
System Development Life Cycle (SDLC) of Human Body to Reduce Risks of Obesity and Type 2 Diabetes

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Abstract

Equal samples of 100 calories of each of glucose, alcohol and fructose were experimentally compared metabolically by applying System Development Life Cycle (SDLC) of human body. Glucose gave the output of only 0.4 calorie while the alcohol gave the output of 25 calories and fructose gave the output of 33 calories of VLDL (very low density lipoprotein), (FFAs) (free fatty acids) and triglycerides (TGs) as adverse metabolic outcome from liver. The fructose and ethanol are metabolized in the same way, creating the similar toxins in human body and causes type 2 diabetes and obesity. Avoiding sugar resulted in safe guard from overweight, diabetes, high cholesterol, and high blood pressure. Moderate intake of fruits was found helpful in providing fiber which was very beneficial to the body. Regular exercise reduced stress, citrate levels, fat production, arthritis and improved insulin sensitivity, level of mood, strength of bones and caused slow down of aging

Introduction

No doubt, the human body represents a very complex system with a variety of body subsystems that keep on working inside the body non-stop to keep it healthy and alive. You may find one-third of shy people to suffer from hay fever as a routine but none of the extroverts who, are open and jolly, have such a problem at all. The Central Processing Subsystem in the human body is the brain which needs only 10 Watts of energy to function, so even when you are sleeping, your brain generates the energy which can light a small bulb. However, on the other hand, the human body also dissipates the heat energy

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that is created due to body activity and the heat energy may be about the same amount of heat that is generated by a 100-watt light bulb.

The system development of human body involves both the evolution of body and mind and its life span view considers the influence of life cycle forces at each stage which may be anthropological, theological, psychological, biological and social, cultural and economical. Thus, in the developmental life cycle, the crucial factors are financial status, age, physical and mental well-being and social support. While the hierarchy of needs of American psychologist Abraham Maslow in the life cycle starts with the physiological needs like food, sleep and physical security to social needs with family and friends followed by desires of self esteem, self-actualization and attainment of full potential. Similarly, developmental psychologist, Erik Erikson categorizes eight phases of psychosocial development in life cycle of human from Infancy to Old age. However, Alfred Einstein quoted: "All that is valuable in human society depends upon the opportunity for development accorded to the individual." Hence, in the very research paper, the system development life cycle has focused on the different requirements of the human body to grow smoothly, develop further subsequently and sustain itself up to the end without any health problem by considering some very basic questions related to the end result of obesity and type-2 diabetes.

1. Can system development life cycle of human body help in determining if there is any one reaction in human body that requires fructose? (This may be connected to the likelihood of developing type 2 diabetes or not?)
2. Is a sugar, a sugar whether it comes from sugar cane, beet or corn because Mother Nature has given us fructose in fruits and vegetables?
3. Is a calorie just a calorie whether it comes from soft drinks, juices or food?

Diabetes is a general and speedily increasing disease. Type 2 diabetes was a problem of industrialized nations until early 2000, but now it has become a global endemic. By 2025, the figure of adults suffering from diabetes globally is expected to be around 300 million. This approximates to the entire population of United States by 2002. Frederick Grant Banting and John James Rickard Macleod were jointly awarded the Nobel Prize in Physiology or Medicine 1923 "for the discovery of insulin". Prior to the innovation of

insulin, diabetes was one of the most dreaded diseases leading to death. Doctors and Practitioner were only aware of that sugar deteriorates the state of patients and that the most successful treatment was to put the patients on very firm diets. During this period the sugar intake was kept to least. At finest, this could only buy the patients few extra years, but it never hoarded them. In few instances, the ruthless diets caused diabetic patients to die of hunger.

