



# Role of Nutraceuticals in the Prevention and Cure of Fibroadenoma and Breast Cancer

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## Abstract

*Breast Cancer and the lesser known fibroadenoma are one of the many problems that wreak havoc in the lives of countless women. Nutraceutical, the new buzz word in the food and medical sector offers promising solution to solve such problems and aid in its prevention as well. Is there solid evidence to prove that Nutraceuticals is the ultimate super food and does it live up to all the hype and hope that surrounds it? The following article addresses this issue and will reveal why our mothers have always fed us with horrible tasting greens and grains despite our vehement protest during meal times.*

**Keywords:** Women, nutraceutical, fibroadenoma, Breast cancer and apoptosis.

## Introduction

The hand that rocks the cradle, rules the world yet forgets to put healthy food into her mouth, Women are such caring beings, so caring that they fail to care for themselves, Mothers who are determined to stuff healthy food into their child's mouth are unmindful of what they stuff into theirs. As a result of this over considerate attitude or the lack of it, most of the women around the world suffer in silence due to an assortment of problems ranging from anorexia, obesity, anaemia, diabetes, depression, fibroadenoma to breast cancer.

Only after disaster strikes do they run for cover, but then it's too late to turn back the clock. The proverb prevention is better than cure has been written for a purpose, but it is upto us to take the precaution. Here is an often repeated yet all the while shocking statistic by The National Cancer Institute, which has estimated that, during the period of a lifetime, 1 in 8 women in America will sooner or later develop breast cancer. Around 184,000 American women may be expected to receive the much dreaded diagnosis this year alone, and 44,000 women will have to give in to this killer<sup>1</sup>. These estimations were made in the year 2003, now in 2013 we are witnesses to how true the predictions are.

A lesser known problem that is prevalent among teenage girls and women under 30 years of age is Fibroadenoma, which is a fibrous lump like tumour found surrounding the mammary glands. When these movable lumps are felt by women, they start to panic thinking that it might be breast cancer but there is no need to worry as the lumps are benign. Literature shows that women who suffer from fibroadenoma during their early stages have a higher possibility of getting cancer in the latter part of their life than women who were not affected at all<sup>1</sup>.

Most Fibroadenomas are left alone and are treated using medication while some women insist on removing them as it causes discomfort. These lumps often appear during menstruation or in women taking contraceptives, so they appear for a while and disappear later on, but action must be taken in cases where the lump starts to enlarge and remains that way for a long period of time.

## Nutraceuticals

Let thy FOOD be thy MEDICINE, You are what you EAT, these pearls of wisdom were not written so that we can read and sigh saying –That's not for me that is written for some fitness freak or some skimpy model, no, it applies to all. Wholesome and nutritious food is the Holy Grail of health and wellbeing that is being ignored by many. When it comes to food, all that people are concerned is about the aroma and taste, no effort is being taken to find out if that which is good to the taste and sight is good for the health or not.

The term nutraceutical was coined in the year 1989 by the founder and president of the Foundation for Innovation in Medicine, Dr. Stephen DeFelice, MD. This term, a concoction of the words nutrition and pharmaceutical is so aptly crafted to clarify discussions pertaining to food and medicine and in the following years and it has become a part of the standard terminology in the nutritional field. A nutraceutical is defined as any material considered as food, or part of a food, with health or medical benefits, including the prevention, treatment or cure of disease. Today, nutraceutical is recognized worldwide as the singular word that portrays the emerging industry of food or food-related substances with prospective medical and health benefits and has carved a niche for itself on the dinner table<sup>2</sup>.

Women in the developing countries are slack about their nutrition, they are satisfied if their stomachs are full but seldom are they concerned about its nutritional value. In order to empower and facilitate women we must make sure that they make informed choices regarding their diet. It is essential that we need to educate them in aspects pertaining to the diseases and health problems that they can encounter and the ways they can combat them using locally grown and farm-fresh organic medicines instead of the expensive synthetic ones<sup>3</sup>.

## Era of Chemoprevention

Chemoprevention is defined as the utilization of minute molecules comprising of herbal or dietary chemicals for the prevention of disease, which is different from chemotherapeutics in which synthetic chemicals are administered to inhibit the manifestation of diseases<sup>4</sup>. When compared to chemotherapeutics, chemoprevention was widely sought after in the East for many years but has caught the attention of the West only in the recent years<sup>5</sup>.

