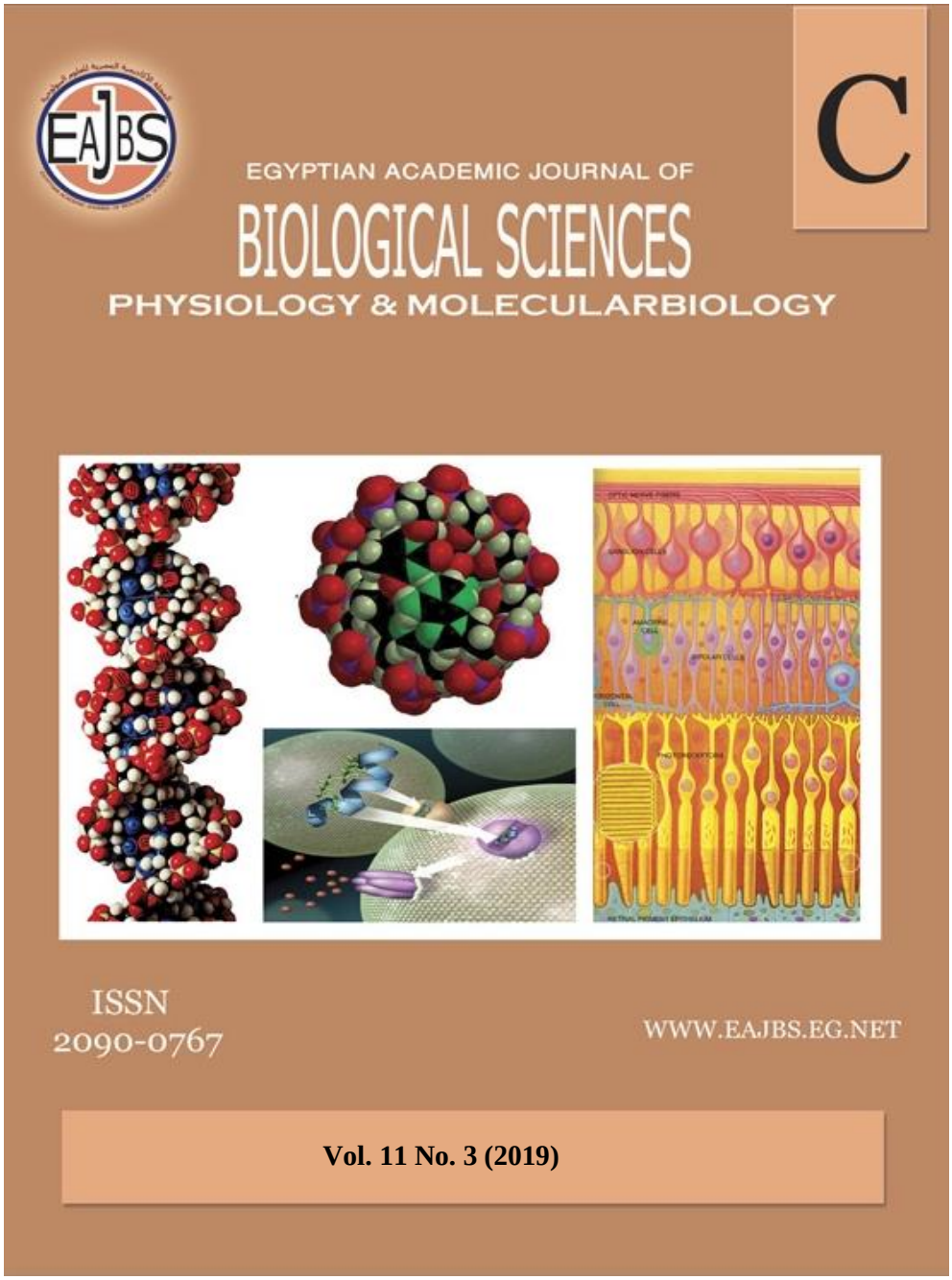

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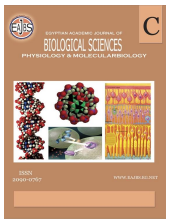

The Efficacy and Safety of Using ω−3 fatty acids to reduce the Incidence of Breast Cancer