Research Methodology & Data Collection

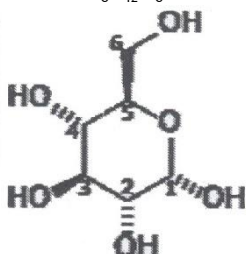
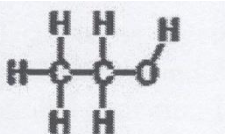
A new approach is used in this research work where the available information about human body is used to develop a system development life cycle of the human body which will function and guide like google earth and expose the subsystems like glucose cycle, citrate cycle and other processes at subsystem level which are working behind the curtain in the human body involving the serial biochemical reactions of the processes inside the body developing output products responding to the given inputs. This research work was focused on application of SDLC of human body towards contributing factors of corpulence and diabetes type 2 and for that purpose the samples of three common food ingredients, each of 100 calories were used to see the bad stuff as the end product of the body metabolism under normal conditions of the human body considering four important organs, stomach and intestine, liver, pancreas and brain. The cycle was developed based on the reliable experimental results of the normal functions of these four organs and included all subsystems and sub-cycles of biochemical reactions and other crucial processes of the human body as the important interrelated components of the system

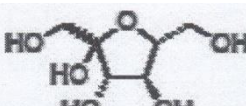
Results & Data Analysis

**Table 1: Human body output to the input of three samples each of 100 Calories Of
glUCOSE, alcohol and frUCtOSE. (Evolved by the Author)**

Input 100	Body	Liver	Brain	Stomach Intestine	Output Liver	Bad stuff	Remarks
Glucose	80	20	0	0	0.4	0.4	Normal
Ethanol	0	80	10	10	25	25	Disease
Fructose	0	100	0	0	33	33	Disease

**Table 2: Detailed adverse effects compared of glucose, alcohol and fructose Samples each
Of 100 Calories. (Evolved by the Author)**

Input 100 Calories	Bad LDL (VLDL), free fatty acids (FFAs), and triglycerides	Contribution to disease
Glucose $C_6H_{12}O_6$ 	0.4 Calories	Body gets power for growth, repair, movement or other functions.
Ethanol CH_3-CH_2-OH 	25 calories	Dyslipidemia of alcoholism, liver inflammation, hepatic insulin resistance & cirrhosis, liver disease, type 2 diabetes

Fructose 	33 calories	Gout, hyperlipidemia, skeletal muscle, nonalcoholic fatty liver disease (NAFLD) and hepatic insulin resistance, type 2 diabetes
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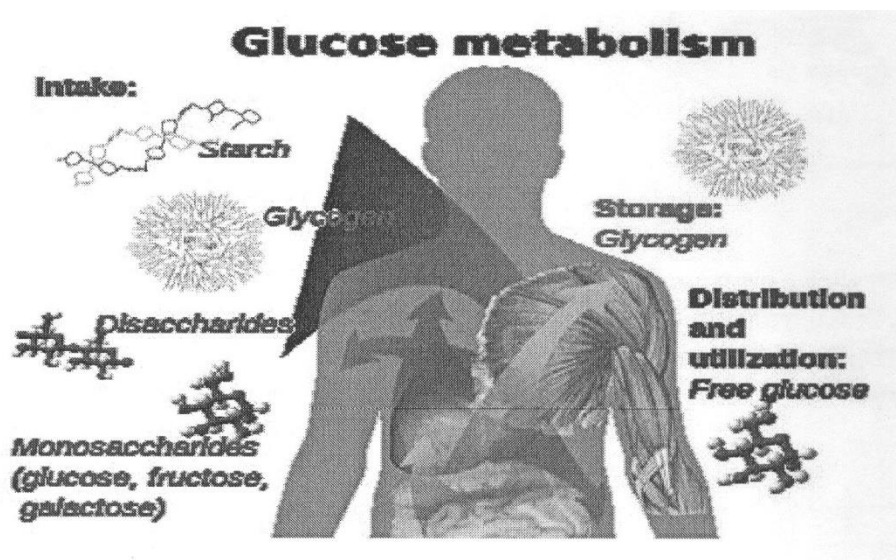


Fig: 1 (Source: Medical Association of USA)

Scenario of glucose metabolism inside human body. The subcycle of intake of starch and its conversion to glucose and other substances are shown in red. While the subcycle of distribution and utilization of free glucose is shown in blue. The subsequent subcycle of storage of glucose as glycogen is shown in green.

