

A Study of Antioxidant Foods' Potent Power Contributing to Human Longevity

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Abstract

This article provides a clear description of various antioxidant foods' potent power in maintaining the healthy state of different human organs, thereby contributing positively to human longevity. The significance of this approach is relied on the characteristics of these types of foods, which are able to nullify the harmful effects of oxygen free radicals. These radicals are created within the body due to extraneous and internal factors, including breathing in and breathing out process. Also, a list of factors affecting human survival aspects is described succinctly in the context of human longevity. The underlying benefit of intake of antioxidant foods in lengthening human longevity is clearly demonstrated.

Keywords: Oxygen free radicals (OFRs); Chemical reaction; Electron; Longevity; Body's DNA; Immune system; Plant power; Life expectancy

Introduction

Antioxidant foods' healing power is well-known within the food and nutrition research community throughout the world in controlling/alleviating very many diseases. A host of diseases is attributable to the adverse effects of generation of oxygen free radicals, OFRs, (or simply "free radicals"), which are responsible for oxidation process – a chemical reaction – that takes place within the human body. Such conditions result from external and internal factors and primarily due to breathing in and breathing out process [1]. This article provides a cogent insight into the contributions of antioxidant foods' potent power to alleviate many deadly diseases and thereby, contributing positively to human longevity. The underlying idea of this concept embraces the principle that "prevention is better than cure". The novelty of the study presented here is to observe the process of changes of bodies cells due to the attack by the OFRs. The counterbalance of this attack is to apply the alleviating power of the antioxidant foods – this is clearly displayed in Figure 7 (page 3). Furthermore, a list of relevant factors determining human survival aspect and longevity is clearly demonstrated.

The article will then review in detail that by timely intake of foods of antioxidant nature suitable for the various human organs, such as (i) heart, (ii) brain, (iii) lungs, and (iv) other body parts, a healthy state of the body's function can be maintained – thereby, people's longevity, lengthened.

Factors Affecting the Human Survival and Longevity

The factors that are attributed to human survival and longevity could be grouped in the following manner (considering that the list is not exhaustive) [2]:

Group A: life style factors

1. Smoking and drug taking
2. Lack of physical activity (e.g. exercise) (Figure 1 as an example) [3], and sedentary lifestyle.
3. Lack of adequate nightly sleep
4. Unhealthy diet
5. Unabated stressful life
6. Unchecked imbibe of alcoholic drinks
7. Overweight and obesity (Figure 2) [4]



Figure 1: Illustrating lack of physical activity.



Figure 2: Physical appearance of an obese person.

Note: Some of the factors cited above (e.g. smoking and drug taking) will accelerate generation of OFRs within the body, resulting in eventual damage of normal body cells (Figure 3 as an example) [5] through oxidation process. The destruction process of healthy body cells by OFRs is shown in Figure 6 (page 3).

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Group B: environmental factors

1. Unhealthy living conditions, e.g. living in poor housing conditions including lack of proper sanitation (Figure 4 as an example) [6].

2. Long exposure to air pollutions, e.g. arising from car exhaust, as we inhale.

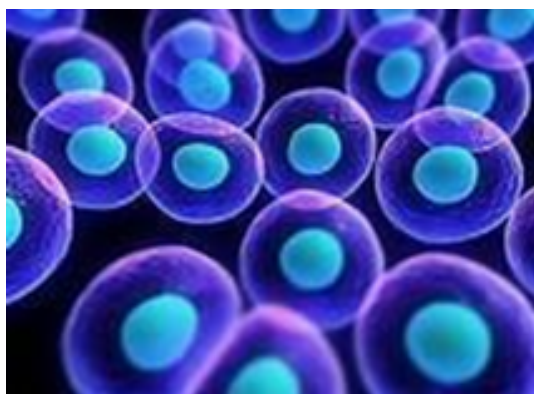


Figure 3: A replica of normal body cells.



Figure 4: Image of unhealthy living conditions.



Figure 5: Displaying a view to exposure to sun's UV light.

Note: Some of the factors referred to above (e.g. long exposure to air pollutions, inhaling toxic industrial chemicals) will accelerate generation of OFRs within the body, resulting in eventual damage of normal body cells.

3. Constant exposure to noisy surroundings

4. Toxic industrial chemicals, pesticides as we breathe air in [7].

5. Long exposure to sun's UV light (Figure 5) [8].

Group C: hereditary factors

1. Longevity depending on hereditary contributions, e.g. certain diseases are ancestors' related, e.g. a person prone to heart attack.

