CHAPTER 25

Ameliorative effects of homeopathic medicines in the management of different cancers

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SUMMARY

Homeopathy is a commonly used complementary and alternative system of medicine for the treatment of various sorts of ailments throughout the world. Homeopathic medicines are made up of potential therapeutic natural products that are primarily acknowledged for their low doses as well as extended patient survival results. Homeopathic medicines are derived from plants such as arnica (mountain herb), red onion, poison ivy, stinging nettle, and belladonna (deadly nightshade); minerals including white arsenic as well as from animals such as crushed whole bees. Homeopathic medicines are synthesized as sugar pellets to be placed under the tongue and may also be used in the form of gels, ointments, drops, tablets, and creams. Homeopathic medicines can be used to treat various disorders including migraine, depression, gastrointestinal diseases, joint pain, inflammation, different sorts of injuries, flu, arthritis as well as sciatica. Cancer is the 2nd major reason behind global mortalities. It is revealed that developing countries around the world shoulder most of the cancer burden. According to a survey conducted in 2020, low- and middle-income countries face 70% of the total mortalities worldwide which accounts for approximately 10 million people of these countries. Homeopathic medicines ensure low-cost cancer treatment with little or no side effects on the bodies of humans and animals. Besides, it is applied as a supportive and palliative therapy in a broad range of cancer patients to enhance the body's fight against cancer, alleviate discomfort resulting from disease or conventional treatments as well as improve the general well-being of the patients. In this chapter, our primary focus will be on the anti-cancerous effects of homeopathic medicines against different cancerous conditions in the body along with their mechanism of action.

INTRODUCTION

Homeopathy is considered a complementary and alternative healthcare system that uses medications prepared from highly diluted vegetables and mineral constituents to treat different biological disorders (Ernst, 2006). Homeopathy is a network of medicine formulated on the idea of 'similia similibus curantur' in simple words 'let like be cured by like' Fig 1. German physician Samuel Christian Fredrich Hahnemann founded homeopathic medicine in 1796 (Hahnemann, 1851). Hahnemann tested the bark of cinchona on his body and quickly after that, he experienced palpitations, anxiety, and trembling despite any fever. Hahnemann employed the bark of cinchona repeatedly and every time the therapeutic effects persisted for 2-3 hours after treatment with a particular dosage of cinchona bark. This experiment gave impetus to Hahnemann to give the idea of 'like cures like', which further turned into an entire network of treatments following its tenets of therapeutic effects known as homeopathy (Hering, 1883). Homeopathic medicines are of natural origin and raw materials employed for their synthesis are pharmaceutical plants and essential minerals. These raw materials are transformed into considerably effective drugs while following a series of preparatory processes. These medicines are prescribed by medical professionals and can be procured from homeopathic pharmaceutical industries with a homeopathic stock of medicines (Othonos, 2010). Homeopathy attained great popularity in the 19th century due to lower mortality rates in hospitals applying homeopathic medicine to treat epidemics of that time (Fisher, 2012).

How to Cite: Akbar A, MU Ijaz, HA Khan, N Ehsan & M Imran, 2023. Ameliorative effects of homeopathic medicines in the management of different cancers. In: Complementary and Alternative Medicine: One Health Perspective (Sindhu ZuD, B Aslam, U Uslu & M Mohsin, eds): FahumSci, Lahore, Pakistan, pp: 186-191. ISBN: 978-627-7745-01-1. https://doi.org/10.61748/CAM.2023/025

As per the National Health Interview Survey conducted in 2012 in the U.S. approximately 1 million children and 5 million adults out of 312 million people utilized homeopathic medicines annually [Tab 1. (Nahin et al., 2009)]. However, the use of homeopathic medicine in increasing with time (Clarke et al., 2015; Black et al., 2015). Nowadays, the most frequently treated ailments by homeopaths are asthma, otitis media, migraine, nonspecific allergies, arthritis neurotic disorders, dermatitis, and hypertension (Loudon, 2006). Moreover, homeopathy is considered one of the top-notch complementary and alternative

Fig 1. Origin of Homeopathy.

medicines currently used to treat cancer patients (Downer et al., 1994).

