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Exploring the Anticancer Potential of Phytochemicals: A Review

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Abstract: Targeting cancer receptor cell are help full for retain the substrate of vegetable, fruits and plant based phytochemical extraction can eliminated to enumerated over utilization of cancer cell and mitochondrial pathway could synthesis dead end receptor cells can intermediate apoptosis and protein synthesis, cellular regression channel membrane could promotes indicates loss of dead cell progression is used to utilizes synthetic and semisynthetic natural, biological agents occurrents for cancer cell receptors of healthy individual cell shood inhibit development of DNA cellular damages propounded to leading breast cancer, colon cancer, oncogenomic for tumor suspension genes are[DNA/RNA]repair the regulatory genes, mediation of cellular cyclic regeneration involved in cellular adhesion factor invasion of epigenetic DNA/RNA is directly involved in cellular modification and histone protein, DNA&RNA involved to micro and macro disintegration contributes to regulation of genetically modified cancer expressed to their cellular body can intimate further leads to development of cancer.

The basal substrate of fruits and vegetables can incorporate with the presence of phytochemical compound is directly enables to prevent the cellular modification leads to development of cancer cells. Her phytochemical compound is effective for traditional medicinal system [TMS] and other are used in pharmaceutical medicinal development of cellular and acellular opportunities can incorporated to treat cancer cells and anticancer, antitherapeutic wound healing, anticancer-treatment for essential anti-draggability of vitamin and minerals are naturally present on fruits and vegetables. Plants are containing differential phytochemical prevented anticancer activity prolonged to green-tea, reversion dry grapes, sunflower seeds, broccoli, cauliflower and vegetable like ginger, garlic, turmeric, tomato, Rosmarinus from rosemary plants and apigenin are partially utilized for anticancer proliferation substrate of phytochemical.

Keywords: Anti-cancer treatment, anti-draggability, anti-therapeutic wound healing, chemotherapy, vegetables, fruits, traditional medicinal plant, phytochemical extraction, phytochemical compound.

I. INTRODUCTION

Cancer in worldwide doctors and scientist are described to the overgrowth cellular disease shood targeted to withstand the proliferation cells due to malignant. Worldwide global health care noted the tolerance of dead rate through cancer cells are contributed to liver cancer, breast cancer, lung cancer, skin cancer, cervix uterine cancer, stomach cancer, brain tumor it causes into over 15to30% of annual death rate in all over states of INAID. Our government can support to lead traditional medicinal system and modern form of therapeutic multispecialty cancer curing centers are approved for treating the cancer cells before attenuated in and preclinical developed stage itself we can eradicate the cancer with the help of anti- cancer therapeutic treatment and traditional medicinal treatment system can eradicate over into development stage of cancer by the help of phytochemicals are highly reduces the cause of damage in our body.

The year of 2018 & 2020 global level impact over developing countries in all 16.74Million people were identified to various different types of cancer where has been leads to over the 4th, development of stage can lead to operate the affected cancer part. Doctors and scientist, they were considering highly incorporates to traditional natural medicine treatment and modern form of diagnostic cancer centers immediately find out the procedure of treating cancer in a developed stage. But traditional medicine system can lead to giving for a particular target medicine cancer in a biological, phytochemical increase modern form. Treating in a particular part of over utilization of cellular treatment through highly incorporated medicinal plants and fruits, vegetables, belongs to phytochemical extraction process towards treatment of anti-cancer. TMS can reduces biological treatment to targeting in a particular sight for reduce the rate of biological, enzymatic phytochemical compound are extracted in medicinal plants.



Chemotherapy treatment prevents to synthesis natural bioactive compound carried out initial stages of carrier cell and compound are prevailing for potential cell intersection and the area of chemotherapy treatment involves to phytochemical extraction prolongs to biological cancer cell are differentiated to identification of X-ray, MRI-scan, PET/CT-scan, and ECG-radiation.

These instruments are used to identify the size and shape of a cancer cell vs, normal cells.eg., differentiate to identify the breast cancer, skin cancer, cervical cancer and tumor cells.

II. APIGENIN PARSLEY& CELERY CHAMOMILE EGYTIAN PLANT MORINGA PEREGRINA

These plants majorly used for flavonoids in vegetables such as parsley celery chamomile is active cytotoxicity agent for the treating of cancer breast cell lines and colonize the cell lines and colonize the cellular activity, it may enhance the <u>doxorubicin</u> substance form the human clone and cancer cell may reduce the formation of male Sprague Dawley rats increases the apoptosis. In which may contribute to clone cancer prediction through receptor pathway and they induce the cell apoptosis in lungs and adenocarcinoma cell line it may also increases melanogenesis in <u>B16</u> cell by activating the <u>P38</u> used for MAPK pathway particularly used for B16 cells are activated in <u>P38</u> MAPK is prudentially used for detect apigenin derivate many potentially be used for treat the cancer cell line and apoptosis cell strength for cell shrinking.

It is an potential therapeutic effects of apigenin and used for the essential flavonoids can be utilized the facilitated the extemporary studies of human cell line and cancer treatment may treated hyperpigmentation disorders for cell shrinking and cell swelling etc.

