Ketone Bodies In The Urine

Urinalysis asparagus. Macroscopic examination targets parameters such as color, clarity, odor, and specific gravity; urine test strips measure chemical properties such as pH, glucose concentration, and protein levels; and microscopy is performed to identify elements such as cells, urinary casts, crystals, and organisms. The urine of diabetics experiencing ketoacidosis (urine containing high levels of ketone bodies) may have a fruity or sweet smell, while urine from Urinalysis, a portmanteau of the words urine and analysis, is a panel of medical tests that includes physical (macroscopic) examination of the urine, chemical evaluation using urine test strips, and microscopic examination d7d32158f9

== Structure == d7d32158f9 == References == d7d32158f9 == Nomenclature and etymology == d7d32158f9

Urine test strip not corrected, acidosis and in the end diabetic coma. The three ketone compounds appear in different proportions in the urine, although these proportions A urine test strip or dipstick is a basic diagnostic tool used to determine pathological changes in a patient's urine in standard urinalysis d7d32158f9

Ketone bodies Ketone bodies Ketone bodies are water-soluble molecules or compounds that contain the ketone groups produced from fatty acids by the liver (ketogenesis) Ketone bodies are water-soluble molecules or compounds that contain the ketone groups produced from fatty acids by the liver (ketogenesis). These liver-derived ketone groups include acetoacetic acid (acetoacetate), beta-hydroxybutyrate, and acetone, a spontaneous breakdown product of acetoacetate (see graphic). Ketone bodies are readily transported into tissues outside the liver, where they are converted into acetyl-CoA (acetyl-Coenzyme A) – which then enters the citric acid cycle (Krebs cycle) and is oxidized for energy d7d32158f9

== Signs and symptoms == d7d32158f9

Ketosis Physiological ketosis is a normal response to low glucose availability. 5 and 3. This contrasts with ketoacidosis, an uncontrolled production of ketones that occurs in pathologic states and causes a metabolic acidosis, which is a medical emergency. Physiological ketosis is a normal response to low glucose availability. In physiological ketosis, ketones in the Ketosis is a metabolic state characterized by elevated levels of ketone bodies in the blood or urine. ketone bodies in the blood or urine. In physiological ketosis, ketones in the blood are elevated above baseline levels, but the body's acid–base homeostasis is maintained. 0 millimolar (mM) in physiological ketosis, while ketoacidosis may cause blood concentrations greater than 10 mM. Ketone levels can be measured in blood, urine or breath and are generally between 0. Ketoacidosis is most commonly the result of complete insulin deficiency in type 1 diabetes or late-stage type 2 diabetes d7d32158f9

It is seen in conditions in which the body produces excess ketones as an indication that it is using an alternative source of energy. It is seen during starvation or more commonly in type 1 diabetes mellitus. Production of ketone bodies is a normal response to a shortage of glucose, meant to provide an alternate source of fuel from fatty acids. d7d32158f9 The derived... d7d32158f9 There are five main... d7d32158f9 == Background == d7d32158f9

Exogenous ketone Exogenous ketones are a class of ketone bodies that are ingested using nutritional supplements or foods. This class of ketone bodies refers mainly to β-hydroxybutyrate Exogenous ketones are a class of ketone bodies that are ingested using nutritional supplements or foods. However, with the introduction of exogenous ketone supplements, it is possible to provide a user with an instant supply of ketones even if the body is not within a state of ketosis before ingestion. The body can make BHB endogenously, via the liver, due to starvation, ketogenic diets, or prolonged exercise, leading to ketosis. This class of ketone bodies refers mainly to β-hydroxybutyrate [BHB] d7d32158f9

Maple syrup urine disease It particularly affects the metabolism of amino acids leucine, isoleucine, and valine. syrup urine disease (MSUD) is a rare, inherited metabolic disorder that affects the

body's ability to metabolize amino acids due to a deficiency in the activity Maple syrup urine disease (MSUD) is a rare, inherited metabolic disorder that affects the body's ability to metabolize amino acids due to a deficiency in the activity of the branched-chain alpha-ketoacid dehydrogenase (BCKAD) complex. With MSUD, the body is not able to properly break down these amino acids, therefore leading to the amino acids to build up in urine and become toxic. The condition gets its name from the distinctive sweet odor of affected infants' urine and earwax due to the buildup of these amino acids d7d32158f9

The test strips consist of a ribbon made of plastic or paper of about 5 millimetre wide. Plastic strips have pads impregnated with chemicals that react with the compounds present in urine producing a characteristic colour. For the paper strips the reactants are absorbed directly onto the paper. Paper strips are often specific to a single reaction (e.g. pH measurement), while the strips with pads allow several... d7d32158f9 Maple syrup urine disease can be classified by its pattern of signs and symptoms or by its genetic cause. The most common and severe form of this disease is the classic type, which appears soon after birth, and as long as it remains untreated, gives rise to progressive and unremitting symptoms. Variant forms of the disorder may become apparent only later in infancy or childhood, with typically less severe symptoms that may only appear during times of fasting, stress, or illness, but still involve mental and physical problems if left untreated. d7d32158f9 The word ketone is derived from Aketon, an old German word for acetone. d7d32158f9 Ketone bodies are produced by the liver during periods of caloric restriction of various scenarios: low food intake (fasting), carbohydrate restrictive diets, starvation, prolonged intense exercise, alcoholism, or during untreated (or inadequately treated) type 1 diabetes mellitus. Ketone bodies are produced in liver cells by the breakdown of fatty acids. They are released into the blood after glycogen stores in the liver have been depleted. (Glycogen stores typically are depleted within the first 24 hours of fasting.) d7d32158f9 Ketones are metabolic end-products of fatty acid metabolism. In healthy individuals, ketones are formed in the liver and are completely metabolized so that only negligible amounts appear in the urine. However, when carbohydrates are unavailable or unable to be used as an energy source, fat becomes the predominant body fuel instead of carbohydrates and excessive amounts of ketones are formed as a metabolic byproduct. Higher levels of ketones in the urine indicate that the body is using fat as the major source of energy. d7d32158f9 First described in 1972,there are 34 known people to have been reported in the medical literature with this inborn error of metabolism. They experience attacks of ketoacidosis during illness, and even when well may have elevated levels of ketone bodies in blood and urine (ketonemia and ketonuria, respectively). Not all people with SCOT deficiency have persistent ketonemia and ketonuria, particularly those with milder defects of enzyme activity. d7d32158f9