HOMEOPATHIC MEDICINE IN THE TREATMENT OF CANCER

According to the WHO report (2003), cancer is the 2nd most common mortality risk factor in developed nations (Milazzo et al., 2006). The use of conventional non-surgical treatments is restricted by multiple side effects even though they could be applied to control and cure cancer. As a result, several patients having cancer frequently use complementary and alternative therapies such as homeopathy (Montfort, 2000). Homeopathy is the most often practiced alternative medication for cancer in seven of the fourteen European nations (Molassiotis et al., 2005). Homeopathy is mainly used as a palliative or supportive treatment to improve the body's defenses against cancer Fig 2, enhance general well-being, and lessen discomfort brought on by illness or conventional therapies (Montfort, 2000; Molassiotis et al., 2005).

Tab 1. Proportion of U.S. population utilizing homeopathic medicine in 2012 (Nahin et al., 2009).

	Population in Millions			Percentage (%)	
Homeopathic products (medicines)	Year	Adult	Children	Adult	Children
	2002	0.5	0.1	0.16	0.032
	2007	1.0	0.2	0.32	0.16
	2012	5	1	1.6	0.32

Cancer patients frequently utilize complementary and alternative treatments to optimize their life's quality. Patients frequently search for better choices to deal with the long-term adverse results of their medications to decrease their risk of developing secondary cancer. Some patients decide to use complementary and alternative remedies such as yoga, nutrition, acupuncture, and homeopathy in their treatment in a way to

Fig 2. Homeopathic products and various cancer types.

attain these objectives [Tab 2. (Mao, 2014; Rowland, 2014; Briggs, 2014)].

Homeopathic medicine in the treatment of lungs and esophageal cancer

Tobacco consumption is considered the fundamental reason behind lung cancer Fig 3. Benzo [a] pyrene can instigate lung cancer and it is revealed that this compound is among the polycyclic aromatic hydrocarbons present in cigarette smoke (Yang et al., 2000). It could induce DNA adduct formation and increase cell proliferation which can lead to lung cancer (Barnes et al., 2000). For individuals having stage-I and stage-II non-small cell lung cancer, the only treatment option is surgical resection, however for people with later stages, better treatment opportunities comprise surgery, radiation therapy along chemotherapy (Paul et al., 2011).

In Benzo [a] pyrene-instigated lung cancer in rats, Condurango 30C, a potential homeopathic medicine stimulates the activation of caspase-3 dependent apoptotic pathway, suggesting that homeopathic medicines may operate at the molecular level as an effective strategy. After receiving post-cancer treatment, condurango 30C potentially causes cells to undergo apoptosis. Condurango 30c regulates various pro and anti-apoptotic genes linked to the caspase-3 mediated pathways, respectively. Furthermore, Western blot and immunohistochemical investigations supported the mitigative effect of condurango 30C by demonstrating its capacity to suppress the high epidermal growth factor receptor expression characteristic of lung cancer (Sikdar et al., 2013).

The use of the homeopathic product psorinum 6X for the treatment of lung cancer has the potential to react with DNA and disrupt the cell cycle and pathways of the proliferation of cells which are major contributors to the growth of cancerous cells.

