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The Influence of Carbohydrate in Foods and Beverages for Infants and Adults

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Editorial

When looking back the human history for 7 million years, foods have been mostly the meat and bones of the animals [1]. Their elements were proteins and lipids, and carbohydrate intake was rare. The fight against hunger lasted for long and blood glucose level had been maintained low. During hunting and life-threatening stress, it was necessary to raise blood glucose, but opportunity to lower blood glucose was rare [2].

However, 10,000 years ago, grain cultivation began and spread, and then the population exploded in the world. The first industrial revolution was seen in the 18th century in United Kingdom (UK), and grain refining technology was prevalent. After that, there has been a change in lifestyle, then it has become a modern era of carbohydrate poisoning at present. In this article, recent topics concerning carbohydrate would be described.

Firstly, there is an increase in obesity for children which would be from excessive intake of carbohydrate. In UK, one in five children aged 4-5 years and one in three in 10-11 years are obese or overweight [3]. This rate tends to be higher for children who are brought up in rather disadvantaged backgrounds. There are lots of related factors involved, such as reduced physical activity, maternal pregnancy obesity, psychological, environmental and socioeconomic factors. These are mainly due to imbalanced energy intake and consumption. Recent reports from the UK have highlighted the actual situation that infant food content is not consistent with national recommendations.

The newest report of NHS showed that 29% of adults was classified as obese in 2019, which was increased from 26% in 2016 [3]. Furthermore, 20% of children aged 6 were classified as obese in 2019, where the prevalence became over twice as before. Additional results were that 29% of adults and 18% of children have consumed 5 or more dishes of fruit and vegetables a day.

According to the Public Health England (PHE) in UK, dietary supplements have not been clearly labelled, and have contained more sugar than usual that people can usually expected [4]. By these inappropriate situations for the younger generation, the related foods and drinks will cause obesity and metabolic

disease for present children in the future. The UK government proposed the report "Childhood obesity: Action Plan" and explained the goal (action plan) to control childhood obesity by 2030 [5]. For successful management, forced restrictions on sweet foods and drinks for babies have been required without delay.

Furthermore, there is a meaningful report of the Prevention Vision for Child Health by Royal College of Pediatrics and Child Health (RCPCH) [6]. It would urge the parents to manage a recommendation. It was to feed the children not sugary food, but rather bitter-tasting vegetables. The reason would be to give the children adequate life style of eating habit, and to prevent children from developing sweet tooth. This approach was reported to avoid the caries of the tooth in the children aged 5 years with 25% reducing effect. Moreover, there are benefits of decreased risk of being obese or overweight from the excess intake of sugary food.

In 2018, PHE presented the results of the National Diet and Nutrition Survey (NDNS) [7]. It reported that the average daily intake amount of free sugars was 11.3% in the infants aged 1.5-3 years. As a reference, the Scientific Advisory Committee on Nutrition (SACN) reported the recommendation ratio for this age group [8]. The desirable value would be 5%. Thus, the actual sugar intake in this age group has been twice amount compared with the standard level.

Secondly, carbohydrates have a remarkable impact on various pathologies, even for adults. A recent topic is the relationship between carbohydrate intake and cancer [9]. Recent literature concerning diet, exercise, and other lifestyle factors and cancer risk was summarized by World Cancer Research Fund (WCRF) and American Institute for Cancer Research (AICR) [10]. Among them, epidemiological data identifies associations between aspects of nutrition, diet, physical activity for one or more cancers associated with some evidence. From basic research aspect, Warburg effect has been known as the predominant use of glucose anaerobically by cancer cells [11].

On the other hand, the relationship between sugary beverage and cancer risk has not been so studied. There has been an evidence of influence of sugary beverage to obesity risk [12]. Moreover, sugary beverage has become increased risk of many

cancers [13]. In addition to the obesity and fat pathways, related mechanism concerning sugary beverages and cancer may be from changed glucose variability and insulin resistance. These are influenced also by glucose absorption degree, increased glycemic index, glycemic load and so on [14]. These phenomena have been found in diabetes related cancer [15], liver cell cancer (LCC) [16] and breast cancer [14].

There has been a recent report by the WCRF/AICR [13]. However, epidemiological data concerning sugary beverage and cancer risk were still limited so far. Among them, there are two conflicting reports about the relationship between breast cancer and obesity. One showed the higher risk in post-menopausal women, which includes about 950 cases from Melbourne Collaborative Cohort study [17]. In contrast, another study showed no significant correlation between them, which includes about 125 cases from Framingham Offspring Cohort Study [18].

Similar to these, there have been several controversy concerning the relationship between sugary beverage and several kinds of cancer risk [19]. They include colorectal cancer [20], pancreatic cancer [21], biliary tract and gallbladder cancer [22] and so on.

Consequently, there have been inconsistencies about the relationship between sugary beverages and cancer risk, with the necessity of further investigations. It would be crucial to investigate the relationship between those beverages and the incidence of cancer by a large cohort study associated with detail dietary product and intake evaluation.

In summary, this article described some recent topics including the role of carbohydrate in the human evolution, excessive intake of carbohydrate in infants from the reports of PHE and RCPCH, the influence of sugary beverage on the cancer risk in adults and so on. It is expected that these become the reference to develop further research in the future.

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