Studies showed that estrogen and progesterone receptors were highly active in patients having Fibroadenomas and Breast Cancer, meticulous clinical studies and documentation have convinced us that using contraceptives such as tamoxifen, raloxifene, which are estrogen receptor antagonists, and a synthetic retinoid-fenretinide was efficient in conferring protection to women against fibroadenoma and breast cancer and on-going studies have also shown that the non-steroidal drug ormeloxifen which is an estrogen receptor modulator can shrink Fibroadenomas<sup>6</sup>. The Chemoprevention Working Group to the American Association for Cancer Research, has let out a report which in turn led to the acceptance that alternative medicines can also provide cure and the usage of nutraceuticals have been given the green signal and therefore research in phytochemicals is going on in full swing<sup>7</sup>. Currently in India a research is going on at CSIR-Central Drug Research Institute, Lucknow to find out if Triaryl pyranones can be used as a promising and new category of anti-breast cancer agents.

## Apoptosis and its Role in Disease

Apoptosis is programmed cell death, undergone by normal cells. Cancerous cells are thus formed because they have devised ways to evade apoptosis thereby leading to an abnormal growth of malignant cancerous mass. Due to the increased attention paid to apoptosis and its active participation in cancer, since the 1990s there has been a tremendous output of literature, with close to 70,000 correlated papers being published in the online journal PubMed. Findings point out that the defect in the apoptosis mechanism is the main culprit for cancer so studies are being conducted to find out how this glitch in our body can be put right. Many reasons are found – defect in the apoptotic pathway, enhanced mutation in Bax, Apaf-1, Caspase-8, down regulation, mutation or inactivation of death receptors, mutation of p53, absence of Fas ligand mediated killing, etc. Thus the

practical solution is to activate the death receptors and to reintroduce robust p53 genes to combat the cancerous cells<sup>8</sup>.

## Nutraceutical Aided Apoptosis

Scientists have recently found out the ravishing benefits of herbal plants which have been buried in mud for ages, only now have they started to appreciate the produce of the soil that they are touting its benefits in full steam. Nutraceuticals of plant origin have been thoroughly studied in vitro and those which are a part of our normal diet and those used for its medicinal benefits have shown commendable anti-cancerous properties. Garlic, Ginger, Soya Bean, Black Cohosh<sup>7,9</sup>, Green Tea, to name a few have shown encouraging results in promoting apoptosis of cancerous cells<sup>10</sup>. Researchers have determined that the "consumption of fruits and vegetables high in carotenoids and vitamin C and B12 will reduce the risk of breast cancer among premenopausal women, specifically among those who are at elevated risk because of a positive family history of breast cancer or consumption of alcohol."

In a study, the correlation between 17 minerals and vitamins and the risk of fibroadenoma and breast cancer was analysed in approximately 289 women with breast cancer and 442 women were used as controls. A food-frequency questionnaire was utilized to analyse and show the significant inverse trends in the rising risk levels when potassium, total carotenoid, lycopene, folic acid, vitamin C, vitamin E, and vitamin B6 intake exceeded the daily recommended values. After further analysis, the many benefits and protective effects of vitamin C and lycopene were found to be remarkable<sup>11</sup>.

Familiarity breeds contempt, it is indeed shocking to know that the familiar and often overlooked fruits, vegetables and herbs growing in our backyard and the general grains and meat could possess such astounding capabilities. The following super foods are sure to leave you pleasantly surprised: i. Carotenoids: Tomato is rich source of carotenoids and lycopene, a carotenoid, is a precursor of  $\beta$ -carotene. Both lycopene and  $\beta$ -carotene have proven capability of inducing apoptosis. ii. Flavonoids: Tea is rich in flavonoids, the tea extracts and tea polyphenols shows potential anti-cancer properties in mouse models. Among the tea varieties green tea is extremely popular for possessing astounding antioxidant properties which neutralizes the free radicals capable of promoting cancer. iii. Stilbenes: Resveratrol, found in pine, grapes and nuts have been found to have antioxidant and anti-inflammatory effect. The most exciting finding in this phytochemical is its ability to facilitate the induction of p53 at the level of mRNA and protein, which is desperately needed for apoptosis. iv. Sulfur-containing compounds: Broccoli, Cauliflower and Garlic have exhibited anti-proliferate activity against human cancers which was attributed to the increase in the levels of Bax. v. Soy: Soybeans contain isoflavones which act as weak estrogens to obstruct the proliferation effect. Research indicates that women from Asia whose intake of soy and soy based products have a lowered risk

