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17/MHS01/042

MBBS/MHS

MEDICAL BIOCHEMISTRY

1.A. **Ketogenesis**:  is the biochemical process through which organisms produce ketone bodies through breakdown of fatty acids and ketogenic amino acids. This process supplies energy under circumstances such as fasting or caloric restriction to certain organs, particularly the brain, heart and skeletal muscle. The body is constantly producing small amounts of ketone bodies that can make 22 ATP each in normal circumstances, and it is regulated mainly by insulin. In a state of ketosis, ketone body production is increased when there are decreased carbohydrates or increased fatty acids. However, ketoacidosis can occur if too many ketone bodies accumulate, such as in cases uncontrolled diabetes.

B. Ketonaemia: This the presence of an abnormally high concentration of ketone bodies in the blood.

C. Ketonuria is a medical condition in which high levels of ketone bodies are present in the urine. 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.

**2. Consequences of ketosis**.

Ketosis is a metabolic process. When the body does not have enough glucose for energy, it burns stored fats instead. This results in a buildup of acids called ketones within the body. Ketosis also commonly occurs in people with [diabetes](https://www.medicalnewstoday.com/info/diabetes/), as the process can occur if the body does not have enough [insulin](https://www.medicalnewstoday.com/info/diabetes/whatisinsulin.php) or is not using insulin correctly.

In the beginning of ketosis, you may experience a range of negative symptoms.

These may include:

* Headache.
* Fatigue.
* Brain fog.
* Increased hunger.
* Poor sleep.
* Nausea.
* Decreased physical performance.

**Ketosis May Cause Digestive Problems;** Constipation is a very common side effect of ketosis. Diarrhea may also occur in some people.

**Elevated Heart Rate****;** A ketogenic diet can increase heart rate in some people, but staying hydrated and increasing your salt intake may help.

**Bad Breath Is Also Common;** It's caused by acetone, a ketone that is a byproduct of fat metabolism. Blood acetone levels are elevated in ketosis, and your body gets rid of some of it via your breath .

**Other Side Effects of Ketosis;**

Other, less common side effects may include:

* **Ketoacidosis:** A few cases of ketoacidosis (a serious condition that occurs in uncontrolled diabetes) have been reported in breastfeeding women, likely triggered by a very low-carb diet. However, this is extremely rare .
* **Kidney stones:** Although uncommon, some epileptic children have developed kidney stones on a ketogenic diet .
* **Raised cholesterol levels:** Some people get increased total and low-density lipoprotein (LDL) [cholesterol levels](https://www.healthline.com/nutrition/low-carb-diets-and-cholesterol/).

Less common side effects include issues for breastfeeding women, kidney stones in epileptic children and raised cholesterol levels.

## 3. Management of ketoacidosis.

If you're diagnosed with diabetic ketoacidosis, you might be treated in the emergency room or admitted to the hospital. Treatment usually involves:

* **Fluid replacement:** The initial priority in the treatment of **diabetic ketoacidosis** is the restoration of extra-cellular **fluid** volume through the intravenous administration of a normal saline (0.9 percent sodium chloride) solution.
* **Electrolyte replacement.** The clinical importance of electrolyte levels in the management of diabetic ketoacidosis is the prevention of cardiac arrhythmias. ECG monitoring should be a minimal standard in the management of diabeticketoacidosis. Electrolytes are minerals in your blood that carry an electric charge, such as sodium, potassium and chloride. The absence of insulin can lower the level of several electrolytes in your blood. You'll receive electrolytes through a vein to help keep your heart, muscles and nerve cells functioning normally.
* **Insulin therapy.** Insulin reverses the processes that cause diabetic ketoacidosis. In addition to fluids and electrolytes, you'll receive insulin therapy — usually through a vein. When your blood sugar level falls to about 200 mg/dL (11.1 mmol/L) and your blood is no longer acidic, you may be able to stop intravenous insulin therapy and resume your normal subcutaneous insulin therapy.
* **Dietary supplement.** You should drink more water and sugar-free, non-alcoholic beverages. Good blood sugar control will help you avoid ketoacidosis .Take your medicines as directed. Follow your meal plan closely. Keep up with your exercise program. Test your blood sugar regularly.