Eshrag Saleh Baothman[1],and Abdullah M Elagali[2]
1-Laboratory Medicine, MSc, RMIT University
2-Department of Histopathology and Cytology Sciences, PHD, Ribat University, Khartoum
E.Mail: Esh.b@hotmail.com

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ABSTRACT

Background: ω−3 fatty acids are essential fatty acids through our bodies cannot make them. The main source of ω−3 fatty acids is fish especially Tuna, Salmon and Halibut species. Omega -3 fatty acids also play a vital role in brain function. It is very important to have the right ratios of ω−3 fatty acids in the diet. This study has established that consumed in the right quantities fish oil supplements containing high levels of Omega-3 fats mainly DHA and EPA had a 30 percent reduced risk of developing breast cancer. The project aims is to investigate and seek from many of the numerous studies that have linked Omega-3 supplementation with a decreased risk of invasive ductal breast cancer.

Methodology: The data in this study was collected via University Library as an electronic database by accessing another database such as Web of Science, ProQuest, PubMed, Medline, and Science Direct databases.

Results: The result part is composed of an analysis of five different studies conducted on the influences of fatty acids on breast cancer.

Conclusion of this study the ω−3 fatty acids does fight against breast cancer especially among women who have been diagnosed with the disease. Omega-3 fatty acids can shrink the breast cancer cells preventing metastasizing

INTRODUCTION

Despite the opinion that omega-3fatty acids defend against breast cancer, epidemiologic studies have come up with inconsistent results. Though preclinical data heavily support the protective effect, contradictions persist, which impede definite suppositions despite 30 years of research in this area. The character of diet in breast cancer progress remains controversial. The contribution to mammary carcinogenesis of the specific fatty acid (FA) composition of the diet has received considerable attention in the literature (Nitsche, et al. 2008 24). Among the FAs, omega-6 and omega-3 fatty acids have been suggested to increase and decrease breast cancer risk respectively (Braden, *et al*. 2008).

Omega−3 fatty acids widely known as n-3 fatty acids are prevalent in plant oils and marine. They are polyunsaturated fatty acids (PUFA) which have a double bond (C=C) that begins after the third carbon atom. The n-3 fatty acids consist of the

methyl (CH3) end and the acid (COOH) carbon end. Omega-3 fatty acids have inherent health benefits hence are regarded as essential fatty acids, which means that they are not formed by the human body; rather they are necessary for normal body metabolism (Simonsen, *et al* .1989). Even though mammals cannot manufacture omega−3 fatty acids, they still have a minor ability to build up the long-chain fatty acids, such as α-linolenicacid (ALA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Regular sources of the fatty acids are algal oil, fish oils and other plant oils, for example, echium and flaxseed oil (Bartnikowska, *et al*. 1997).

Sources of ω−3 fatty acids consist of freshwater fish that encompasses eicosapentaenoic acid, and (DHA), certain seeds (flax) and nuts (walnuts), and some vegetable oils (soybean). Plant sources of n-3 FA contain a-linolenic acids (ALA). Supplies of n-6 FA include vegetable oils, for example, corn or sunflower oil [containing linoleic acid (LA). After extensive researches carried out in Japan, USA, and France on the overall fat consumption, it was concluded that fats have no link to breast cancer; the amounts of fat could be (Science daily, *et al.,* 2010). The researchers studied the linkage that exists between the amounts of PUFA in adipose tissue in breast tumor incidence and postmenopausal females. Almost 291 breast cancer victims and approximately 351 controls were applied during the research, which took place in five European health centers. All victims had segments of adipose tissue taken and scanned for the amounts of the key polyunsaturated fatty acids: i.e. omega-6 acids (LA), docosahexaenoic acid (DHA), omega-3 acids - eicosapentaenoic acid (EPA) and alpha-linolenic acid (ALA) (Simopoulos, *et al.,* 2002).