2. Longevity also depends on the genes passed on from the parents to the offspring.

Group D: other factors affecting the longevity

1. Age: simply getting older increases the risks of us becoming ill and eventually succumbing to death and demise.

2. Sex of human being: Women are more prone to live longer compared to men.

3. Health conditions, e.g. having high blood pressure, diabetes and the like, could result in being affected by the disease and premature death.

4. Lack of proper medical facilities to treat a particular disease.

What Happens to the Body in a Diseased Condition?

When worked upon adversely by the oxygen free radicals (OFRs), the cells of the relevant part of the body will undergo a change. This is attributed to adverse chemical reactions and the cells will be damaged (Figure 6) [9].

However, the process of this attack and deterioration is gradual. In course of time, the symptoms will be manifested in several forms: e.g. inflammation in any parts of human body, pain in the chest, headaches, lack of concentration and similar effect.

Without preventive treatment, the condition of the relevant part of the body will deteriorate and the particular disease, e.g. lung cancer, will be the result.

Role of Antioxidant Foods' Potent Power in Preserving Body's Cells

Antioxidants are simply edible substances (include fruits, vegetables, herbs and spices) that work interactively inside and outside of the body's cells, protecting these cell membranes from the damaging effects of highly reactive molecules, known as "oxygen free radicals" (OFRs).

The OFRs are "positively charged" molecules whose atomic structure lacks one electron in its outer shell. Hence, they will attack anywhere within the body to gain this deficit electron. In this "pillage" process, they will cause irreparable damage to the cell membranes and cell structures (including our DNA or genetic blueprint), causing dangerous diseases such as cancer, and also resulting in accelerated ageing of the human body. Joint stiffness and chronic ache and pains in the body are indicative sign of heightened levels of attack by OFR's and reduced antioxidant protection. It is this antioxidant food that protects us, and literally "breaks the chain reactions" of these OFR molecules and potential chemical destruction of the body cells by transferring one electron from antioxidant food's outer shell to OFR's outer shell (Figure 7 as an example) [9].

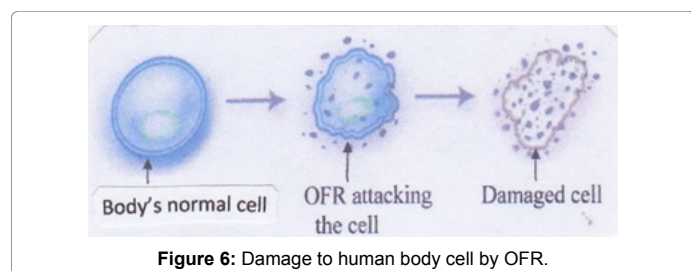


Figure 6: Damage to human body cell by OFR.

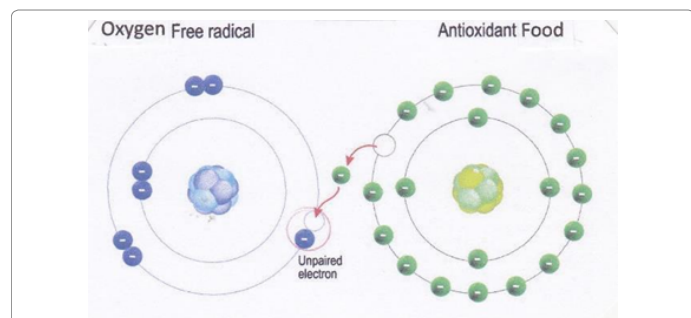


Figure 7: Human body cell protection by an antioxidant food against the attack by oxygen free radical (OFR).

Note: Referring to Figure 7, an electron from the outer shell of the antioxidant food's atomic structure is imparted to the outer shell of the OFR and thus the destructive effect of the latter is neutralised.

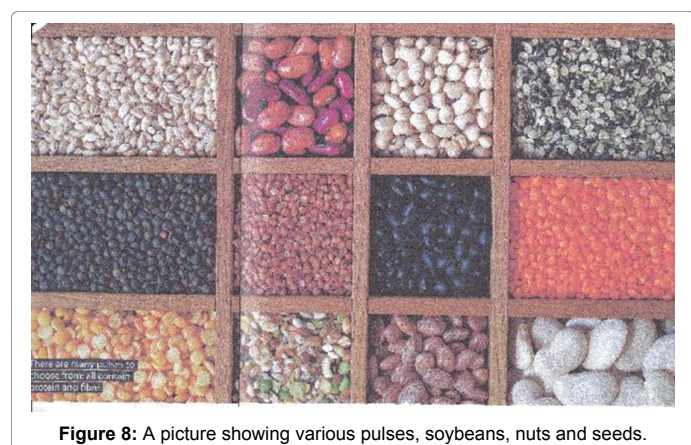


Figure 8: A picture showing various pulses, soybeans, nuts and seeds.