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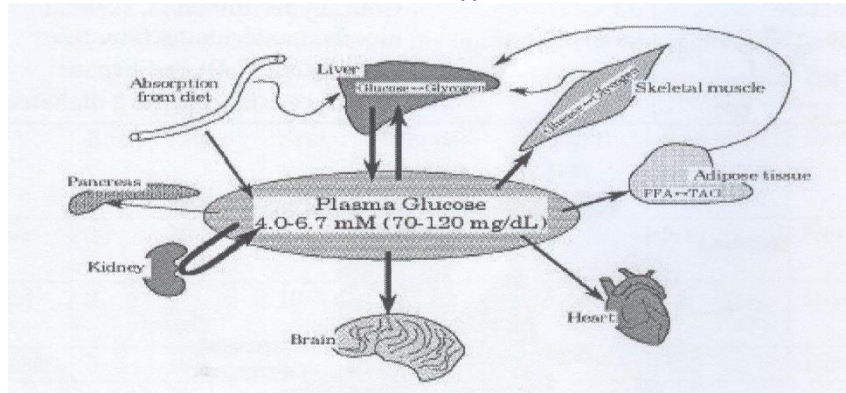


Fig. 2: Coordination of organs to maintain and regulate normal sugar level in the blood as another phase in the human body of control and balance.

(Source: Medical Association of USA)

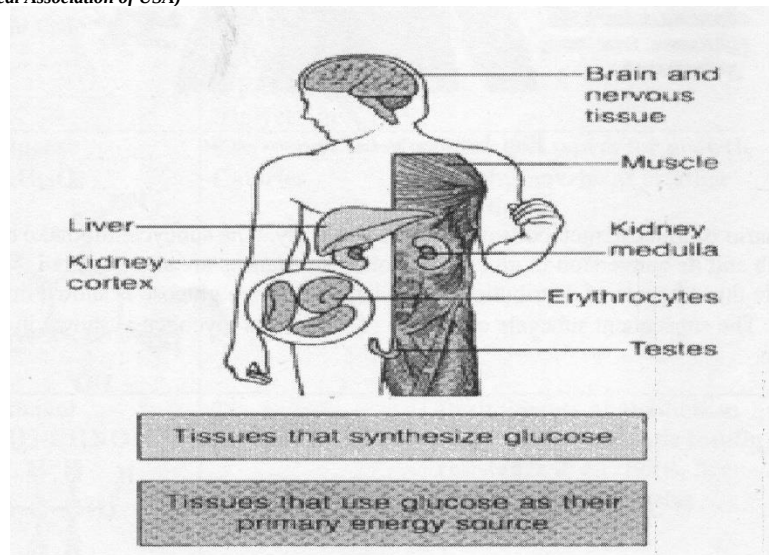


Fig. 3: Importance of glucose as energy for body functions through tissue synthesis of glucose and its use throughout the body as primary source of energy.

(Source: Medical Association of USA)

Cell division and growth is dependent on glucose as the primary source of energy to generate the required electric current signals for communication and coordination among the organs involved in the synthesis of needed hormones and other products for vital processes in the body. The usable energy produced for each molecule of glucose is exhibited in table 3:

Table 3: Production of Adenosine tri-phosphate (ATP), the energy

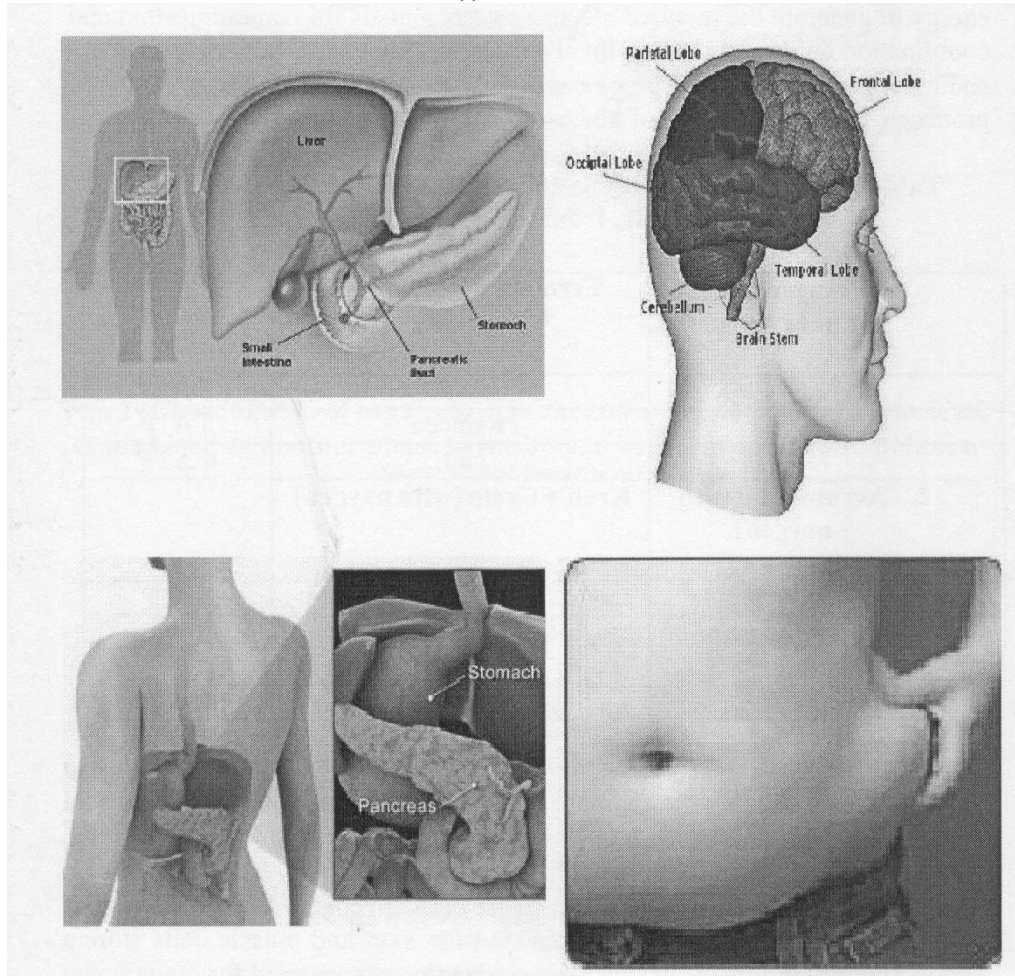
Currency Of life, from glUCOSe. *(Evolved by the Author)*

1. Anaerobic (without oxygen)	Fermentation (without oxygen)	
	Consumed:	2 ATP
	Produced:	8 ATP
	Net:	6 ATP
2. Aerobic (with oxygen)	Kreb's Cycle (with oxygen)	
	Consumed:	0 ATP
Massive Energy from Glucose	Produced:	2x 15 ATP
	Net:	30 ATP

Therefore, up to 36 ATPs can be generated for each glucose molecule that gets into the muscle. More than 2×10^{26} molecules or > 160kg of ATP are estimated to be formed in the human body daily!

The human body stores energy either as fat or as glycogen. However, most of the energy stored in the body is as fat, but the liver and muscle cells store a certain amount of glucose as glycogen as standby arrangement for maintaining balance of normal sugar level in blood in case blood glucose happens to run low. Hence, the body cannot store glycogen without glucose which then leads to fatigue and muscle weakness.