The research found a tendency to accumulative incidence with cumulating stages of omega-6 in the adipose muscle trials even though they did find no important relationship between levels omega-3 fatty acid and breast cancer. Secondly, researchers found an important connection between the level of DHA and EPA to levels of LA and the occurrence of breast cancer in 4 out of every 5 patients of the medical centers, who participated in the study. They discovered that women with high levels of adipose tissue of both DHA and EPA and low levels of LA and its metabolites are at less risk of cancer (Braden, *et al*., 2008). The scientists further noted that LA is the initiator of some eicosanoids that may then cause cancer development. EPA and DHA hinder the formation of these dangerous compounds and may hinder tumor growth (Dewailly, *et al.,* 2001).

Several epidemiological researchers have found a contrary connection between the depletion of fish and prevalence of breast cancer cases and desire for more research to ascertain the connection between dietary consumption of fish and breast cancer occurrences (Dimri, *et al.,* 2010). The studies indicate the following Intake of ω−3 fatty acid has enhanced less spread and slowed the growth of the tumor (Galli, et al. 2007 and Qamr, et al. 2009). Another study of approximately 12, 866 men in the U.S showed that those consuming large quantities of omega-3 and fewer quantities of omega-6 exhibited a lower risk level of 33% of suffering from cancer (Dolecek, *et al.,* 2007, Bartnikowska, *et al.,* 1979).

ω−3 fatty acids are acquired by consuming food, thus making external

sources of these fats "vital." Fish that are wealthy in essential oils also referred to as omega-3 comprise tuna mackerel, mullet, salmon, sturgeon, sardines, bluefish, menhaden, herring, and trout. (Willett, *et al.*, 2010 and Vibet, *et al.*, 2008) Although not all specialists approve this, women who feed on diets with ω−3 fatty acid in many years are unlikely to acquire breast cancer. Thus additional findings are required to show omega-3 fatty acids activity on breast cancer. Previous studies have revealed an entirely natural prescription, that not only defends against the growth of cancer but also those patients who have been identified with inveterate cancer and discharged to die, have managed to live normal lives (Dimri, *et al.*,1998). It's also likely that the omega-3 diet may help in the treatment of depression, according to the scientist who premeditates the effects of omega-3s on the disease (Bartnikowska, *et al.*, 1979 and Dimri, *et al.*, 2008).

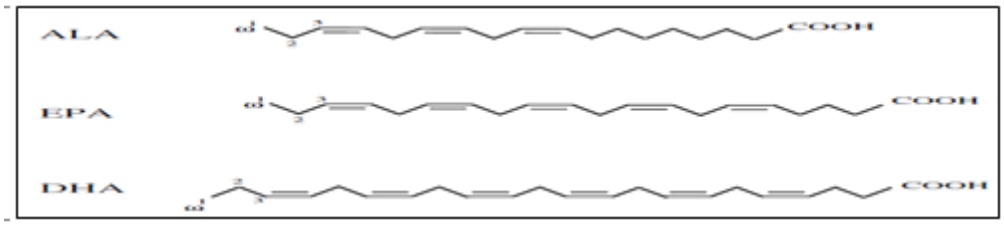

Fig.1. Chemical structures of Omega-3 PUFAs. ALA: α-linolenic acid; EPA: eicosapentaenoic acid; DHA: docosahexaenoic acid

Oil	Omega-6 Content	Omega-3 Content
Safflower	75%	0%
Sunflower	65%	0%
Corn	54%	0%
Cottonseed	50%	0%
Sesame	42%	0%
Peanut	32%	0%
Soybean	51%	7%
Canola	20%	9%
Walnut	52%	10%
Flaxseed	14%	57%
Fish*	0%	100%

Fig.2. Percentage of Omega 3 and Omega 6 in dietary intake Prevalence of breast cancer maximized as Icelandic and Greenland women discarded their usual diets of seafood (Bjarnason, 2008).

MATERIALS AND METHODS

The data in this study was collected via University Library as an electronic database by accessing another database such as Web of Science, ProQuest, PubMed, Medline, and Science Direct databases.

The studies were limited to English articles which were written in recent years those articles might be trials, reports, review, and original articles which recovered from reference lists of identified studies to expand the search. The Endnote program from RMIT Library was used to organize the references for this study by using the Vancouver style in writing.