A. Curcumin From Turmeric

Curcumin is an active compound found in turmeric has a plethora is used for beneficial Indian species -turmeric the basal extract found in curcumin is the family of GINGER. It acts as an anticancer study. It is used to treat some efferent studies ,colon cancer ,breast cancer and lung metastasis brain tumor they can windup to treat natural anti-inflammatory compounds that may useful in various health conditions like heart disease, cancer treatment and Alzheimer disease, control the anti-inflammation and cancer treatment by the help of curcumin compound is majorly utilization of inducing apoptosis in cancer cell without any cytopathic effects healthy cell may induce to attains cancer research . It connects with inflammatory disease includes blood cancer, breast cancer, skin cancer and tumor growth cells through regarding enclosed multiple cells signaling pathway shood induces the alternative function endothelium living in our blood vessels can reduces the risk of apoptosis. It induces through regulation of multiple cell carryover signaling including proliferation pathway, The mitochondria inhibit cellular growth has been detected to IL-1 beta cell matrix, metalloproteinase **-3** enhance the children's and adult's inflammatory bowel disease.

It can improve our endothelium blood vessels can be reduced the risk of heart disease and curcumin is potentially treat the depression, boosting the level of our immunity and cell growth cell stability they helpful for neutralizing our body antioxidants, ant iconicity and boost our body immune system.

B. Crocetin Extraction From Saffron

Saffron plant are the species of crocus sativa present in <u>saffron crocus</u> majorly utilized in layer of dry stigmas of plant used for potential agent treated anticancer and anti-therapeutic as an potential source for anti-drug agent helpful for hepatocellular carcinoma this flower extract action method has been help full for ethanol extract and used to study of human lung cancer, pancreatic cell cancer, skin cancer ,colorectal cancer and breast cancer treated through mechanism of an action and general credential affects over growth of cancer cell line and inhibition of nucleic acid synthesis of anti-oxidant system induces the cell shrinking and programmed cell death [APOPTOSIS] handling growth factors signaling as fair enough for cellular pathway.

Croce tine compound is naturally found in saffron flower [CROCUS SATIVUS] actin as yellow pigment responsibility for the properties of color processing may also play major health benefits due to antioxidant and ant-inflammation properties are essential for biological components are present saffron they inhibit lipopolysaccharides [LPS] nitric oxidase and reduce the production of an <u>TNF-alpha IL-1beta</u> intracellular reaction of oxygen travel through activation of effective <u>LPS cell death</u>.

C. Cyanidins Synthesi From Grapes

Cyanidin extraction has been taken from red grapes, black grapes, red berries and blackberry, cranberry, raspberry and majorly found in apple plums, red cabbage red onion ensures the properties of antioxidant radicals scavenging effect which may retain cellular dis-function and reduces the risk of cancer.



This process is essential for inhibition of new cell proliferation through INOS and COX-2 gene are cloning the cancer cell attenuated for BENZO-A PYRENE-7,8diole-9,10-EPOXIDE induce the activation of <u>AP-1</u> and <u>NF-KB</u>. phosphorylation blocking the ethanol inducing activation of breast cancer metastasis cynadine released through glycoside enzyme can be extracted through ethanol is a source of freezing directly all the fruit and vegetable extraction are derivative of growth inhibition and reduces apoptosis, reduces the tumor reduce cell line inhibition of UVB-expression cell line is helpful for compound extraction and clinician studies for the detection of pharmacokinetic drug resistance in vivo condition.

III. DIINDOLYMETHANE[DIM] INDOLE-3/CARBINOL[I3C] FROM VEGETABLE AND FRUITS

INDOLE-3-CARBINOL [13C] found in fruits and vegetable such as cabbage, cucumber, broccoli, cauliflower and DIM-Diindolylmethane is treated for indole-3-carbinol used to condensation analyses through acidic environmental taken 10 to 15C studies for therapeutic cancer prevention makes therapy treatment for tobacco smoking cancer, lung cancer and sometime induces carcinogenic studies.

A. Epigallactechirgallate [EGCG]

Epigallocatechin gallate <u>EGCG</u> is a unique plant compound is reducing inflammation reduce weight loss and help full for heart treatment and brain dysfunctions. The plant compound are potential antioxidant proactive and it contain potentially used to treated the formation of green tea and found in other various form of tea such as black and white prosody in <u>EGCG</u> has been retain to promote numerous health benefits are induces the metabolic activity and regulates the inflammation antioxidant, anti-inflammatory and anticancer tends to remain green tea contain major active antioxidant called as <u>epigallocatechin</u> and their contributes its health benefits are induces the potential growth of our breaking the anti-cancer activity.