Maintaining a Healthy State of Human Body Parts using Anti-oxidant Foods

The antioxidant foods necessary to maintain a healthy state of different parts of the body are listed below:

Foods for the heart's health

The antioxidant foods suggested for a healthy heart are: (a) Seafood including oily fish (for example, crab, mollusc, crustacean, shrimps, lobster, prawn, fishes like salmon, trout, sardines, mackerel), (b) Fruits (for example, berries, oranges, grapes, bananas, apples, avocados), (c) Vegetables (for example, all green leafy vegetables including spinach, asparagus, tomatoes, mushrooms, carrots, sweet potatoes), (d) Grains (for example, whole rye, oats, barley, millet, brown rice, corn, wheat), (e) Legumes (for example, beans, lentils, peas), (f) Garlic, (g) Onions, (h) Olive oil, (i) Red wine (in small amount, like one or two drinks a day), (j) Vitamin C foods (e.g. oranges, melon and tangerines, strawberries,

sweet peppers, tomatoes, broccoli, and potatoes), (k) Vitamin E foods (found in: vegetable oils, margarine, wheat germ, seeds, nuts), (l) Foods containing carotenoids (found in: red orange, dark green leafy vegetables, tomatoes, carrots, spinach, Brussels sprouts, sweet potatoes, and broccoli) [9].

Foods for proper function of the brain

The foods that are beneficial to maintaining a healthy brain are:

(a) Carbohydrates (e.g. brown rice, potatoes, cereals, and whole wheat), (b) Pasta, (c) Oily fish (e.g. salmon, herring, sardine, and mackerel), (d) Fruits and vegetables (e.g. strawberries, blackberries, spinach, beetroot, and all types of beans), (e) All types of nuts, and seeds, (f) Green tea, (g) Plenty of water and other fluids.

Note: The brain contains about 80% water. So, it is advised to drink 6 - 8 glasses of fluid every day for its proper functioning [10].

Foods for lungs' healthy function

For this purpose, the following antioxidant foods are recommended:

(a) Fruits: all types of berries (for example, blueberries, cranberries, blackberries, strawberries), prunes, apples and pears, grapes, peaches, apricots, nectarines, cherries, plums, pineapple and pomegranates.

(b) Vegetables: bell peppers, asparagus, red cabbage, tomatoes, potatoes, broccoli, artichokes and kale.

(c) Other means of maintaining lungs' healthy functions – eating garlic and onions, ginger, using turmeric in cooking, and drinking plenty of water, for cleansing action, essential to keeping blood flowing into and out of the lungs (Note: it is well-known that drinking plenty of water helps avoiding de-hydration) [11].

Antioxidant foods for liver's healthy function

For this purpose, the recommended foods are: garlic, grapefruits, beet roots, leafy green vegetables, green tea, avocados, all types of nuts, oily fish (e.g. sardines, salmon, mackerel), lemon, olive oil, lentils and apples [12].

Antioxidant foods for healthy function of stomach and other parts of the digestive system

The following antioxidant foods are recommended: Cruciferous vegetables (e.g. broccoli, cauliflower, Brussels sprout), fruits (e.g. bananas, blueberries, cantaloupe and honeydew melon, grapes, oranges, pineapple, strawberries), quinoa, oats or brown rice, nuts, seeds and nut butter, lean protein (e.g. eggs) and yogurt [13].

Foods for healthy function of the kidneys

To maintain healthy function of kidneys, the appropriate foods are: Apple, blueberries, cabbage (green and red varieties), cranberries, cauliflower, cherries, egg whites, oily fish, garlic, onions, olive oil, red bell peppers, raspberries and strawberries [14].

Body's immune system - for the entire body part

The body's inherent immune system needs to function properly [15].

The following foods are conducive for this purpose: (a) yogurt (b) shiitake mushroom (c) garlic (d) ginger (e) vegetarians' diet (f) fruits (e.g. apple, avocado, bananas, blueberry, grape fruit, kiwi fruit, pineapple), (g) citrus fruits (e.g. oranges, lemon, grapefruits), (h) vegetables:

- (1) umbelliferous vegetables (e.g. carrots, celery, parsnips),
- (2) cruciferous vegetables (e.g. broccoli, cauliflower, Brussels sprouts),
- (3) solanaceous vegetables (e.g. tomatoes, eggplant, peppers), (i) turmeric, (j) green tea (k) sea food (e.g. mollusc, crustaceans), (l) lean meat, e.g. chicken, (m) red wine-limited amount, say one glass a day.