of breast cancer when compared to American women who generally do not have soy food or supplements as a part of their diet. vi. Fatty acids: Fatty acids such as eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA), are both omega-3 fatty acids which is popular for its amplified immune and antioxidant properties. The foods that are rich in omega-3 fatty acids are herring, sardines, cod, tuna, salmon, mackerel and flax seed oil for the vegetarians. vii. Fiber: Fiber-rich diets are hugely popular in minimizing the risk of breast cancer. Fiber is considered to be beneficial because it lowers the level of estrogen. Legumes and cereals, especially bran has high concentrations of Inositol hex phosphate (IP6) which is an active component in lowering the occurrence of breast cancer. viii. Selenium: Recently selenium has gained popularity as a cancer-preventive agent. It reduces the risk of cancer by producing the glutathione peroxidase which is an antioxidant enzyme that guards the cells against damage by free radical from within. Selenium can be found in whole grains, Brazil nuts, and seafood. ix. Black Cohosh: A study was conducted in rats to assess the effects on gene expression in the liver and pharmacological parameters by actein which is a triterpene glycoside. Actein is an active component in black cohosh herb which has shown a remarkable potential to impede the proliferation of cancerous breast cells. x. Pepper: The effect of pepper against cancer cells and normal cells engineered to develop cancer has been constantly tested and monitored by scientists. In mice injected with human breast, lung, bladder or melanoma cancer cells, pepper inhibited tumour growth by diminishing the level of reactive oxygen species (ROS) and showed no toxic effects in normal mice. xi. Calcium D-glucarate: It is closely related to a natural substance, glucaric acid that is found in foods such as apples, broccoli, and cabbage. Calcium D-glucarate helps to clear toxins and excess hormones out of the body that would otherwise increase the risk of hormone-dependent cancers, such as breast cancer. xii. Other Phenolic Compounds: An active phenolic component that is extracted from the honeybee propolis-Caffeic acid phenethyl ester, is proficient in blocking tumorigenesis via a surge in NF- $\kappa$ B activity and curcumin from turmeric which is widely used in Indian cooking is adept at inducing apoptosis via a p53 mediated pathway.

The Journal of Oncology has published a paper titled The Role of Nutraceuticals in Chemotherapy and Chemoprevention and Their Clinical Outcomes, and other papers titled Delivery of anti-inflammatory nutraceuticals by nanoparticles for the prevention and treatment of cancer, Gene expression analysis of the mechanisms whereby black cohosh impedes breast cancer cell growth<sup>12</sup>, Actein impedes the Na<sup>+</sup>-K<sup>+</sup>-ATPase<sup>13</sup> and enhances the inhibitory effect of digitoxin which activates EGR1 and in addition to it interacts with a mitotic inhibitor paclitaxel, a drug used in cancer chemotherapy of breast cancer cells<sup>14</sup> and Carnosic acid inhibits the growth of ER-negative human breast cancer cells<sup>15</sup> and synergizes with curcumin shows that researcher are turning to nutraceuticals for solutions. Therefore we can see evidences piling up in favour of

nutraceuticals. Many women have testified to its capability of curing Breast cancer and fibroadenoma and therefore we can see that nutraceuticals stands an equal chance against synthetic chemicals.

## Regulations

In USA, a legislation called watershed legislation was passed in the year 1994 to standardize the production and marketing of nutraceuticals. The Dietary Supplement Health and Education Act, upturned 45 years of cumulative FDA regulation of health products. A similar law is under development in India to legalize production, import and export of dietary supplements or health foods and other nutraceuticals. In addition to it the central drug control department of our country has taken measures to instigate the rules but due to discord among states it is taking a long time to get implemented. A new association has been formed to deal with these issues. Also the Indian Health and Dietary Supplement Association was formed to embody herbal, nutraceutical, pharmaceutical, sales and service related industries and proposals were made to partner with The International Alliance of Dietary Supplement Associations. Frequent scientific conference will be conducted by the association to bring the government and industry together to communicate experience, information and perspectives on the consumption and regulation of dietary supplements<sup>3</sup>.