- 1) APPLE: year of 2007 USA examined many different fruits and vegetables and foods for detection of the nutrient contain phytochemical studies for the treatment of anticancer and therapy treatment etc.
- 2) It was forms the nutritional and beneficial phytochemical content may present into 6.26mg of EGCG per 100g of apple the fungi variety of fruits can potentially use for good digestive fiber rich food it may contains useful for unsweetened canned apple sausage and found to be small benighted source helpful for the general skin care treatment proliferated to skin cell line consume the potential micronutrients and macronutrients etc.
- *3)* BLACK BERRIES: the raw black berries were found to be maximum of 7.50mg <u>EGCG</u> per 100g in 2007 USDA study the general studies of blackberries are rich in nutrient and contain up to 312.86mg of total catching of get the full benefit consumption of raw blackberries rather than done for juice production, jelly jam and sweet juice processing etc.
- 4) CAROB-FLOUR: carob plant is similar to cocoa but they are differential taste slightly more honey and carob flavone contains freshly harvested carotenoids clique tree and can be used as the substitution for the chocolate powder making for production of carbon flower contains much 109.46mg of EGCG OF 100g of according to the USDA of study and their monitoring for flower needs to consumption of raw byproduct contain integrity of cooked.
- 5) GREEN TEA: The primary source of EGCG is loose-leaf green tea. Standard green tea contains between 180 and 200 mg of catechins per cup. Due to variability in the number of leaves used for each cup of tea, it's impossible to determine an exact amount. Decaffeinated brewed green tea has approximately 60 mg, while flavored brewed green tea has 45 mg. It's advisable to select "real" green tea instead of instant or bottled varieties, as these typically have an average of 9 mg of EGCG.
- 6) POTENTIAL ANTIOXIDATIVE PROPERTIES: Kohl Stadt notes that EGCG exhibits significantly greater antioxidant activity compared to both vitamins C and E, both considered important antioxidants. Research conducted by the University of Kansas in the late 1990s demonstrated that EGCG not only surpasses the antioxidative strength of vitamins C and E but is also twice as effective as resveratrol, which is present in grape skins and red wine, in neutralizing free radicals. Additionally, EGCG hampers cell proliferation—an especially beneficial characteristic in combating cancer's spread.
- 7) OTHER FOOD: A variety of nuts and fruits has measurable amounts of EGCG. Though their EGCG content is relatively low, these foods provide a wide array of other nutrients that improve their nutritional benefits. This group includes pecans with 2. 3 milligrams of EGCG for every 100 grams, filberts or hazelnuts offering 1. 1 milligram, raw cranberries containing 1 milligram, and pistachios providing 0. 4 milligrams per 100 grams, based on USDA data.

EXAMLE: some fruits and vegetables may ensure antioxidative and antioxidant properties are strawberries, nuts, peaches, plums, onions, raspberries.



B. Rosemary Acid From Rosemarinica

it is an comprehensive essential role of rosemary oil can delivered into fascinating history of intravascular process of oil extraction is differential through chemotherapy and unique properties are used for considering Rosmarinus acid are naturally produces the antioxidant are prevents culinary spice and medicinal herbal are very rich beneficial source full of plant mixing composition are lemon, peppermint, cardamom, cinnamon are treated rosemary is an numerous amities are used as an extraction plays an major important role in anti-inflammation , anticancer, antibacterial and antifungal proliferation through invitro condition and in vivo process . the study of LS174-T cell is useful to blood oxygenation and increases the coloration cancer cell are surrounded through pathway of a simultaneous mediated acquit cancer research therapy and mechanisms are helpful for human leukemia cell are significantly induces the Rosmery acid and are treated for TNF alpha cell line induces apoptosis.

C. Triterpenoids From Fruits, Vegetables And Medicinal Herbal Plants, Wax

triterpenoids are synthesized from various kind of fruits and vegetables ,medicinal plants are used for hydrocarbon steroid production done through phytochemical are derived into sub-classes they are Friedelanes, Langostinos, Limonoids, Lupane's, Oleananes, tirucallanes are the group of phytochemical are present they are predominantly used for terpenoids are appreciated through invitro condition and in vivo studies aspects they also used to treat the chemotherapy regulatory functions for anticancer activity and regulate ingrown over cell of breast cancer , pancreatic cancer are treated for triterpenoids is more helpful source of phytochemical extraction from the fruits , vegetables and medicinal plants for anticancer activities are enhancing sudden onset of cell death (apoptosis).

1) Curcumin structure



Fig1.1 https://www.researchgate.net/figure/Chemical-structure-of-curcumin_fig1_344004327

2) Crocetin structure



Fig1.2 https://www.chemsrc.com/en/cas/27876-94-4_361314.html



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3) Cyanidins Synthesi



Fig1.3 https://www.researchgate.net/figure/230649532_fig1_Fig-1-Molecular-structure-of-cyanidin-the-common-anthocyanin-aglycone- core-present-in

4) DIINDOLYMETHANE[DIM] INDOLE-3/CARBINOL[I3C] structure



Fig1.4 https://www.researchgate.net/figure/Formation-of-3-3-diindolylmethane-DIM-from-indole-3-carbinol-I3C_fig1_225058075

5) EPIGALLACTECHIRGALLATE



Fig1.5 https://www.researchgate.net/figure/a-Molecular-structure-of--epigallocatechin-gallate-EGCg--epicatechin-EC_fig1_350527983







7) Triterpenoids



Fig1.7 https://pubchem.ncbi.nlm.nih.gov/compound/Triterpenoids

IV. VITAMINS AND MINERALS FROM MUSHROOM, THEIR BENEFITS

mushroom are highly containing nutrient, protein and rich fibrous food it contains different source of nutrients in a vital source of B6 mushrooms are good for vitamin D, ceric potential mushroom is good source of selenium can help full to prevent cell damages in our body. Vitamin D is help full for cell growth and vitaminB6 boost our red blood cells and boost our body immune system.