The molecular mechanism behind the aforementioned function of psorinum 6X comprises an aggregation of ROS in A549 cells. It depolarizes mitochondrial membrane potential and stimulates the discharge of cytochrome C into the cytosol. The exact mechanism behind apoptosis includes the up and down-regulation of signal proteins such as pro and anti-apoptotic cytokines. The elevated level of p53 could instigate apoptosis in the cells via intrinsic pathways. Thus, activated p53 in turn stimulates the downregulation of caspase-3. The dysregulations in the concentration of Bax/Bcl-2 ratio and level of p53 is a significant element that decides whether cells will experience apoptosis or not. These events affect the activity of several cellular proteins, driving psorinum-treated A549 cells toward apoptosis. Taken together, psorinum 6X instigates regulation of key signal proteins comprising caspase-3, p53, Bax, and bcl-2 to induce apoptosis in A549 cells (Mondal et al., 2016). More diluted homeopathic medicines are said to have more curative effects against any chronic state while treating different patients. Condurango is successfully applied to treat malignancies of the stomach and esophagus using therapeutic formulations. Both condurango 6C and 30C induce apoptosis in H460 cells of the

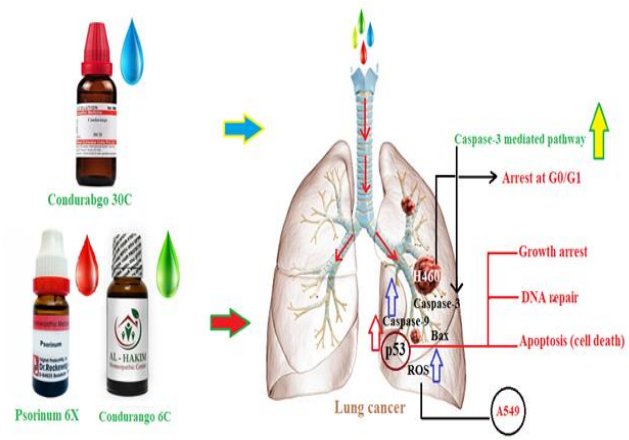

Fig 3. Homeopathic treatment of lung cancer.

lungs via arresting the cell cycle at G0 or G1 altering the expression of a few apoptotic markers and stimulating the caspase-3 mediated signaling cascade (Sikdar et al., 2014).

Homeopathic medicine in the treatment of brain cancer

It is documented that Ruta, a potential therapeutic homeopathic medicine is primarily isolated from a plant, *Ruta graveolens* (Hamilton, 2006). For the *in vitro* examination of its effect against human brain cancer, various doses of Ruta in conjunction with $Ca_3(PO_4)_2$ were applied. After treatment of 15 patients with Ruta 6 along with Ca3(PO4)2 in intracranial tumors, Ruta 6 displayed tremendous anti-tumorous potential in glioma patients. Both *in-vivo* and *in-vitro* studies demonstrated the upregulation of the cell signaling pathway through the treatment of Ruta 6. Besides this, Ruts 6 triggers telomere erosion in cancer cells, as apoptosis is telomere-dependent. The shorter the telomer length, the higher the chances of cell death. Hence, Ruta and Ca3(P04)2 can be used to effectively treat brain cancer, especially glioma conditions (Pathak et al., 2003).

Homeopathic medicine in the treatment of liver cancer

Lycopodium-30 is a potential therapeutic homeopathic medicine prepared from the extract of spores of *Lycopodium clavatum* (Khuda-Bukhsh, 2014) that can be applied as a remedy for different disorders of the liver Fig 4. Lycopodium was tested on rats which were treated with *p*- dimethyl azo amino benzene (*p*-DAB; a cancer inducer) and phenobarbital that promote hepatic cancer (Calfee-Mason et al., 2002; Biswas et al., 2005). Treatment with *p*-DAB and phenobarbital dysregulated the cytogenic endpoints such as mitotic index, micronuclei, and chromosomal aberrations. Furthermore, *p*-DAB and phenobarbital instigated severe impairments in the liver function markers, including alanine aminotransferase, alkaline phosphatases, aspartate aminotransferase, reducing glutathione activity concentration and dysregulated lipid peroxidation. Interestingly administration of homeopathic medicine (Lycopodium-30) maintained the aforementioned