RESULTS

The result part is composed of an analysis of five different studies conducted on the influence of fatty acids on breast cancer. The first study

was by Ruth *et al* on the prognosis of breast cancer with the ingestion of fatty acids in drug and food supplements. The second result by Joann *et al* analyzes the influence of vitamin D and ω−3 fatty acids in the prevention of breast cancer. The third sturdy results by Isabelle *et al* show the results obtained from the clinical trials of fatty acid food supplements on the prevention of breast cancer. Forth study results by Kent and Neil show the stem cells and fatty acids in cancer prevention. The last results by Brown *et al* are about the level of detection of ethanolamines in patients after treatment with omega-3 fatty acids.

Prognosis of Breast Cancer with Ingestion of Marine Fatty Acids:

The choice of patients for observation of the prognosis of breast cancer is limited to women with no history of cancer recurrence. Ruth *et al* conducted research on women who averaged 3088. The women were administered with fatty acids food sources and supplements in different doses. The occurrence or non-occurrence of breast cancer was observed among these women. Some of the obtained results are provided in detail in table 1 below.

Ruth *et al* found out that there was a 25% risk reduction for additional events of breast cancer. A combination of marine fatty acids with dietary supplements produced the same effect. There was no sufficient evidence of additional events of breast cancer due to EPA and DHA supplements. Ruth *et al* collected information about the intake of fatty acids from self-reports of subjects. The mean of the intake was calculated and found to be around 185 mg per day (Calviello, et al. 2009, Koletzko, et al. 2010 36). An average of 4.0 women reported using supplements with ω−3 fatty acids such as fish oil supplements. The women who used fish oil supplements recorded a daily intake of the fatty acids that averaged a minimum of 350 mg. The study by Ruth *et al* recorded that several women who were using the fish oils to supplement their fatty acids content did not experience any additional events of breast cancer. A further examination of the reported information revealed that most of the women who did not take fish oil supplements recorded increased events of breast cancer.

The use of a time-dependent multivariable covariate helped in the calculation of the events of breast cancer in these women. The model revealed a 25% reduction of the risks related to the breast cancer for the women who took fish oil supplements containing n-3 fatty acids (Dimri, et al. 2008).

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Table 1: summary by Ruth *et al* on the association of marine fatty acid intake with a prognosis of breast cancer

Study population	Mode of fatty acid intake	No additional cancer events	Additional cancer events
3088 women with non-recurrent breast cancer	Food sources	n	n
	Baseline	2564	517
	6 mo	1214	195
	12 mo	2331	314
	24 mo	1129	115
	36 mo	1111	100
	48 mo	2189	144
	72 mo	2085	60
	Supplements	% of users	% of users
	Baseline	4.1	5.0
	6 mo	3.3	3.1
	12 mo	3.9	3.5
	24 mo	5.6	0.9
	36 mo	6.2	4.0
	48 mo	7.1	6.3
	72 mo	10.7	1.7

Effects of vitamin D and ω−3 fatty acids on cancer prevention. This study by Joann *et al* selected a group of 20,000 US women and men. The choice of these people was restricted to subjects with no history of cancer or cardiovascular disease. People from the African American origin were given special consideration due to the inability of their pigmented skin to synthesize vitamin D. The male and female were randomly administered with supplements of marine fatty acids at baseline and follow up procedures. They were observed for a period of 5 years. The observations are provided as in table 2 below. It has been found out that ω−3 fatty acids and vitamin D are helpful in the reduction of risks towards cancer and cardiovascular disease. Other than these, the omega-3 and vitamin D supplements also aided in the prevention of secondary of these diseases as well as reducing the high risks (Manson, *et al.*, 2012).

Table 2: Summary by Joann *et al* on the vitamin D and n-3 trial (VITAL) on the prevention of cancer and cardiovascular disease (CDV).