- A. Vitamin & Mineral Source From Mushroom And Their Types
- 1) VITAMIN-B6: vitamin b6 help full for_our red blood cells and boost our immune system, muscle gaining and rich fiber & protein content.
- 2) VITAMIN-D: it helps for growth cell and boost our immunity power, reduces the inflammation.
- 3) VITAMIN-B2: it is used for commercial source of a cutaneous enlarge cultivation of mushrooms.
- 4) NIACIN: it is a potential source of mushroom growth.
- 5) FOLATE: folate is helpful for mushroom growth and bulging structure etc.
- B. Minerals
- 1) SELINIUM: selenium is the best source of weight gaining and our human body makes the production of antioxidant enzyme can prevents cell damages and it promotes the cell growth.
- 2) POTASIUM: potassium is help full for maintains our intra venal human body fluids and balancing the minerals which can helpful for reduces blood pressure.
- *3)* COPPER: copper is helpful for regaining some essential minerals and vitamin from our daily day resource and potential for human body consumption.



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4) PHOSPHOROUS: phosphorous uptake as a source of mineral which intakes the coloration is helpful to enduring antioxidants for the growth of mushroom.

FOR EXAMPLE: more over the available nutrients are founds through mushroom they are Antioxidants, Biotin and Mannitol [beneficial for reduction of diabetes].

C. Vitamin - E From Plant Base Oil

Vitamin-e represented the compounds of tocopherols and fat-soluble antioxidant profit etic measure for the extraction of food can induces the germ oil sunflower oil and saffron flower oil is amphoteric in most active and bio-active components of vitamin E is a cohesive source of oxygen and fat induces the oxidation of tocopherol contains anti-tumor, anti-cancer effects are undergoing for anti-proliferation properties [COX-2]. Inhibition of in-vitro studies and hypomethylation are highly in-vitro condition metabolisms are cytoprotective action prevents cancer disorders of cytoprotective and cytotoxicity effects of cigarette smoking, alcoholic drinks are left to fallen liver disfunctions and increases the rate of liver cancer mechanism of cellular signaling pathway of meta-analysis and meta-regression study although vitamin-E intakes to reduced breast cancer, lung cancer and the data where has been noted.

V. CHEMOTHERAPY TREATMENT FOR CANCER CELL MECHANISMS OF PHYTOCHEMICALS

- 1) MOLECULAR PHYTOCHEMICAL MECHANISMS OF APOPTOSIS IN CANCER CELL: apoptosis a programmed cell death prolonged to blocking cell line and overgrowth utilizes the cell shrinking and burst out apoptosis is mainly focused on different cancer cell induce extensive and intrinsic pathway involved on lung cancer cell are potentially ingrown breast cancer cells and brain tumour cell line receptors of drug additives show the phytochemical leads the mechanisms to treated the cancer cell line.
- 2) PHYTOCHEMICAL MODULAATION OF APOPTOSIS IN CANCER CELL SIGNALLING: phytochemical play a major role in cancer treatment and chemotherapy removes the disfunctions related to organoleptic Intracellular compounds are reduce the degradation of lysosomes and self diagnostic mechanisms increases the cell membrane strengths, defensive mechanisms of cell line emerging through evidence and supportive roles of autophagy cancer cell treatment potentially regulated thee programmed cell during cancer regulated autosomal autophagias regulated the [MTOR & AMPK]. Autopage's are activated in suppressive carcinogenic function therapeutic activities of phytochemical compound shows that the target of auto-pages apoptosis promising agent of cancer treatment shood be dependent through target the specific area of mechanisms of cell line and phytochemical modelling is benefitted to reduce the auto-pages. Of cancer treatment and apoptosis effects are readily ineffective reduction of programmed cell death.
- 3) PHYTOCHEMICAL APOPTOSIS AUTO-PHAGE SIGNALLING: apigenin flavonoids derived through modulation of several kinase pathway of inhibition of cell cycle G2M phase studies have shown apigenin cell growth induced auto phage in [HEPG2] cell found to be mediated inhibition of the P13K, AKT, MTOR pathway is HEPG2cells. The alkaloids substance are excrete anticancer activity of auto phage signalling pathway of cordycepin ROS cancer cell are enhancing P53 expression of cell line and modulating the generation of auto phage renal carcinoma migration of the cell line by reducing [DNA/RNA] genomic expression phosphor pyruvate induces the anticancer effects and they can treated breast cancer, lung cancer, cardiovascular disease enable the cancer stem cells and targeted to LC3-auto phage phenolic compound ignitions quell reduces the auto-cancer disorders and anti-cancer, tumour effect retains the cervical cancer cell line notably induced the auto phage treated with inhibition of metastasis lysosomal protease cathepsin [CTSS] and conversion of acidic vascular organelles formation.
- 4) INISHIATING FOR APOPTOSIS & MECHANISMS OF PHYTOCHEMICALS: very important essential pathway in cancer cell relates therapies for phytochemicals are utilized through auto anti-inflammation and virulency factor while it may undergo for cancer cell and regulated the mechanism of anti-cancer activity, anti-tumour activation of targeted cancer cell is recognized for traditional medicine system [TMS], traditional Chinese medicine system [TCM].
- 5) The multicellular organisms are induces cell shrinking and cell swelling of nuclear membrane bound organelles are fragmented to insufficient cancer cell line and induces apoptosis resulted to control over growth cell utilized proliferation of dead cell mechanisms involves several signal transduction process carried out by mitochondria cell swelling increases permeability of the mitochondrial cell membrane synthesis of leucocytic cell synthesis of cytosols binder to inhibition of dead cell derived through inhibition of caspases carry out cellular degradation in an normal human body cell [AIP's]are follows mitochondria induce cellular apoptosis. The mitochondria mobilized the anti-cancer properties and cellular anti-inflammation inhibited carried out pore cell reduces the cell death.