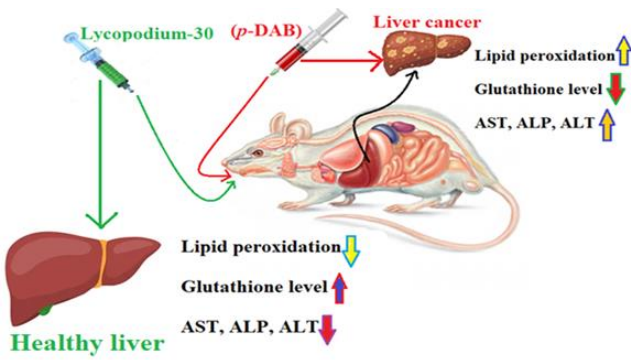

Fig 4. Effect of Homeopathic on liver cancer.

cytogenic and toxicity markers indicating its pharmaco-therapeutic potential against p-DAB prompted hepatocarcinogenesis in rats (Pathak et al., 2006).

Similarly, *Chelidonium majus* is also considered a therapeutic homeopathic product that can effectively ameliorate the problem of liver cancer by regulating the activity of antioxidant proteins (Biswas & Khuda-Bukhsh 2004). Moreover, derived compounds from the crude extract of *Chelidonium majus* and the crude extract of this plant itself, have been documented to express anti-inflammatory, anti-viral, anti-microbial, and anti-cancerous properties (Biswas et al., 2008; Gilca et al., 2010).

Tab 2. Summary of homeopathic drugs against relevant cancer with mechanism of action.

Homeopathic Drug	Cancer condition	Mechanism of action	Reference
Condurango 30C	Lung cancer	Induce apoptosis via triggering caspase-3 mediated pathway	Sikdar et al., 2013
Psorinum 6X	Lung cancer	Instigate apoptosis via generating ROS, escalate the activity of pro-apoptotic markers and reduce the expression of anti-apoptotic markers	Mondal et al., 2016
Condurango 30C and 6C	Esophageal and lung cancer	Induce cell cycle arrest at G1 or G0 phase	Sikdar et al., 2014
Ruta 6	Brain cancer	Trigger apoptosis via telomere erosion (as apoptosis is telomere dependent, the shorter the telomer more likely the cell death occurs)	Pathak et al., 2003
Lycopodium-30	Liver cancer	Maintain the level of liver function markers as well as the level of glutathione	Pathak et al., 2006
Chelidonium majus	Liver cancer	Regulate the concentration of anti-oxidant proteins	Biswas & Khuda-Bukhsh 2004
Conium, Phytolacca, Thuja and Carcinosin	Breas cancer	Triggers cell cycle arrest via enhancing the expression of phosphorylated Rb and lowering the expression of CDK inhibitor factor p27, Enhancing apoptotic cascade	Frenkel et al., 2010
Ruta graveolens	Colon cancer	Upregulate apoptotic marker's concentration and induce cell cycle arrest at the G2 or M phase	Arora & Tandon 2015

Chelidonium is a homeopathic medication frequently used to treat numerous liver conditions, including human liver cancer (Biswas & Khuda-Bukhsh 2002). For their potential anti-tumor along with enzyme-modulating properties in the liver and their anti-clastogenic potential during p-DAB-prompted hepatocarcinogenesis in mice, two active formulations of Chelidonium particularly Ch-200, Ch-30 were applied on mice model with hepatic cancer. Taken together, the ultra-minimal dose of the homeopathic medicine Chelidonium can effectively extend anti-genotoxic as well as anti-cancerous potential to antagonize azo-dye instigated hepatocarcinoma condition in rats indicating that homeopathic drugs can successfully ameliorate liver cancer with high degree of efficacy (Biswas & Khuda-Bukhsh 2002).