Study population	10, 000 women aged over 55 years		
	10, 000 men aged over 50 years		
	Total cancer	Cancer Mortality	Breast Women (Normal)
	52.1	-	-
	86.3	-	-
	98.5	-	-
	99.9	42.3	32.8
	99.9	60.9	48.4
	99.9	77.7	64.7
	99.9	89.7	79.0

Clinical Trial for the Prevention of Breast Cancer:

This study by Isabelle *et al* selected women who appear to be at a greater incidence of developing breast cancer. As subjects for the assessment, 3,081 breast cancer survivors were used to assess whether a major increase in dietary fat ingestion reduces the risk of recurrent and new primary breast cancer. Trained dietary assessors obtained detailed statistics on dietary ingestion and also probed participants on the exhaustion of dietary complement, Even so, the use of double-blind randomized control trial was applied to increase the efficiency of the survey as well as to do away with any possibility of biasness. 35,016 postmenopausal women between the ages of 50 and 76 took part in a ten-year vitamins and lifestyle (VITAL) study. All participants were residents of Washington State and had no history of breast cancer (Bjarnason, 2008).

Dietary foods such as flaxseed and drugs such as anastrozole were used as sources of omega-3 supplements. Isabelle et al used biomarkers for the observational process. Details of the study are provided ion table 3 below.

These include breast density and the progress of cancer. At the end of the clinical trial on the cancer survivors, concerning the original tumor, 16.8% had additional invasive breast cancer events and 10.2% died. Breast cancer caused 83.1% of the deaths while 8.6% of the deaths were by other cancers (Bjarnason, 2008).

Information on the ingestion of marine fatty acids was also taken during the study.Generally, the ingestion of marine fatty acids increased overtime. Women who had increased ingestion of fatty acids from marine foods did not experience additional breast cancer events. For those who did not increase intake, they experienced additional events. ‘This is the major study conducted on breast cancer survivors to indicate that consumption of marine fatty acids is associated with improved breast cancer prognosis; high intakes of EPA plus DHA from marine food was associated with a reduction in additional breast cancer events’ (Galli, et al. 2007 and Harris, 2012).

Table 3: A summary by Isabelle *et al* on the clinical trials for the Prevention of breast cancer

Trial tools	Outcomes that are measured
n-3 dietary supplements such as lovaza Drug applications such as roloxifene	Density of breast, oxidase stress biomarkers, Metabolites.
Diet supplement included flaxseed. Drugs used was anastrozole	Primary cancer development, baseline changes to a period of 6 months
Flaxseed dietary supplement Drug called anastrozole	Transformations from the Original biopsy of tumor to a resection tumor, The recurrence of mammas rate scores. Profiles of steroids and growth hormones
The use of n-3 in the diet to preventing breast cancer	Mammographic density of the breast, Peroxidation of lipids, hormones.
Dietary supplements of flaxseed, the anastrozole drug	Characteristic of the tumor, apoptosis as well as proliferation

The Role of Stem Cells in Cancer Prevention:

This study by Kent and Neil employed the services of experimental animals and tumor cells from human beings and found that high concentration of EPA, DHA, and CLA is capable of altering cell tumor genesis. However, dietary application of these agents in humans gives a very weak link to the prevention of breast tumors. By culturing tumor cells in dishes with low adherence, the effects of fatty acids on proliferation and cytotoxicity were observed for two weeks. The cells causing tumors (stem cells) were significantly altered by the fatty acids. Fatty acids prevented both cancer tumor proliferation and cytotoxicity (Erickson, et al. 2010). Detailed results are presented in table 4 below.

Table 4: Summary of Kent and Neil on the role of stem cells in fatty acids prevention of breast cancer

Control element	Dead	1 cell	2-8 cells	Small cluster	Tumor sphere
Control	0%	22%	35%	74%	100%
LA	5%	6%	15%	52%	100%
(t10.c12)-CLA	55%	58%	82%	98%	100%
C9.t11-CLA	55%	59%	72%	98%	100%
EPA	36%	0%	56%	87%	100%
DHA	48%	52%	67%	98%	100%

Ethanolamides Detections after Treatment with N-3 Fatty Acids:

According to Brown *et al*, the time during which eiccosapentaenoyl ethanolamides retebntion (EPEA) occurred was approximately 6 minutes. Instead, the retention time for docosahexaenoyl ethanolamide (DHEA) in the human cell was observed to average about 7.0 minutes. The chromatography results on the retention of 2- arachydonoylglyceral (2-AG) recorded a peak result of 7.8 minutes.