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6) ENZYME REAMODELING ASSOCIATED TO SYNTHESIS OF ATP MOLECULE: [ATP stands for Adenosine try Phosphate Molecule] the enzyme can synthesized nucleosome DNA&RNA chromatin induces the structural genomic DNA, histone protein can damages the cellular damages DNA prevents [DDR] enable cell utilization of post translation histone modification in ATP, synthesis depends on chromatin substrate increases the mechanisms of DNA and nucleosome removes the DNA repair for an comprehensive ATP synthesis of molecular hybridization of chromatin substrate modifies En-number of large multiple protein complex enzymatic modulation engulfs DNA repair and N-terminus involved methylated histone cellular DNA transcription linked to chromatin responsible for DNA damages and cancer cells remodelling for sudden onset to increases cellular death.

A. DNA-Methylation & Epigenestic Studies

DNA - Methylation Epigenetic studies co-related the apoptosis leading formation enable to modification synthesis DNA methylation patterns can regulated expression of genes and programmed cell death often it enhances towards abnormal survival condition.

- 1) DNA-EPIGENETIC STUDIES
- MECHANISMS: The epigenetic studies are primarily synthesized from [DNA/RNA] methylation activated through genetically modified accessibility on transport process.
- 2) SUDDEN HERITABLE CHANGES IN APOPTOSIS
- HYPERMETHYLATION: They promoting pro-active apoptosis cell suspension described through DNA. They convert auto anti-proactive apoptotic gene expression [BCL-2] cell are leading to expression of resistance gene.
- DNA METHYLATION: DNA methylation patterns are leads to hypermethylation dispute towards activation of proactive balancing cell engaged with protein can retains anti-apoptotic induces cancer cell.
- POST TRANSCRIPTION HISTONE MODIFICATION: They regulated post transcription and translation modification of histone acetyl and methyl can alters the structural chromatin interpret gene expression and apoptosis pathway.
- STRUCTURAL CHROMATIN REAMODELING: They changes the structure of chromatin induces nucleosome and DNA looping attains together DNA transcription factor are regulated the expenditure of chromatin structural genes.
- EPIGENISTIC NON-CODING [RNAs]: Non coding epigenetic gene expression interferes the function of coding [RNAs] and micro RNAs can regulates pathway of apoptosis.

EXAMPLE

- HYPERMETHYLATION TUMOR SUSPENSION GENES: Hypermethylation gene are involved apoptosis link together RASSF1A-Cells are leading to silence for the promote survival of cancer cell.
- ➢ HYPERMETHYLLATION APOPTOSIS PATHWAY FOR ONCOGENES: They are leading expression over interferes potentially induces the pathway of apoptosis.
- MODIFICATIO OF HISTONE CANCER CELL: Acetyl-CO-A, has been associated with increases gene expression leading to methylation can be induces regulatory gene silencing cancer cell influencing to apoptosis.

3) Epigenetic Cancer Regulation Through Apoptosis

- The cancer cell is exhibiting disintegration of epigenetic mechanisms are leading to resistance to cancer cell.
- Epigenetic cell are changes the contribution of cancer cell line and development through propagating enumerated to disruption of apoptosis pathway.
- Epigenetic studies are regulated at a particular cellular target for specific traits can leads to phytochemical drug target usage in a particular sight can inhibit the cellular regression level alters the particular traits of cancer-causing cell line.

4) Therapeutic Implictions

- Therapeutic implication understands their epigenetic mechanisms understand apoptosis disintegration off leading cancer cell developed into therapeutic strategies.
- Epigenetic studies of drugs can reduce the potential restoration of cancer cell resist the modifications of diagnose to monitored cancer cell progressions.
- Therapy can induce the development of modified cancer cellular diagnosis program it can induces the apoptosis.



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5) REVERSE PROGRAMMED EPIGENESTIC STUDIES: Based on nature of genetic mutation and epigenetic charges may induce reversibility makes the modification cells are attines to targeted for therapeutic treatment.

VI. CONCLUSION

They are naturally present in fruits, vegetables and plants can incorporated to phytochemicals productions are widely used to detect the *In-vitro* and *in-vivo* conditions are treated to pre-clinical cancer treatment shows various enormous mechanisms are observed through chemoprevention effect of phytochemicals are utilized through the impotency of cancer treatment shood detected to completely eradicate natural phytochemical are responsible for the metapolitics activations through stabilization of diagnostic purposes are deliberately used to degradation of dosage remains through plants and vegetables, fruits are comparatively used for phytochemical into readily pre-curable to controlled the cellular receptors and they can induces cell death and cell shrinking. Finally it will prevents to stop cancer.

