

BioBran Beneficial for Our Health Defense System

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Our health defense system is an integrative one for maintaining wellness of our body. Basically speaking, it is composed of our defense system against foreign bodies (not-self) and our altered bodies themselves. Reality of our health defense system is relevant to a mode of inflammatory response. In this situation, immune-committed cells are main role in natural healing power. BioBran shows immunologically excellent function observed in animal models showing anti-inflammatory result as well as anti-allergic phenomenon.

Generally speaking, it is recognized that inflammation is often caused by any infection of bacteria or viruses so that causative factors of inflammation must come from outside of the body. Nevertheless, almost all phenomena of inflammation must come from inside of the body itself without any infection. For instance, sun burn after bathing or a bump at the forehead without wound must lead to inflammatory phenomenon in the skin. Primary trigger of inflammation have been recognized to come out from our cells themselves, such as a specific fatty acid, namely arachidonic acid basically integrated into the lipid bilayer of the cell wall. Arachidonic acid is one of the most fundamental substances causing a main cascade chain system of inflammatory chemical mediators involving prostaglandins and leukotrienes. In other words, cell wall of every cells in our body, whatever it is, must involve inflammatory cascade system, which could lead and potentiate inflammatory process, whenever any cell is damaged in the form of passive process of cell death (so-called necrosis, a technical term in pathology) due to whatever it is going to be. On the contrary, apoptosis, in other words programmed cell death, does not cause inflammation.

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Both of the two are strictly different each other from the biological point of view.

Diseases from the outside, and those from the inside

Causative factors of representative diseases from the outside are bacteria, fungi, parasites or viruses, which have influenced enormous impact to human history in terms of catastrophic and horrible objectives. Infectious diseases are fundamental causes to kill human beings and to shorten life expectancy of them. Overcome of infectious diseases had been by all means the primary purpose of human history until discovery of antibiotics. Battles to overcome infectious diseases were basically started and have given people more fruitful progress than ever by practical and widespread use of light microscopy, which has shown people a micron-meter world by magnification of 1,000 times of microorganisms and cells.

This tool enabled to boost scientific progress to open a new world of modern medicine on the basis of establishment of pathology and microbiology especially in Germany and western world. In the middle of the 20th century, penicillin and other antibiotics were discovered and distributed world wide followed by of overcome of infectious diseases. Drs. Fleming and Waxman became heroes and deserved Nobel Prize. Thereafter, life expectancy of people in the developed countries has prolonged revolutionary and then diseases from the inside such as life-style related diseases such as diabetes mellitus, arteriosclerosis (hardening of arterial wall) due to hypertension and/or diet overload of lipid, and cancer, has emerged.

Diseases from the inside

Alteration of self body is closely related to nutritional abnormalities, allergy or cancer. These disorders are appeared insidiously and not easily so far cured by any modern treatment. We have not been able to discover any specific drug like antibiotics against bacterial infection. Every specific drug has tendency to cause, more or less, inevitable adverse effect, because of the necessity of long-term treatment using chemical substances. Therefore, the point to discuss health defense system of our body is to focus on the matter to protect or relieve diseases from the inside. Among others, cancer is to be discussed in this article from the point of protective efficacy of BioBran in the consequence of chronic inflammation as a major promoter in cancer formation.

What is cancer

Cancer is the disease of DNA. DNA is involved in the nucleus of every cell in our body. DNA is reality of cell generation, such as promotion or inhibition of cell growth of apoptosis (programmed cell death). These complicated and well-organized mechanisms are regulated by fundamental genome, so-called functional DNA sequence, namely exon. Irreversible alteration is occurred in cancer cells. Cancer cells are defined as autonomic growth not controlled by physiologically ordinary system. Therefore, regardless to say, cancer cells are originated from own cells and have characteristics nearly close to "self" property. Even if cancer cells are characterized as something foreign in nature, namely "not-self" just the same as bacteria or viruses for immune competent cells, cancer cells must be a target of immune cells in terms of rejection. However, this is in reality not the case. Nonetheless, transformed cells are assumed to be subtly different from self cell in immunological features. If ever, not-self part of cancer cells must be target epi-

topes in terms of vaccine potentiality in cancer cell. It is assumed that cancer cells in advanced stage must be quite different from self characteristics so that they must be target cells in cancer immunotherapy. Unfortunately, it is still on going in scientific and clinical research as one of the greatest goals in place of anti-cancer drugs.

