



Food and Health Science

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Over Indulgence in Fast Food Comes with a Price: It Can Cost You Your Vision

The Never Ending Temptation of Fast food: Can we avoid it for Good Reasons?

'A platter full of golden fries, a cheese pizza with extra pepperoni toppings, a sumptuous hamburger dripping with molten cheese, a sizzling hot dog and a triple scoop sundae of your favorite flavor'...Did I get you tempted? Well I surely am! Well, do not worry, this is not a party menu; instead, it is a prescription that will surely land you in a doctor's clinic, if not any time soon but eventually. For those who think this is yet another article lecturing you about good health and nutrition, let me bring to your kind attention, we are talking neuroscience here, and to support our arguments, we back it up with potent research evidence. We are familiar with the health implications associated with unhealthy diet; lifestyle issues and so called junk food or fast food, which are the leading causes of obesity, cardiac problems and even cancer. However, more recently the impact of junk food has been explored in relation with the human brain and vision. To clearly define any food which has abnormal high levels of salt,

sugar, starch, fat and is processed in a manner which makes it lose its nutritional qualities, qualifies as junk food. These foods are rich in trans-fats and processed carbohydrates, give a feeling of immediate satiation upon consumption but are devoid of any substantial nutrients.

The brain is the master controller of all body functions including hunger and appetite. It is a popular fact that human emotions such as happiness, anxiety, stress and sometimes depression drastically influence our eating habits and food cravings. We often come across the term 'stress buster food' which is actually not entirely incorrect if talking from a neuroscience point of view. However, before we discuss how the brain influences diet and vice versa, we must shed light on a case, which has been making headlines in the past month and obviously for the right reasons.

The Impact of Fast Food on the Health of an Adolescent: A Case Report

An alarming case report recently published in the journal 'Annals of Internal Medicine'

brought to light the story of a teenager who nearly lost his vision due to his junk food addictions. A teenage boy at age 14 started complaining about lethargy and perpetual tiredness, upon consultation with the family practitioner he was diagnosed with macrocytic anemia and low vitamin B12 levels. He was advised against his fussy eating habits and given vitamin B12 injections. Next year at age 15 he developed vision problems and sensorineural hearing loss. However, medical reports, magnetic resonance imaging (MRI) and eye tests were completely normal and the cause went undetected.

Over the next two years his vision deteriorated progressively and at age 17 he was diagnosed with optic neuropathy. His eye test revealed that his vision was 20/200 in both eyes, the threshold for being "legally blind" in the United States. Genetic testing

revealed no hereditary links to Leber hereditary optic neuropathy, thus ruling out any possibility of a genetically inherited disorder. Path-lab tests showed weak persisting anemia, low levels of selenium and copper, however iron levels, thyroids functions etc. were normal. His bone mineral density was low and so were the vitamin D levels. The teenager was not addicted to tobacco, alcohol or any kind of drugs which could suitably be held responsible for his condition. However, upon further probing he confessed about his dietary habits and his junk food addictions since his elementary school days. Throughout his growing up years he had routinely hogged on fries, wafers, white bread, processed sausages and ham slices. He further admitted that he had an aversion for certain texture and colors of foods which he perpetually avoided (avoidant restrictive food intake disorder) (1).