This study by Brown *et al* used both human and animal cells. Human prostate and breast cancer cells were collected together with the cell culture of animals and tested with fatty acids. Several observations were made with other kinds of cells and cell compounds. Two peak retention times were observed for 2- AG as shown in table 4 below. According to Brown et al, n-3 fatty acids aid in inhibiting the growth of prostate and cancer cells as shown in table 5. All the cells not treated had a greater level of the overall 2-AG as compared to endocannabinoids as demonstrated by Brown *et al*. This is obtained to meet the mean of the value 135.63 pmol/mg, which confirmed that the breast-related cancer cells attain a higher baseline than that of prostate-related cancer cells with respect to the 2-AG level. The EPEA was absent in the untreated breast cancer cells. After the

administration of treatment, MDA-MB-231 cells increased significantly as MCF-7 cells, which resulted in the production of both 0.99 pmol/mg of the overall cell protein and 0.93 pmol/mg of the total cell oriented protein. There was an increase in the DHEA related synthesis in cell lines following the treatment of cells with DHA. It is therefore correct to say that the actual treatment of the cancerous cells with DHA as well as EPA causes an increase in the level of the corresponding n-acylethanolamine endocannabinoid related derivatives in actual vitro (Bjarnason, 2008). This is so irrespective of the presence of FAAH. The CB receptors, as well as the levels of FAAH, enable the actual treatment of cancer through dietary based intervention or perhaps the actual supplements of the available n-3 fatty acids (Pardini,et al. 2007 and Trappmann, et al. 2011).

Table 5: Summary by Brown *et al* showing that omega-3 N-acelethanolamines is synthesized endogenously from omega-3 fatty acids in different cancer and prostate cell lines

Endocannabinoid Compounds	Peak retention time at 100 relative abundance(min)
EPEA	6.05
AEA	7.50
AEA-D4	7.50
DHEA	7.34
2-AG	7.89

DISCUSSION

From the research, there is satisfactory evidence to suggest key involvement between ω−3 fatty acids and cancer incidences. According to the study, there was a 25% risk decline for extra events of breast cancer. A mixture of marine fatty acids with nutritional supplements created an identical effect. There was little confirmation of extra events of breast cancer owing to EPA and DHA supplements. The study by Ruth *et al* established that some women who used the fish oils in a supplement of their fatty acid content did not have recurrent events of breast cancer. An additional evaluation of the research revealed that the majority of the women who did not use fish oil supplements developed high events of breast cancer (Aben and Danckaerts, 2010). Nonetheless, the use of time reliant multivariable covariance assisted to approximate the events of breast cancer among women. The model confirmed a 25 percent decline in the risks linked with breast cancer for those women who had used fish oil supplements rich in n-3 fatty acids.

Thus, it was evident the feeding of marine fatty acids was connected to enhanced cancer prognosis in particular among the cohort of 3088 women with non-recurrent breast cancer(Table 1). Huge intakes of DHA and EPA in food also reduced the breast cancer recurrences. It is clear the models that used marine fatty acids as a constant variable were not considerable, and hence there were no indications of a linear association amid this experience and breast cancer result.

There is a brink effect with intakes of >72 months as the extra cancer events were negligible concerning intakes of baseline and >6 months which amplified extra cancer events. The median intake was of >72 months and this was associated with a

reduction in the risk. In line with our expectations, fish oil supplements gave huge amounts of marine fatty acids and were in no way associated with recurrent breast cancer events. The use of fish oil supplements in this cohort of 3088 women with non-recurrent breast cancer was small and therefore not adequate to examine its exposure. Also, the use of fish oil supplements contributed minimally to enhanced outcomes in this cohort is an indication that fatty acids from foods are usually indicative of other dietary and lifestyle factors. The modifications in our analysis have attempted to isolate an independent effect; unmeasured variables cannot be wholly evaluated in an observational study of this nature. It is now confirmed that results researching the link between breast cancer risk and ω-3 fatty acids will vary based on the design of the study (Bahadori, et al. 2010). These results did confirm the significant effects of ω-3 fatty acids from fish on breast cancer incidence in women with non-recurrent breast cancer. However, with respect to the etiologies of recurrent breast cancer, various hypotheses will hold. Thus in most cases, the link between nutritional fat ingestions and breast cancer risks will vary in women with recurrent breast cancer.