Cancer in adulthood is thought to appear after a long term of latent period, more than 20 years. During the latent period, DNA may be damaged step by step by toxic effect closely related to life-style or environmental influence. Life-style related cancer occur only in adulthood and most frequently over 50 years of age. Incidence of life-style related cancer have been increased much more than expected, even though it is considered that life expectancy has been getting longer in order to a common sense saying that the longer the life expectancy is, the more chance to occur cancer in adulthood is increasing. It is stressed to say that cancer site in adulthood is quite different from that in children. Thus, cancer site in adulthood is thought to be closely related to life-style and environmental influence.

Chronic inflammation as a major promoter of cancer formation

As far as cancer formation is concerned, three theories as follows are accepted on the global standard.

1. Genomic abnormalities of cell growth, formerly oncogenes
2. Genomic abnormalities of cell growth inhibition, formerly tumor suppressor genes
3. Genomic abnormalities of apoptotic processes

Gene mutations must occur step by step at random along the double stranded chains of DNA in the cell nucleus mainly by oxidant production closely linked to oxygen consumption during metabolic processes every second. In accordance with the widespread theory of cancer formation, multistep theory of cancer is composed of initiation, promotion and progression of DNA damages and gene mutations. Author has considered chronic inflammation as one of the most potent promoters. Inflammatory cells such as neutrophils and macrophages have tendency to migrate and produce oxidant in the inflammatory area of the body. When tons of oxidant produced in the inflammatory area must attack bacteria, they would be beneficial for us. When they attack our own cells, they become enemy and they are damaged. Tissue are repaired by regenerating cells so that cell cycle are accelerated in the inflammatory area and DNA of regenerating cells must be a target of oxidant. Under these circumstances, epithelial cells are vulnerable in the inflammatory area and frequently damaged in terms of erosion or ulcer formation in the digestive tract or respiratory tract. Therefore, author would like to suggest that chronic inflammation is the most fundamental factor as promoter of cancer formation in adulthood.

Following evidence is pointed out to convince the above-mentioned hypothesis.

1. Stomach cancer in the antral area of chronic inflammation (chronic atrophic gastritis) due to *Helicobacter pylori*.
2. Decreased incidence of colon cancer due to anti-inflammatory drugs.
3. Skin cancer and sun burn (ultraviolet light dermatitis).
4. Higher incidence of lung cancer and chronic inflammation (chronic interstitial pneumonia) by cigarette smoking than those of smokers.
5. Cervical cancer and chronic contact cervicitis associated with human papilloma virus infection.
6. Hepatocellular carcinoma associated with liver cirrhosis and inflammation due to hepatitis B or C virus infection.

Summary

Key-word of this hypothetical scheme is oxidant and anti-oxidant. Anti-oxidant as well as anti-inflammatory effect of BioBran must be a potent candidate against cancer protection. Oxidant produced in the inflammatory area is a potent promoter and might attack DNA of regenerating epithelial cells which must fasten cell cycle. BioBran can protect oxidant attack as an anti-oxidant substance and inflammatory processes as anti-inflammatory effect so that it has prophylactic effect against cancer formation in adulthood. In advanced stage of cancer, BioBran can support immune function of natural healing power, which must accentuate immune system against advanced cancer cells in terms of less-self cancer cells as a major target of immunological rejection.

Moreover, this strategy must expand to apply to protect thrombotic reaction on the basis of chronic inflammation at site by BioBran. Initial step of atherosclerosis or thrombosis of the deep veins must be oxidant damage of endothelial cells along the arterial and venous system. Tar components of cigarette is one of the most potent oxidant effects so that they have to be avoided or suppressed by anti-oxidant. Thus, BioBran must be a versatile tool against various modes of life-style related diseases.