Author's note

A future paper will pinpoint the types of antioxidant foods that will be suitable for medicinal use against a particular ailment. Further research is underway.

Endeavour to Lengthen Human Life

The underlying idea of antioxidant foods' potent power to maintain a healthy body is relied on the fundamental principle that "prevention is better than cure". Also, the fundamental concept here is that the very first step in the initiation of many kind of diseases sprouts out from the detrimental effects of human bodies' chemical reactions due to generation of OFRs within the body. Timely administration of the categories of foods listed above (as well as, below) clearly indicates the ability of these types of foods in maintaining a healthy body condition, and thus contributing positively to the longevity.

Summary of Protection against Oxygen Free Radicals, and Survival of Human Life

In summary, the aspect of maintenance of a healthy body and lengthening human life span can now be suggested by consuming the following antioxidant foods linked to the particular antioxidant category (AOC) [1]:

1. AOC: Alpha and Beta Carotene (available in: dried apricots, carrots, dark leafy vegetables, kale, spinach, pumpkin and sweet potatoes)
2. AOC: Glutathione (available in: asparagus, avocado and water melon).
3. AOC: Indoles (available in: broccoli, Brussels sprouts, cabbage, cauliflower, cress, kale, radish, swede and turnip)
4. AOC: Lycopene (available in: apricots, tomatoes and water melon)
5. AOC: Quercetin (available in: broccoli, red grapes (not white grapes), yellow and red onions (not white onions) and yellow squash)
6. AOC: Ubiquinol 10 (Co-enzyme Q10) (available in: peanuts, pistachio nuts, sesame seeds, some meats, sardines, mackerel and soybeans)
7. AOC: Vitamin A (Form 1: retinol: available in: butter, eggs, cod liver oil, liver, Form 2: beta carotene: available in any bright coloured fruits and vegetables, for example: carrots)
8. AOC: Vitamin B series (B1: available in: whole grains, brown rice, sea food and legumes (e.g. lentils); B2: available in: seaweed, milk, liver, kidneys, yeast, cheese (hard) and green leafy vegetables; B3: available in eggs, avocados, liver, lean meat, whole grains, peanuts and fish (e.g. salmon, sardine, mackerel); B5: available in: lean meat, whole grains, bran, kidneys, nuts and eggs; B6: available in: brewer's yeast, liver, kidneys, nuts, chicken and eggs; B9: deep green leafy vegetables, liver, whole grain, avocados, egg yolks, melon and apricots; B12: food sources: cheese, egg, milk, meat and liver)

9. AOC: Vitamin C (available in: bell peppers, broccoli, Brussels sprouts, cauliflower, spinach, citrus fruits, e.g. lemon, and cabbage)

10. AOC: Vitamin D (available in: all oily fish and also produced in the skin from the energy of the sun)

11. AOC: Vitamin E (available in almonds, green leafy vegetables, soybeans, sunflower seeds, wheatgerm, wholegrains and eggs).

Furthermore, antioxidants referred to above are also present in many plant-based foods. Figure 8 shows an example of plant - based antioxidant foods [16]. Plant based foods (for example, beans) can also help in providing the human body with antioxidants, thus aiding in the process of human longevity (Figure 8).

Notes on daily dose: Instructions for the intake of daily amount of fruits and vegetables can be found in various sources, for example, from the Government Agencies and from other books available in the market [17].

Concluding note

It is to be remembered, however, that human body is subjected to the limit which is termed as "boundary of longevity". This boundary of longevity at present stands at 117 years [18]. Science and technology are now working continuously to shift this boundary to a higher scale. The study of telomere science is an example in this respect [19,20].

Conclusion

In this article, a description of maintaining a healthy state of the body by use of antioxidant foods is clearly presented. These foods are necessary to maintain a healthy state of (i) the heart (ii) the brain (iii) the lungs and (iv) other organs of the human body. As elaborated in this article, by maintaining a healthy state of the body, human longevity could be lengthened. In this study, the antioxidant foods' potent power in maintaining a sound health, and thereby, sustaining body's survival and contributing to human longevity have been cogently illustrated. In the context of longevity, the relevant factors affecting human survival aspects are also clearly demonstrated.

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