions. Ketosis is a common feature in metabolic disequilibria and is a symptom, not a disease. It may indicate problems from diabetes, malnutrition, or alcoholism. Of the three ketone bodies (acetoacetate, acetone, and  $\beta$ -hydroxybutyrate),  $\beta$ -hydroxybutyrate ordinarily is present in the greatest concentration. It accounts for approximately 75% of the three ketone bodies. During periods of ketosis, the ratio of  $\beta$ -hydroxybutyrate-to-acetoacetate increases to 7-10:1<sup>1</sup>.

Ketone levels have historically been evaluated by testing for acetoacetate because of readily available chemical methods. Blood acetoacetate concentration can be determined by gas chromatography but this method is not practical because it is complicated, lengthy, and requires specialized instrumentation and highly trained operators. Semiquantitative methods for the determination of acetoacetate (e.g., dipstick) are fast and convenient but not optimal for blood samples<sup>5</sup>; these methods are more suitable for urine samples.

Blood  $\beta$ -Hydroxybutyrate determination has been found to be the best means of evaluating ketone levels for the diagnosis of ketoacidosis for a variety of reasons including higher specificity<sup>2</sup>, better overall accuracy<sup>4</sup>, and others<sup>3</sup>. In diabetics, the measurement of  $\beta$ -hydroxybutyrate as well as blood glucose is needed for the assessment of the severity of diabetic coma and is essential for the exclusion of hyperosmolar, non-ketotic diabetic coma. In addition, blood  $\beta$ -hydroxybutyrate concentration is a more sensitive indicator of a patient's response to insulin therapy than urinary ketone levels, and insulin requirements are often based on the extent of the existing hyperketonemia as indicated by the blood concentration of  $\beta$ -hydroxybutyrate.

Quantitative  $\beta$ -Hydroxybutyrate testing will be performed at each of our rapid response labs using the Stanbio STAT-Site® M <sup>$\beta$ -HB</sup> reader and test strips. Requests for testing on non-hospital patients will be transported to one of our performing sites.

<b>Order code:</b>	BHB
<b>Method:</b>	Reflectance photometry
<b>Specimen Requirements:</b>	One gold top or light green top tube 0.5 mL serum or lithium heparin plasma, (0.1 mL minimum).
<b>Stability:</b>	Ambient: 2 hours, Refrigerated: 7 days
<b>Storage and Transport:</b>	Refrigerated
<b>Schedule of Testing:</b>	Daily
<b>Billing Code:</b>	1010576
<b>CPT Code:</b>	82010

## References

1. Laffel L. Ketone bodies: a review of physiology, pathophysiology and application of monitoring to diabetes. *Diabetes Metab Res Rev.* 1999 Nov-Dec. 15(6):412-26.
2. Arora S, Henderson SO, Long T, Menchine M. Diagnostic accuracy of point-of-care testing for diabetic ketoacidosis at emergency-department triage: beta-hydroxybutyrate versus the urine dipstick. *Diabetes Care.* 2011 Apr. 34(4):852-4.
3. Taboulet P, Haas L, Porcher R, Manamani J, Fontaine JP, Feugeas JP. Urinary acetoacetate or capillary beta-hydroxybutyrate for the diagnosis of ketoacidosis in the Emergency Department setting. *Eur J Emerg Med.* 2004 Oct. 11(5):251-8.
4. Taboulet P, Deconinck N, Thurel A, Hass L, Manamani J, Porcher R, Schmit C, Fontaine JP, Gautier JF. Correlation between urine ketones (acetoacetate) and capillary blood ketones (3-beta-hydroxybutyrate) in hyperglycaemic patients. *Diabetes Metab.* 2007 Apr. 33(2):135-9.
5. Comstock JP, Garber AJ. Ketonuria. In: Walker HK, Hall WD, Hurst JW, eds. *Clinical Methods: The History, Physical, and Laboratory Examinations.* 3<sup>rd</sup> edition. Boston: Butterworths; 1990. Chapter 140; p658-661.

Questions regarding these tests may be directed to Cheryl Haskins, MS, MT(ASCP)SC, Manager of Chemistry and Referral Testing, at 315-410-7014 or [cherylhaskins@lacny.com](mailto:cherylhaskins@lacny.com).