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REFERENCES

- Reyes-Munguía, A.; Carrillo-Inaugural, M.L.; Carranza-Álvarez, C.; Pimentel-González, D.J.; Alvarado-Sánchez, B. Antioxidant activity, antimicrobial and effects in the immune system of plants and fruits extracts. Front. Life Sci. 2016, 9, 90–98.
- [2] El-Belt Agi, H.S.; Mohamed, H.I.; Abdel Azeem, A.S.; Youssef, R.; Safwat, G. GC-MS analysis, antioxidant, antimicrobial and anticancer activities of extracts from Ficus sycomorus fruits and leaves. Not. Bot. Horti Aerobot. Cluj Napocor 2019, 47, 493–505.
- [3] Hamed, M.M.; Abd El-Moddy, M.A.; Kamel, M.T.; Mohamed, H.I.; Bayoumi, A.E. Phytochemical and biological activities of two Asteraceae plants Senecio vulgaris and Pulchra Dioscorides L. Pharmacology Online 2019, 2, 101–121.
- [4] El-Belt Agi, H.S.; Mohamed, H.I.; Alade, M.I.; Al-Khayri, J.M.; Rezk, A.A.; Al-Mussallem, M.Q.; Sattar, M.N.; Ramadan, K.M.A. Production and antioxidant activity of secondary metabolites in Hassani rice (Oryza sativa L.) cell suspension under salicylic acid, yeast extract, and pectin elicitation. Vitor. Cell. Dev. Biol. Plant 2022, 58, 615–629.
- [5] Dal Martello, M.; La Vecchia, C.; Bertuccio, P.; Buffeted, P.; Levi, F.; Negri, E.; Malvezzi, M. European cancer mortality predictions for the year 2022 with focus on ovarian cancer. Ann. Oncol. 2021, 33, 330–339.
- [6] Abdel-Rahim, E.A.; El-Belt Agi, H.S. Constituents of apple, parsley and lentil edible plants and their therapy treatments for blood picture as well as liver and kidney functions against lipidemic disease. Elec. J. Environ. Agri cult. Food Chem. 2010, 9, 1117–1127.
- [7] Meeran SM, Ahmed A, Tollefson TO. Epigenetic targets of bioactive dietary components for cancer prevention and therapy. Clin Epigenetics. 2010;1(3-4):101–116. Doi: 10.1007/s13148-010-0011-5.
- [8] Karakas GA. Anticancer and chemo preventing natural products: some biochemical and therapeutic aspects. J Buon. 2010;15(4):627–638.
- [9] Sarkar FH, Li Y, Wang Z, Padhye S. Lesson learned from nature for the development of novel anti-cancer agents: implication of isoflavone, curcumin, and their synthetic analogues. Curr Pharm Des. 2010;16(16):1801–1812. Doi: 10.2174/138161210791208956.
- [10] Gullett NP, Ruhul Amin AR, Bayraktar S, Pezzuto JM, Shin DM, Khuri FR, Aggarwal BB, Surh YJ, Kucuk O. Cancer prevention with natural compounds. Semin Oncol. 2010;37(3):258–281. Doi: 10.1053/j.seminoncol.2010.06.014.
- [11] Viola V, Pioli F, Parodi M, Pierpaolo E, Orlando F, Provincial M, Betti M, Mazzini F, Galli F. Why tocotrienols work better: insights into the in vitro anticancer mechanism of vitamin E. Genes Nutra. 2011 Doi: 10.1007/s12263-011-0219-9.
- [12] Scoria RI, Popa R., Jr. Boron-containing compounds as preventive and chemotherapeutic agents for cancer. Anticancer Agents Med Chem. 2010;10(4):346– 351. Doi: 10.2174/187152010791162289.
- [13] Glamis E.A., Scheet P., Beck T.N., Scolnick E.M., Hunter D.J., Hawk E., Hopkins N. Molecular mechanisms of the preventable causes of cancer in the United States. Genes Dev. 2018; 32:868–902. Doi: 10.1101/gad.314849.118.
- [14] Vogel V.G., Costantino J.P., Wickerham D.L., Cronin W.M., Cecchini R.S., Atkins J.N., Bevers T.B., Fehrenbacher L., Pajon E.R., Wade J.L., 3rd, et al. Update of the National Surgical Adjuvant Breast and Bowel Project Study of Tamoxifen and Raloxifene (STAR) P-2 Trial: Preventing breast cancer. Cancer Prev. Res. 2010; 3:696–706. Doi: 10.1158/1940-6207.
- [15] Pramanik K.C., Fofaria N.M., Gupta P., Ranjan A., Kim S.H., Srivastava S.K. Inhibition of beta-catenin signaling suppresses pancreatic tumor growth by disrupting nuclear beta-catenin/TCF-1 complex: Critical role of STAT-3. Nontarget. 2015; 6:11561–11574. Doi: 10.18632/oncotarget.3427.
- [16] Pramanik K.C., Srivastava S.K. Apoptosis signal-regulating kinase 1-thioredoxin complex dissociation by capsaicin causes pancreatic tumor growth suppression by inducing apoptosis. Antioxidant Redox Signal. 2012; 17:1417–1432. Doi: 10.1089/ars.2011.4369.
- [17] Liu Z., Zhu P., Tao Y., Shen C., Wang S., Zhao L., Wu H., Fan F., Lin C., Chen C., et al. Cancer-promoting effect of capsaicin on DMBA/TPA-induced skin tumorigenesis by modulating inflammation, Erk and p38 in mice. Food Chem. Toxicology. 2015; 81:1–8. Doi: 10.1016/j.fct.2015.04.002.
- [18] Pandey K.B., Rizvi S.I. Plant polyphenols as dietary antioxidants in human health and disease. Oxid Med. Cell Longed. 2009; 2:270–278. Doi: 10.4161.
- [19] Abdallah, R.; Saito, A.A.; Badran, A.; Baydoun, S.; Sobey, M.; Ouchi, W.; Sahri, N.; Eid, A.H.; Mesmer, J.E.; Baydoun, E. Fractionation and phytochemical composition of an ethanolic extract of Ziziphus nummular leaves: Antioxidant and anticancer us properties in human triple negative breast cancer cells. Front. Pharmocol. 2024, 15, 1331843.
- [20] Birtwell, C.; Indra, S.S.; Luke, C.; Kakoma, M.K. A review of modern and conventional extraction techniques and their applications for extracting phytochemicals from plants. Sci. Afr. 2023, 19, e01585.