All cancer patients will differ from the controls in their dietary habits. The adding of other nutritional supplements has assisted us to know the impact of ω-3 fatty acids ingestion. From the study by Joann *et al* , when a cohort of 10, 000 women aged over 55 years and 10, 000 men aged over 50 years were exposed to Vitamin D and consumed ω-3 fatty acids, and their risk of cancer was lowered. Dietary DHA is known to be protective against aggressive prostate cancer in men and breast cancer in women. Furthermore, more research into nutritional intakes of Halogenated hydrocarbons or heavy metals and genetic factors will be imperative in expounding the protective effect of fish intake on breast cancer (Musa, et al. 2010).

It is very evident that Omega- 3 fatty acids inhibit the tumor growth in breast cancer and high intakes reduced considerably the risk of cancer. There was almost a 50 percent decline in the incidence of cancer deaths and a 19 percent decrease in mortality among the men and women taking Omega-3 fatty acids. Thus, there is a clear link between increased ω-3 fatty acids ingestion and a favorable cancer prognosis in the cohort of 10, 000 women aged over 55 years and 10, 000 men aged over 50 years (Lee, et al. 2009).

Advances in medicine in the past decades have enhanced the identification and cure of breast cancer. In spite of this progress, breast cancer remains the leading cause of mortality among women with majority relapsing with metastic disease. The survival rates of the disease have remained minimal after close to 10 years. Joann's *et al* study raises the fact that the surveillance of tumors and other defensive mechanisms could have the capability to control the disease. This study by Joann *et al* researched a cohort of 3081 women who at the time were at high incidence of developing the disease. Omega-3 blocks the development of breast cancer tumors even in women with recurrent breast cancer (Lee, et al. 2009).

Advances in medicine in the past decade have enhanced the diagnosis and treatment of breast cancer. In spite of this progress, breast cancer remains the leading cause of mortality among women with majority relapsing with metastatic disease. The survival rates of the disease have remained minimal after close to 10 years. The fact that the surveillance of tumors and other defensive mechanisms could have the capability to control the disease. The Joann's *et al* study researched a cohort of 3081 women who at the time were

at high incidence of developing the disease.

Thus, the clinical trials by Isabelle *et al* in the cohort of women at the high incidence of developing cancer established that with the consumption of omega-3 supplements, just about 16 percent had other breast cancer occasions and close to 10 percent succumbed to the disease. Many of the deaths were due to breast cancer and just about 8.5 percent was attributed to other cancers. During the research, the ingestion of marine fatty acids increased over time and those women who had increased their ingesting of marine fatty acids did not have extra breast cancer events. The women who did not increase their consumption of marine fatty acids, however, developed additional breast cancer events. This is the first study to be done on breast cancer survivors that have established a link between the ingestion of marine fatty acids and flaxseeds improved breast cancer diagnosis. Thus from the cohort of the cancer survivors, it was established that huge intakes of DHA, EPA, and Flaxseeds as treatment reduced the occurrence of breast cancer events (Koletzko, et al. 2010).

Kent and Neil, in the research they used experimental human and animal tumor cells and established that cells with high concentrations of DHA, CLA and EPA could tumorigenesis of the cell. Nutritional applications to these agents yielded a weak link in the prevention of breast cancer tumor growth. It is evident fatty acids altered the tumor causing cells and hence prevented the growth of additional cancer events. Our present paradigm with respect to cancer prevention was introduced when many cancers were perceived as homogenous collections of many transformed cells (Wood, et al .2010). This study by Kent and Neil has noted the mixed nature of solid tumors and the role played by stem cells.

We cannot deny the fact that stem cancer therapy theory has significant implications in relation to cancer treatment as most of the chemotherapy regimens used have been able to shrink tumors by killing the non-stem cells and hence eliminating the cancer stem cells. Epithelial models of cancer have given hope for the use of epithelial stem cells as the main candidate to be used as a predecessor of the cancer stem cells. So what unique features does the stem cell have to offer such prospects in cancer treatment Stem cells are known to have unique properties of self-renewal, prolonged existence, and pluripotential. Though most adult stem cells are tissue-based, more attention was concern to the circulating adult stem cells such as HSC (hematopoietic stem cells) and MSC mesenchymal stem cells. Key aspects of the stem cells are controlled by the stem cell niche.