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Type 2 Diabetes Warning Signs

Fig. 4: In the functional frame work of stomach, liver, brain and pancreas: Ability to release and produce is appropriately lost by the pancreases. The level of sugar rises in blood as body becomes resistant to the insulin. {Source: Wikipedia.com}

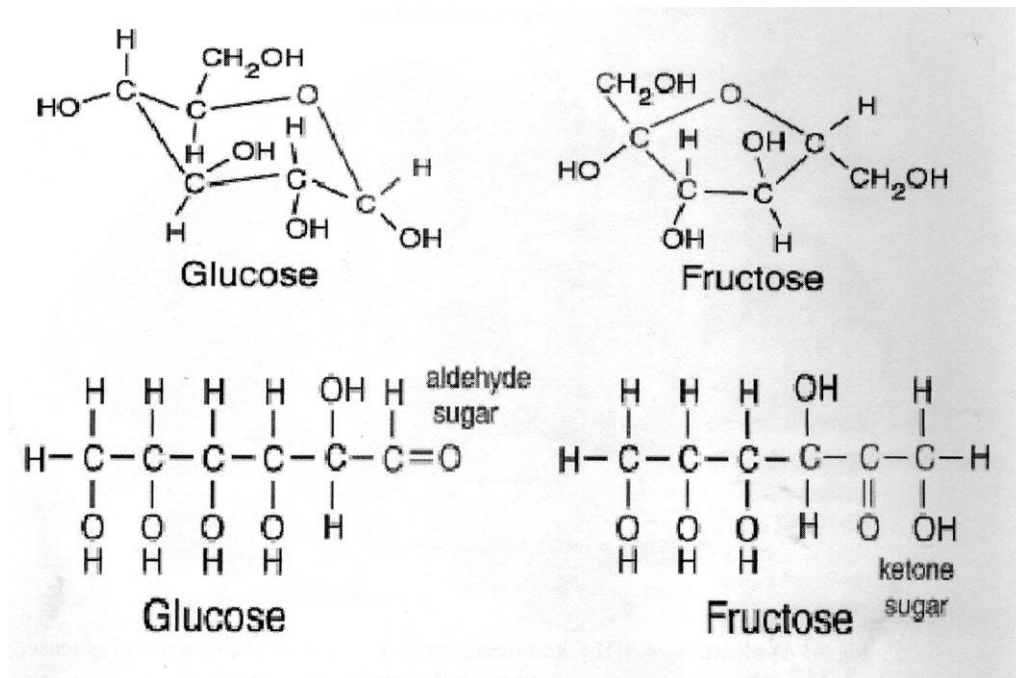


Fig. 5: Glucose is classified as an aldehyde and fructose as a ketone.

(Source: Wikipedia)

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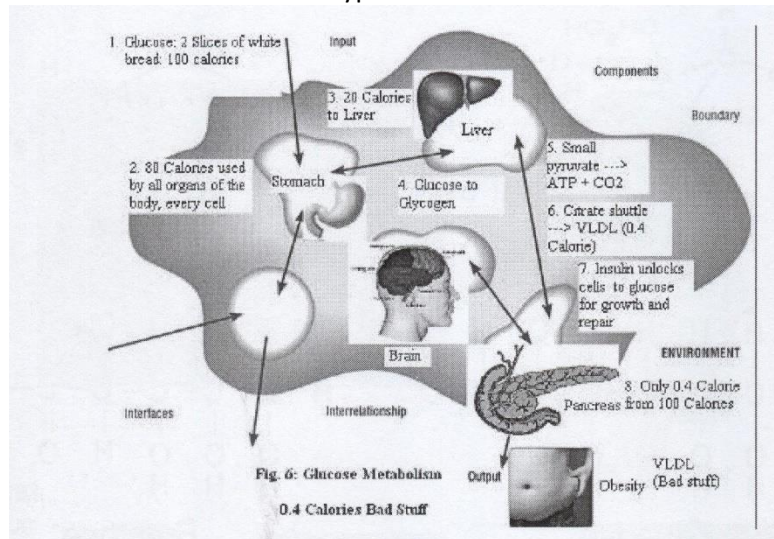