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- [21] Thakur, A.; Prasad, N.; Raina, K.; Sharma, R.; Chaudhary, A. Role of plant-based anticancer compounds in treatment of breast cancer. Curr. Pharmocol. Rep. 2023, 9, 468–488.
- [22] Vialba, B.; Prasheetha, P.; Vijayakumar, S. Phytochemical stimulants for cancer therapeutics from Garcinia gummi-gutta: A prime research report. Gene Rep. 2024, 34, 101885.
- [23] Tholl, D. Biosynthesis and biological functions of terpenoids in plants. Biotechnic. Isoprenoids 2015, 148, 63-106.
- [24] Dai, J.; Mumper, R.J. Plant phenolics: Extraction, analysis and their antioxidant and anticancer properties. Molecules 2010, 15, 7313–7352.
- [25] Ojo, O.; Kengne, M.H.; Fotsing, M.C.; Multani, E.M.; Nineths, D.T. Traditional uses, phytochemistry, pharmacology and other potential applications of Vitellaria paradoxa Garten. (Sapotaceous): A review. Arab. J. Chem. 2021, 14, 103213.
- [26] Jie, Z. Structures and Bioactivities of Triterpene Glycosides from Three Plants (Bitter Gourd, Passion Flower, and Shea). Ph.D. Thesis, Nihon University, Tokyo, Japan, 2015.
- [27] Gu, J.-W.; Makey, K.L.; Tucker, K.B.; Chinchar, E.; Mao, X.; Pei, I.; Thomas, E.Y.; Miele, L. EGCG, a major green tea catechin suppresses breast tumor angiogenesis and growth via inhibiting the activation of HIF-1α and NBC, and VEGF expression. Vase. Cell 2013, 5, 9.
- [28] Penta, D.; Natesh, J.; Mondal, P.; Meeran, S.M. Dietary diindolylmethane enhances the therapeutic effect of cent chroman in breast cancer by inhibiting neo angiogenesis. Nutri. Cancer 2023, 75, 734–749.
- [29] Abrams S. L., Follo M. Y., Steelman L. S., Lert Priya pong K., Cocco L., Ratti S., et al. (2019). Abilities of berberine and chemically modified berberines to inhibit proliferation of pancreatic cancer cells. Adv. Biol. Ragul. 71, 172–182. 10.1016/j.jbior.2018.10.
- [30] Adams L. S., Phung S., Yee N., Seeram N. P., Li L., Chen S. (2010). Blueberry phytochemicals inhibit growth and metastatic potential of MDA-MB-231 breast cancer cells through modulation of the phosphatidylinositol 3-kinase pathway. Cancer Res. 70 (9), 3594–3605. 10.1158/0008-5472.CAN-09-3565.
- [31] Akumal J. J., Slotkin R., Schwartzman J., Chorale G., Munar M., Graff J. N., et al. (2015). A phase II study of sulforaphane-rich broccoli sprout extracts in men with recurrent prostate cancer. Invest. New Drugs 33 (2), 480–489. 10.1007/s10637-014-0189-z.
- [32] Aras D., Cinar O., Cakar Z., Zanuck S., Can A. (2016). Can dicoumarol be used as a gonad-safe anticancer agent: an in vitro and in vivo experimental study. Mol. Hum. Repro'd. 22 (1), 57–67. 10.1093/molar/gav065.
- [33] Banerjee S., Bueso-Ramos C., Aggarwal B. B. (2002). Suppression of 7,12-dimethylbenz(a)anthracene-induced mammary carcinogenesis in rats by resveratrol: role of nuclear factor-dB, cyclooxygenase 2, and matrix metalloprotease 9. Cancer Res. 62, 4945–4954.
- [34] Bayet-Robert M., Kwiatkowski F., Lederer M., Gach on F., Planchet E., Abrial C., et al. (2010). Phase I dose escalation trial of docetaxel plus curcumin in patients with advanced and metastatic breast cancer. Cancer Biol. Ther. 9 (1), 8–14. 10.4161/cbt.9.1.
- [35] Beynon R. A., Richmond R. C., Santos Ferreira D. L., Ness A. R., May M., Smith G. D., et al. (2019). Investigating the effects of lycopene and green tea on the metabolome of men at risk of prostate cancer: The Parodied randomized controlled trial. Int. J. Cancer 144 (8), 1918–1928. 10.1002/ijc.31929.
- [36] Chang J. H., Cheng C. W., Yang Y. C., Chen W. S., Hung W. Y., Chow J. M., et al. (2018). Downregulating CD26/DPPIV by apigenin modulates the interplay between Akt and Snail/Slug signaling to restrain metastasis of lung cancer with multiple EGFR statuses. J. Exp. Clin. Cancer Res. 37 (1), 199. 10.1186/s13046-018-0869-1.