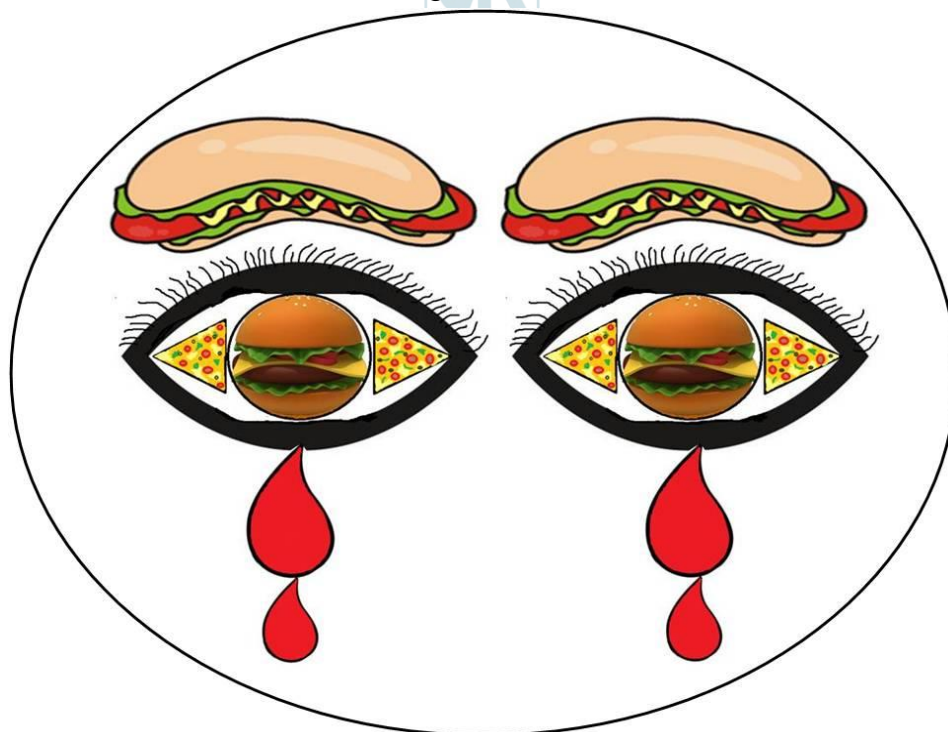


Figure1: An imaginary visual depiction of junk food taking a toll on optic health. [Source: The author has created the image via Paint using Google clip arts.]

Thus came to light a possible cause which had gone unnoticed for years and now the damage had reached a level which was beyond rescue. Vitamin supplementation improved his dietary deficiencies to some extent and his vision was stabilized but could not be improved or cured any further. This heart rending case of a teenager going virtually blind is not just a medical case being discussed by the fraternity but is a warning to all who underestimate the detrimental effects of junk food.

Nutritional optic neuropathy is usually caused by drugs, malabsorption, smoking/alcoholism combined with poor diet. Dietary reasons alone are not a major cause in developed countries. The mechanism of vitamin B group is well understood and majorly contributed towards the patient's vision impairment while the deficiency of vitamin D probably contributed towards his osteopenia (characterized by low bone density and brittle bones) (1). These were simple nutritional deficiencies which could have easily been rectified, had they not been overlooked for long. This is one of the unusual cases where nutritional deficiency and eating disorder has emerged as the sole cause of nervous system deterioration in the form of vision loss. It may seem a drastic case but has clearly highlighted the possibility of how junk food can severely damage vision and other brain tissues if not controlled timely. Figure 1 is an imaginary visual depiction of junk food taking a toll on optic health.

Human Brain: The trigger or the target of junk food?

The only thing that can distinguish Homo sapiens from any other species in the world

is the human brain, one of the smartest organs in the universe. "The mind is a powerful force. It can enslave us or empower us. It can plunge us into the depths of misery or take us to the heights of ecstasy. Learn to use the power wisely." This famous quote by author David Cuschieri can be aptly applied to the brain in a more biological sense. The brain has an inbuilt reward system which enables us to engage in any pleasurable activity such as gorging on delicious food. Eating junk food helps in the release of a chemical called dopamine, which is a well-known neurotransmitter and hormone associated with happiness and also responsible for fueling addictions. When we consume these so called rewarding foods the central nervous systems (CNS) responds by adapting to the release of happy hormones and in turn makes more dopamine receptors. Therefore, more junk food is required to attain the same level of high or happiness and this triggers what we call junk food cravings. The process is very similar to developing drug addictions. Further the learning and memory forming ability of the CNS rapidly registers the experience of eating salty/sugary and fatty foods as a pleasurable activity and we are tempted visually every time we see our favorite junk dish. This temptation can be resisted by the prefrontal cortex- the major control center in the brain. This area of the brain does not mature until our early 20's, thus underlining the clear cut reason behind the impulsive nature of teenagers. This also explains why children and adolescents are more prone to addictions and these can affect their well-being for a lifetime if not corrected timely. Research findings illustrate how consuming

sugary foods and drinks can alter the brain development. Further junk food is also known to cause hippocampal neuroinflammation which eventually can damage neurons. Hippocampus is the

region of the brain which controls the signal for appetite and fullness in coordination with the gut and thus when it is damaged the individual loses his control on appetite and is perpetually hungry (3).