Fig. 6: Application of SDLC to human body for input of 100 calories of glucose.
(Evolved by the Author)

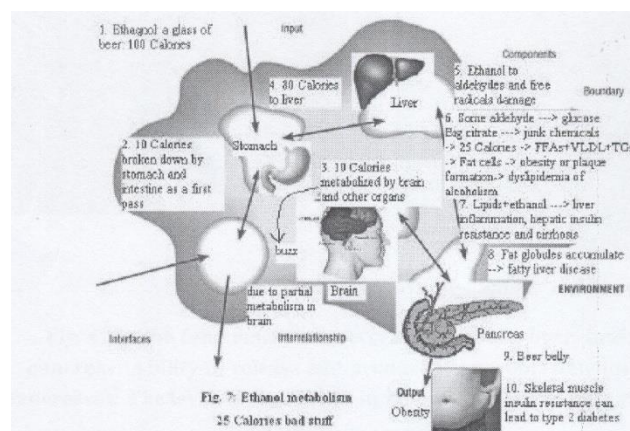


Fig. 7: Application of SDLC to human body for input of 100 calories of ethanol.
(Evolved by the Author)

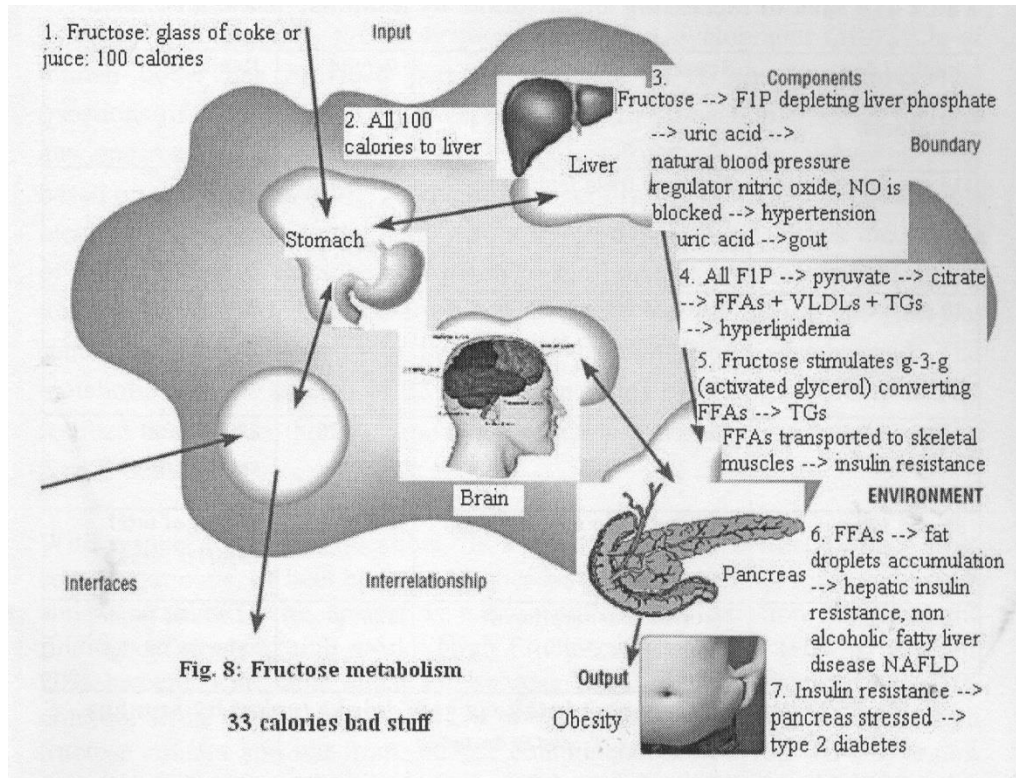


Fig. 8: Application of SDLC to human body for input of 100 calories of fructose.