- [37] Chen J., Song Y., Zhang L. (2013). Lycopene/tomato consumption and the risk of prostate cancer: a systematic review and meta-analysis of prospective studies. J. Nutri. Sci. Vitaminic (Tokyo) 59 (3), 213–223. 10.3177/jnsv.59.
- [38] Chen L., Xia G., Qiu F., Wu C., Denmon A. P., Zi X. (2016). Phys Apu buskin selectively induces apoptosis in VHL-null renal cell carcinoma cells through down-regulation of HIF-2alpha and inhibits tumor growth. Sci. Rep. 6, 32582.
- [39] Lewis S, Brennan P, Nyberg F, Ahrens W, Constantinescu V, Makaria A, et al. Re: Spitz, M. R., Diphone, C. M., DeTroy, M. A., Pillow, P. C., Amos, C. I., Lei, L., de Andrade, M., Gu, X., Hong, W. K., and Wu, X. Dietary intake of isothiocyanates: evidence of a joint effect with glutathione S-transferase polymorphisms in lung cancer risk. Cancer Epidemiol. Biomarker. Prev. 9: 1017–1020, 2000. Cancer Epidemiol Biomarkers Prev. 2001; 10:1105–6.
- [40] Kristal AR, Lampe JW. Brassica vegetables and prostate cancer risk: a review of the epidemiological evidence. Nutri Cancer. 2002; 42:1–9. Doi.
- [41] Drewnowski A, Gomez-Carneros C. Bitter taste, phytonutrients, and the consumer: a review. Am J Clin Nutri. 2000; 72:1424-35.
- [42] Holst B, Williamson G. A critical review of the bioavailability of glucosinolates and related compounds. Nat Prod Rep. 2004; 21:425-47.
- [43] Liu RH. Potential synergy of phytochemicals in cancer prevention: mechanism of action. J Nutri. 2004; 134:3479S-85S. Doi: 10.
- [44] Smith-Warner SA, Spiegelman D, Yaun SS, Albanes D, Beeson WL, van den Brandt PA, et al. Fruits, vegetables and lung cancer: a pooled analysis of cohort studies. Int J Cancer. 2003; 107:1001–11. Doi: 10.1002/ijc.11490.
- [45] Voris LE, Gold Bohm RA, Verhoeven DT, van Poppel GA, Sturman's F, Hermus RJ, et al. Vegetable and fruit consumption and lung cancer risk in the Netherlands Cohort Study on diet and cancer. Cancer Causes Control. 2000; 11:101–15. Doi: 10.1023/a:1008906706084.
- [46] Leskanich D, Ziegler RG, Michaud DS, Giovannucci EL, Speizer FE, Willett WC, et al. Prospective study of fruit and vegetable consumption and risk of lung cancer among men and women. J Natl Cancer Inst. 2000; 92:1812–23.
- [47] Neuhauser ML, Patterson RE, Thornquist MD, Omenn GS, King IB, Goodman GE. Fruits and vegetables are associated with lower lung cancer risk only in the placebo arm of the beta-carotene and retinol efficacy trial (CARET) Cancer Epidemiol Biomarkers Prev. 2003; 12:350–8.
- [48] Lewis S, Brennan P, Nyberg F, Ahrens W, Constantinescu V, Makaria A, et al. Re: Spitz, M. R., Diphone, C. M., DeTroy, M. A., Pillow, P. C., Amos, C. I., Lei, L., de Andrade, M., Gu, X., Hong, W. K., and Wu, X. Dietary intake of isothiocyanates: evidence of a joint effect with glutathione S-transferase polymorphisms in lung cancer risk. Cancer Epidemiol. Biomarker. Prev. 9: 1017–1020, 2000. Cancer Epidemiol Biomarkers Prev. 2001; 10:1105–6.
- [49] Walters DG, Young PJ, Agus C, Knize MG, Bobys AR, Gooderham NJ, et al. Cruciferous vegetable consumption alters the metabolism of the dietary carcinogen 2-amino-1-methyl-6-phenylimidazo[4,5-b] pyridine (Phips) in humans. Carcinogenesis. 2004; 25:1659–69. Doi: 10.1093/caring/bgh164.
- [50] Michels KB, Edward G, Joshipura KJ, Rosner BA, Stampfer MJ, Fuchs CS, et al. Prospective study of fruit and vegetable consumption and incidence of colon and rectal cancers. J Natl Cancer Inst. 2000; 92:1740–52. Doi: 10.1093/unci/92.21.1740.







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