## Global Nutraceutical Market

Japan gave birth to functional foods in the 1980s. Europe in 1995 propelled the concept of new taste effects from unrelated flavours, creating products with increased fortification, sophisticated taste sensation and also promoted probiotic cultures. The projected global market size is US \$100 billion for functional foods. Currently, 55% of food, 36% of pharmaceutical, and 90% of biotech firms are enthusiastically researching nutraceutical products<sup>2</sup>. In the future other countries are certain to join the nutraceutical bandwagon.

## Advantages and Disadvantages

The major advantage of using nutraceuticals is that it is obtained from natural sources and can be trusted to have little or no side effect in comparison to pharmaceuticals. These natural pharmaceuticals are custom made to specifically address the many health problems in an organic, effective and accurate manner. The disadvantage is that it is a little too expensive and takes time to react but will definitely provide the intended benefits. There is the problem of quality control, an area of major concern and it deals with issues such as contamination by toxins and adulteration by harmful alternatives. Questions pertaining to purity, dosage and clinical consequences still hover in the background and to add to it all there is lack of public awareness as people are still sceptical if age old wisdom will exhibit any benefit at all. The present generation is an impatient one and requires immediate results so the idea of

waiting for the nutraceutical to work doesn't sound very appealing to them. As the old proverb goes "You can lead a horse to the water, but not make it drink", likewise you can rave about the very many benefits of nutraceuticals and lead people to it but you cannot coax them to eat.

### The Annie Appleseed project

When Ann Fonfa was diagnosed with cancer of the breast in the year 1993, it prompted her to explore alternative therapies and therefore in New York she formed a group. After 60 meetings or so, in June 1999 she created a concern called "The Annie Appleseed Project", which is now a 501(c) 3 non-profit organization catering to the needs of 85,000 people via the Internet on a monthly basis. Information collected by Ann and her volunteers can be found at ([www.annieappleseedproject.org](http://www.annieappleseedproject.org)). Ann is a person who is actively involved in promoting the benefits of alternate medicines to cure breast cancer<sup>16</sup>. She is an eminent personality as she holds many distinguished positions such as The Advocacy Chair for the Florida Breast Cancer Foundation, Florida's Field Coordinator for the National Breast Cancer Coalition and a member of the Society for Integrative Oncology. She is a consumer advocate on the Adverse Effects Methods Group, an associate of the Cochrane Collaboration and a member of CUE-Consumers United for Evidence-based Healthcare.

### Conclusion

The fact that this article might have revived your faith in adages doesn't mean that you should seriously consider following this one which says If a little is good, a lot is better, just because we are excited by the wonderful promises of nutraceuticals we must not go over the top and overdo the consumption part. Nutraceutical confirms the very essence of Abraham Lincoln's theory that some things work for some of the people, some of the time. We just do not know who. So moderation is the Key.

Women in their 20s are strictly advised to have regular self or clinical breast examinations and older women above 40s are recommended to have yearly mammogram or ultrasound done in order to detect Fibroadenomas or Breast Cancer at a very early stage and prevent it from progressing. Healthy and wholesome eating habits must be imparted in homes from an early stage so that your young girl will not develop harmful ones later on in life just to keep up the looks. On the whole women must not only be figure conscious but health conscious as well because if the hand that rocks the cradle falls sick, then who will run the world?

Nutraceutical is no new concept, it has always been around and practised by many mothers around the globe, but only after being given a fancy name tag is it suddenly in the limelight. Nutraceutical has potential benefits of becoming the most popular sector in the near future and now itself the products are selling like hot cakes that too with everyone turning vegan and

stuff. Being instrumental in the prevention and cure of fibroadenoma and breast cancer is just one aspect of Nutraceuticals, it has much more such cures which are under stringent study and can be implemented in the future bringing commendable benefit to women and all mankind in general in a nutritious and organic way.

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