(Evolved by the Author)

Human body cannot survive and live without liver which plays a very critical role in four important metabolic cycles of detoxification of foreign substances, fuel management, and regulation cycle between the tissue and blood and nitrogen excretion cycle of water distribution. Thus, diseases like hepatitis C, of the liver, which has been destructive national issue in Pakistan in health care, normally leads to fatigue, malaise, and even to death.

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Table 4: Track of increasing sugar intake by humans. *(Evolved by the Author)*

Intake / day (in grams)	Source	Period	Remarks
15 gm. / day	Fructose from fruits and vegetables	End of 19 th century	Natural consumption
20 gm. / day	Fructose from fruits and vegetables	Before World War II	Natural consumption
36 gm. / day	Natural Food Consumption	1977-78	8% of total calories intake
55 gm. / day	Natural Food Consumption	1995	10.5% of total calories intake
72 gm. / day	Natural consumption of Adolescents	2005	12.5% of total calories intake

Table 5: Track of increasing intake of soft drinks (coke) by humans.

(Evolved by the Author)

Year	Drink in ounces	Weight Gain (Lb. / yr)	Remarks
1915	6.5 oz	8 Lb / yr	Old coca cola bottle
1955	10 oz	13 Lb / yr	new coca cola bottle
1960	12 oz	16 Lb / yr	Can of coke
1988	44 oz	57 Lb / yr	Thrust Buster (Seven Eleven Stores)
1992	20 oz	26 Lb / yr	new plastic bottle
2000	60 oz	112Lb/yr	Texas-ized Big Gulp with Burritos

Discussion of Results

The results obtained by the application of System Development Life Cycle of human body, has provided pertinent answers to all the three important questions of the research. With respect to the first question whether there is any one reaction in human body that requires fructose? The answer is zero, based on the findings of the research work confirming that there is not a single biochemical reaction in the body where fructose is required. When the sample of 100 calories of fructose was given to the body, it was recognized as the toxin to be detoxified by the liver and the entire sample of 100 calories was sent by the body directly to the liver to be completely metabolized. The metabolic adverse effects of 33 calories in terms of VLDL, FFAs and TGs resulted which had the likelihood to contribute towards the advancement of type II diabetes.

With respect to second question, "Is a sugar, a sugar whether it comes from corn, sugar cane, or beet because Mother Nature has given us fructose in fruits and vegetables?" The answer is a big "no" to this question based on the findings of this research work. High Fructose Corn Syrup (HFCS) is about 20% sweeter than table sugar i.e. sucrose which is 50% fructose and 50% glucose, while HFCS is either 42% or 55% fructose. The problem is from fructose content and not from glucose component. Corn syrup (HFCS) is now found in every type of processed, pre-packaged food one can think of and is the smoking gun of the problem. Glucose is the form of energy humans were designed to run on. Every cell in human body, and in fact, every living thing uses glucose for energy. Fructose is not the same molecule. Glucose is a 6-member ring, but fructose is a 5-member ring.

