



New Era of Low Carbohydrate Diet (LCD) and Ketone Bodies (KB) as Energy Source

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Received date: Sep 19, 2017; Accepted date: Sep 21, 2017; Published date: Sep 28, 2017

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Editorial

Historically speaking, primitive man had evolved to human race, in which they had always fought with hunger for several million years. What did they live on? They could sometimes hunt animals and ate meat, bone, visceral organ and bone marrow. This food consists of protein and fat with less carbohydrate. That is the reason why human body has only insulin that decreases blood glucose.

About 10,000 years ago, agriculture changed our lifestyle. They began to make crops such as rice, wheat, corn which is carbohydrate. As the result, the population on the earth increased explosively, and several civilizations were born where people continued hard work. On 18th century, industrial revolution changed our lifestyle with less manual labors and postprandial hyperglycemia due to refined crops by milling technology. On last 20th century, computerized society made us immobilization tendency.

Consequently, metabolic syndrome became urgent problem. International Diabetes Federation (IDF) summarized the current situation in the world [1-2]. Diabetic prevalence will increase from 8.8% in 2015 to 10.4% in 2040. Top 5 countries are China, India, USA, Brazil, Russian Federation, and high prevalence of 23-35% are observed in Qatar, Kuwait, Saudi Arabia, Micronesia and Marshall island. Taking this situation into consideration, to prevent and treat obesity and diabetes is crucial, where low carbohydrate diet (LCD) is effective for weight reduction and diabetic control [3-5].

It was previously believed that brain can generate energy from only glucose. However, it was proved to be wrong. At present, correct understanding has been spread that KB generates energy at brain and muscles, and KB has important role of human metabolism.

In 1910-1920, fasting therapy with metabolic changes of hormones and free fatty acid (FFA) was studied. It showed beneficial effects for various diseases, probably due to elevated KB [6]. Starvation revealed that β -hydroxybutyrate (3-hydroxybutyric acid, 3-OHBA) replaced glucose as a source of energy with various metabolic changes including a switch in cell fuel from glucose to fatty acids [7-10]. KB inhibits amino acid metabolism and protein turnover in skeletal muscles, which may be survival mechanism during adaptation to catabolic states such as fasting [10-12].

Authors and colleagues have investigated LCD and ketone bodies so far, including remarkable weight reduction by LCD in 2699 cases, improvement of glucose level and Morbus (M) value, and changes of lipids and renal function [13-16]. Furthermore, we clarified the fraction ratio of KB (3-OHBA and Acetoacetate), and extremely elevated KB in fetus, placenta, newborn and mother blood, indicating that KB would have important role of generating energy [13-17].

Concerning diabetic treatment, systematic review in 2012 [18], comment for no one-size-fits-all in 2013 [19] and standard medical care in diabetes in 2015 [20] were valuable. From now, the new era would come to everyone with adequate management of LCD and KB for health [21].

As described above, the study of LCD and KB has been developed and contributed for diabetic research and clinical practice. In other words, new era has come for everyone leading to healthy life in the anti-aging perspective.

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