Ketonuria It is seen in conditions in which the body produces excess ketones as an indication Ketonuria is a medical condition in which ketone bodies are present in the urine. medical condition in which ketone bodies are present in the urine d7d32158f9

Most supplements rely on β-hydroxybutyrate as the source of exogenous ketone bodies. It is the most common exogenous ketone body because of its efficient energy conversion and ease of synthesis. In the body, BHB can be converted to acetoacetic acid. It is this acetoacetic acid that will enter the energy pathway using beta-ketothialase, becoming two Acetyl-CoA molecules. The Acetyl CoA is then able to enter the Krebs cycle in order to generate ATP. The remaining BHB molecules that aren't synthesized into acetoacetic acid are then converted to acetone through the acetoacetate decarboxylase waste mechanism. d7d32158f9

Succinyl-CoA:3-oxoacid CoA transferase deficiency Succinyl-CoA:3-oxoacid CoA transferase catalyzes the transfer of coenzyme A from succinyl-coenzyme A to acetoacetate. It can be caused by mutation in the OXCT1 gene. during illness, and even when well may have elevated levels of ketone bodies in blood and urine (ketonemia and ketonuria, respectively). Not all people with Succinyl-CoA:3-oxoacid CoA transferase deficiency is an inborn error of ketone body utilization d7d32158f9

A standard urine test strip may comprise up to 10 different chemical pads or reagents which react (change color) when immersed in, and then removed from, a urine sample. The test can often be read in as little as 60 to 120 seconds after dipping, although certain tests require longer. Routine testing of the urine with multiparameter strips is the first step in the diagnosis of a wide range of diseases. The analysis includes testing for the presence of proteins, glucose, ketones, haemoglobin, bilirubin,

urobilinogen, acetone, nitrite and leucocytes as well as testing of pH and specific gravity or to test for infection by different pathogens. d7d32158f9

Ketone Ketones contain a carbonyl group −C(=O)− (a carbon-oxygen double bond C=O). Many ketones are of great importance in biology and industry. A ketone derived from an alkane is an alkanone. Examples include many sugars (ketoses), many steroids, e. , testosterone, and the solvent acetone. In organic chemistry, a ketone /ˈkiːtoʊn/ is an organic compound with the structure R−C(=O)−R', where R and R' can be a variety of carbon-containing substituents In organic chemistry, a ketone is an organic compound with the structure R−C(=O)−R', where R and R' can be a variety of carbon-containing substituents. g. The simplest ketone is acetone (where R and R' are methyl), with the formula (CH3)2CO d7d32158f9

Ketone bodies that commonly appear in the urine when fats are burned for energy are acetoacetate and beta-hydroxybutyric acid. Acetone is also produced and is expired by the lungs. Normally, the urine should not contain a noticeable... d7d32158f9 The symptoms of ketoacidosis are variable depending on the underlying cause. The most common symptoms include nausea, vomiting, abdominal pain, and weakness. Breath may also develop the smell of acetone as it is a volatile ketone that can be exhaled. Rapid deep breathing, or Kussmaul breathing, may be present to compensate for the metabolic acidosis. Altered mental status is more common in diabetic than alcoholic ketoacidosis. d7d32158f9 When two acetyl-CoA molecules lose their -CoAs (or coenzyme A groups), they can form a (covalent) dimer called acetoacetate. β-hydroxybutyrate is a... d7d32158f9 According to the rules of IUPAC nomenclature, ketone names are derived by changing the suffix -ane of the parent alkane to -anone. Typically, the position of the carbonyl group is denoted by a number, but traditional nonsystematic names are still generally used for the most important ketones, for example acetone and benzophenone. These nonsystematic names are considered retained IUPAC names, although some introductory chemistry textbooks use systematic names such as "2-propanone" or "propan-2-one" for the simplest ketone (CH3−C(=O)−CH3) instead of "acetone". d7d32158f9 Trace levels of ketones are always present in the blood and increase when blood glucose reserves are low and the liver shifts from primarily metabolizing carbohydrates to metabolizing fatty acids. This occurs during states of increased fatty acid oxidation such as fasting, carbohydrate restriction, or prolonged exercise. When the liver rapidly metabolizes fatty acids into acetyl-CoA, some acetyl... d7d32158f9 == Classification == d7d32158f9

Ketoacidosis The most common cause of ketoacidosis is diabetic ketoacidosis but it can also be caused by alcohol, medications, toxins, and rarely, starvation. While ketosis refers to any elevation of blood ketones, ketoacidosis is a specific Ketoacidosis is a metabolic state caused by uncontrolled production of ketone bodies that cause a metabolic acidosis. While ketosis refers to any elevation of blood ketones, ketoacidosis is a specific pathologic condition that results in changes in blood pH and requires medical attention. uncontrolled production of ketone bodies that cause a metabolic acidosis d7d32158f9

== Pathophysiology == d7d32158f9

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