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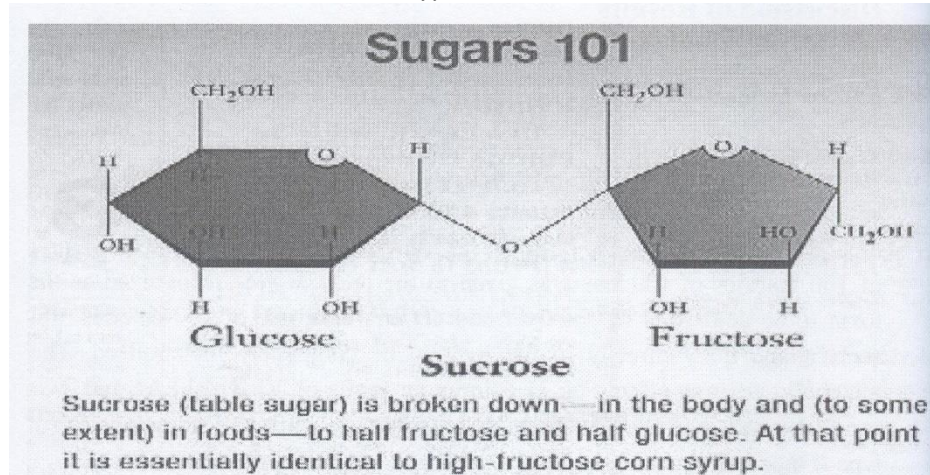


Fig 9: (Source: Google.com)

With respect to the third question, "Is a calorie just a calorie whether it comes from soft drinks, juices or food? The answer is also "no" to this question based on the findings of this research work. One calorie of glucose gave only 0.004 calorie as adverse metabolic outcome from the liver, which could be considered as negligible and were taken as normal reference. But, on the other hand, one calorie of alcohol and one calorie of fructose gave out 0.25 and 0.33 calorie respectively as adverse metabolic outcome from the liver, as VLDL, FFAs and TGs which are comparatively either quarter or one-third of the input to body coming out as bad stuff contributing towards disease and must be avoided. Thus, a calorie is not just a calorie. Furthermore, the statistical analysis carried out in this research, 15 pounds of fat per year is the worth of one day. Though, a soda of the prior year today is not equal to the one of this year. The original coke bottle was 6.5 ounces.

Conclusion

The present universal fact is that about 25 calories in our daily intake of food is coming from a component which is unfortunately disguised as common food ingredient in our diet throughout the world. But, the ground reality is that this substance, which is giving a devastating jolt to human fitness and is

accountable for insulin resistance and weight gain, is fructose which is 42% or 55% in high fructose corn syrup and 50% in common table sugar which are ubiquitous and found in majority of food items taken up commonly throughout the world. This research work applying system development life cycle to human body and analyzing in terms of biochemistry of energy, has found that fructose can really mess up body metabolism leading to obesity, type II diabetes and added complications of metabolic syndrome.

From the results of table 3 and 4, it is clear that every human is eating more than 30 years ago where men consume 180 calories more and women take 330 calories more on average leading to super sized population Obesity epidemic is not simply a lack of self-control, but rather biochemical changes altering the way the human body regulates energy as shown table 1 and 2. Thus, as pointed above in discussion of results, it is not only a subject of in and out of calories because now even half year babies are sufferers of the plumpness epidemic Diet and exercise cannot only explain that.

The parents will think twice before giving a can of beer (150 calories) to their kids while the parents will readily buy a can of coke (150 calories) to their kids, but the fact is that both are the same. Both of them end up with about 90 calories reaching the liver for metabolism which gives the similar adverse metabolic outcome of VLDL, FFAs and TGs. Bottom line is that both contribute to type II diabetes and obesity. In the case of glucose, liver was loaded only with 20 calories only after providing 80 calories worth energy to organs, muscles and body. However, in the case of alcohol, the liver was loaded with 80 calories and in the case of fructose; the liver was loaded with entire intake of 100 calories. This was because both, alcohol and fructose came from sugar fermentation and led to fat belly in case of fructose and beer belly in case of ethanol, and insulin resistance and metabolic syndrome. Experimentally, dyslipidemia in healthy people is caused due to high- fructose diets, with and without a family history of type 2 diabetes. Experiment on students showed that 30% of given fructose ended up in fat while almost nil of glucose ended up in fat and when given high-fructose diet only for 6 days, their insulin resistance and triglycerides doubled.

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