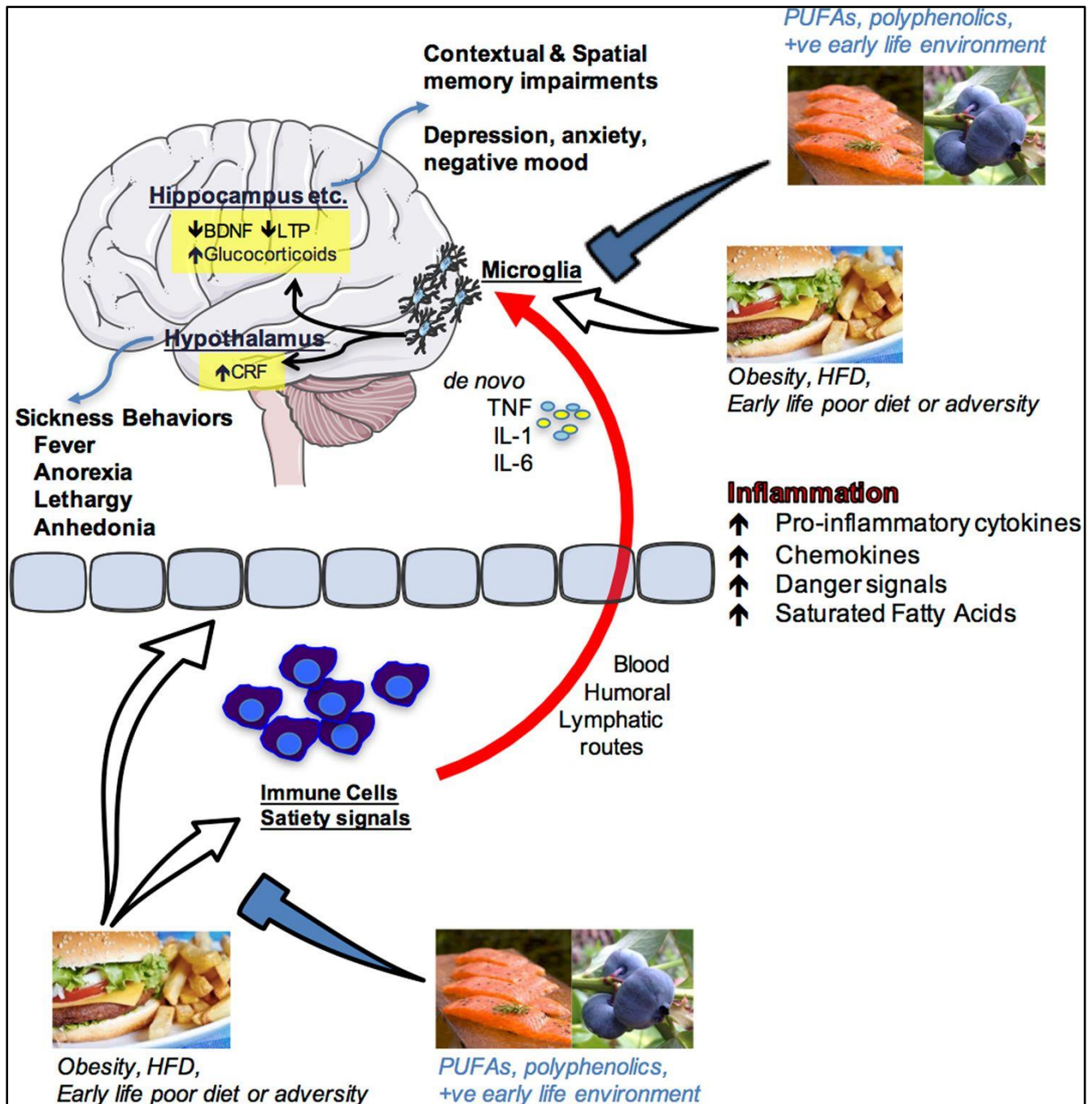


Figure 2: Schematic depiction of how nutrition influences cognition and emotion. [Source: Spencer SJ et al., npj Science of Food, 2017].

The hippocampus is also the memory centre of the brain and its impairment can further cause CNS disabilities. Junk food is further reported to reduce the neuroplasticity of the brain, which means the neurons are unable to fire and wire properly. This further reduces neurogenesis (the production of new neurons) and leads to gradual neurodegeneration. Thus although the brain sets the trigger for junk food consumption it eventually become the prime target organ of the same. Figure 2 represents the schematic depiction of how nutrition influences cognition and emotion (2).

Conclusion and Food for Thought

This editorial is meant to alert people who mindlessly indulge in eating junk food without realizing the actual irreversible harmful effects it can have on ones vision and brain health. Parents need to be more careful and aware of their children's eating habits and should not ignore any specific unusual patterns of diet because the child may develop a serious mental eating disorder. Growing up children are often fussy and tend to avoid foods of certain colors and shapes. If the pattern goes unchecked it may develop

into a psychological dietary disorder which may take ages to be rectified. Proper counseling and timely parental guidance can help in overcoming such problems. Researchers and clinicians can also delve at the grass root level of the mechanism of optic neuropathy in relation with junk food as the sole cause of the disorder. This may give us a complete new perspective on how we can treat and cure such disorders. Thus, if ignorance and indulgence are checked timely and if we can tame our cravings for junk food, we may actually live a lot longer and see the world a lot better, literally!

References

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