A vital step in tumor development is the angiogenesis process as it includes the recruitment of endothelium progenitor cells from the blood to produce new blood vessels. In our model system, solid tumors could also arise from BMBDs instead of the epithelial stem cells as in the majority of cases they have been brought to the site by the chronic injury and inflammation of tissues. Inflammation promotes and some cases are known to induce cancer and this study established that T cells and macrophages are vital when it comes to sustaining the progression of the tumor. On the other contrary, the modifications in the stem cells could even result in the conversion of normal stem cells into cancerous stem cells. Nevertheless, more comprehension of the nature of stem cells could provide new approaches for inhibiting the formation of cancer at the initial stages when it is easily controllable (Heird, 2010). There is an essential to know the role that maintenance of cell division and differentiation of stem cells play, as this could result into a

new approach that will give indications of the pathways that are contributory in the progression of cancer, and this could eventually produce new approaches for the treatment of cancer.

The notion that the existence of the transformed population's cells with a characteristic of stem cells is responsible for the growth of tumors is very dominant in the breast cancer field. Any novel treatments targeting the population of stem cell cancer can be used to treat both metastatic and primary breast cancer tumors. Most of the therapies using cancer stem cells have been proven to be clinically relevant when it comes to the inducing the long term clinical remissions of cancer.

We should not also ignore that cancer stem cells have cell antigens that give new targets for the immune therapy of cancer. Dendritic cell (DC)-based therapies and adoptive T-cell transfer are known to treat putative cells with tumor origin and they are many times used with present treatments (Lee, et al. 2009). To ensure our treatments are effective, researchers will need to define the cancer stem cells in terms of antigenicity and the distinctions between stem cells and the cancer stem cells. Thus, it is imperative to assess the function of stem cells in mammopoiesis, their role in tumor development and the prospect of using cancer stem cells for therapy with a spotlight on breast cancer.

In the study by Brown *et al* it was established that eiccosapentaenoyl ethanolamides retention (EPEA) occurred in around 6 minutes while the retention time for docosahexaenoyl ethanolamide (DHEA) in the human cell was close to 7 minutes. Thus, the Endogenous synthesis of omega-3 N-acelethanolamines by omega-3 fatty acids in prostate and cancer cells in the cohort of human and animal cells showed that n-3 fatty acids helped in the prevention of the growth of cancer and prostate cells as illustrated in table 5. The cells that had not been treated with ω-3 fatty acids showed high levels of the overall 2-AG concerning endocannabinoids in the study(Joensen, et al . 2010).

Thus, the treatment of cancer cells by the use of EPA and DHA results in the increase of n-acylethanolamine endocannabinoid in actual vitro. DHA and EPA have been known to activate the CB1 and CB2 results in LNCaP and PC3 cells. The ethanolamides DHEA and EPEA can be detected in vivo after the intakes of nutritional diets rich in DHA and EPA. The mechanisms responsible for such inhibitions are so far unclear as they differ between DHEA and EPEA and also in the prostate cancer cells used in the study (Koletzko, et al. 2010). There is no doubt a statistical difference between the potency of ethanolamides concerning their fatty acid parent molecules.

DHEA is known to cause apoptosis in PC3 and LNCaP cells. Results from Brown *etal* study show that omega-3 long-chain polyunsaturated fatty acids (LCPUFA) can induce apoptosis(Koletzko, et al. 2010).independently of the p53 activation that could adapt the appearance of the mutant p53 to establish the wild type role in brain cancer cells. It is still vague whether omega-3 ethanolamides can affect apoptosis in a similar reactivation approach in either breast or prostate cancer cells. Finally, it is now confirmed that EPEA, DHEA, and omega-3 ethanolamides are more patent than their parent fatty acids DHA and EPA in inhibiting prostate cancer growth (Musa, et al . 2010). Thus as a proposal, DHEA and EPEA should be classified as endocannabinoids as omega-3 ethanolamides are produced in *vivo* after intake of their parent fatty acids, EPA and DHA

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