Homeopathic medicine in the treatment of breast cancer

Four ultra-diluted homeopathic remedies were tested against breast cancer *in vitro* (Conium, Phytolacca, Thuja, and Carcinosin). The breast cancer cell lines were specifically targeted by this homeopathic medicine, resulting in apoptosis and cell cycle arrest. These outcomes are achieved by alterations in the levels of the proteins involved in regulating the cell cycle activity such as the downregulation of the phosphorylated retinoblastoma and the upregulation of the cyclin-dependent pathway inhibitor factor p27. Besides this, the activation of caspase-7 along with cleavage of poly ADP ribose polymerase (PARP) in the presence of the homeopathic drug eventually leads to cell cycle arrest and stimulates the apoptotic cascade in cancerous cells of the breast (Frenkel et al., 2010).

Homeopathic medicine in the treatment of colon cancer

As per the Globocan report of the International Agency for Research on Cancer, colon cancer is a prime cause of mortalities worldwide, comprising 10% of all malignancies in males and 9.2% of women (IARC, 2012). There is a significant need for innovative therapeutic modalities due to the insufficiencies of contemporary therapeutic intervention. (Moongkarndi, 2004).

Sars, Phyto, and Ruta are homeopathic medications that have both cytotoxic and anti-proliferative characteristics. Mother tincture (MTs), a specific liquid prepared from extracts of certain plants and ultra-diluted preparations of the 3 aforementioned homeopathic medicines accelerates cytotoxicity and decreases proliferation in targeted colon cells. Mother tincture exert the most remarkable results against cancerous cells, whereas Sars express no effects on the MDCK cell line. Chromatin condensation, apoptosis, cell shrinkage, and DNA fragmentation are the significant events induced by aforesaid homeopathic medicines while treating colon cancer (Arora et al., 2013).

Ruta graveolens, a potential homeopathic therapeutic agent, exhibits significant anti-cancer activity on the COLO-205 cell line through cytotoxic, morphological, and migratory effects. The drug also regulates genes involved in apoptosis and cell cycle arrest and induces biochemical alterations that enhance its anti-cancer potential. Moreover, homeopathic medicine (Ruta) upregulated the activity of Bax, caspase-9, caspase-3, p27 as well as p21 in targeted cells following cell cycle arrest at the G2 or M phase of the cell cycle. These results revealed that phytochemicals present in homeopathic medicine (Ruta) have significant therapeutic effects against colon cancer (Arora & Tandon 2015).

Homeopathic medicine in the treatment of gallbladder and pancreatic cancers

Chatterjee et al. (2018) conducted clinical investigations on the effect of homeopathic medicine on the treatment of gallbladder and pancreatic cancers. They achieved the possible

therapeutic role of psorinum against gallbladder and pancreatic cancers and revealed tremendous results. Further clinical investigation, pharmacokinetics, molecular, and pharmacodynamic studies are required for more accurate outcomes of homeopathic medicine against aforementioned cancerous conditions.

CONCLUSION

Homeopathy provides potential curative drugs prepared from natural sources such as plants, minerals, and vitamins. Owing to these medicines, the system of homeopathy is playing an outstanding role as a source of complementary and alternative medicine with minimal or zero side effects. Homeopathic medicine could therapeutically reduce or eradicate the risk of cancer through its mechanism of action comprising of triggering various pathways and via particular modulation at the molecular level in the targeted cells, which are extensively involved in eliminating cancerous cells. In this way, we may get natural and inexpensive cancer treatment besides protecting us from the lethal side effects of chemotherapeutic and radiotherapeutic treatments.

REFERENCES

Arora S & S Tandon, 2015. DNA fragmentation and cell cycle arrest: a hallmark of apoptosis induced by Ruta graveolens in human colon cancer cells. Homeopathy 104(01):36-47.

Arora S, A Aggarwal, P Singla, P Jyoti & S Tandon, 2013. Anti-proliferative effects of homeopathic medicines on human kidney, colon, and breast cancer cells. Homeopathy 102(04): pp.274-82.

Barnes SL, KW Singletary & R Frey, 2000. Ethanol and acetaldehyde enhance benzo[a]pyrene-DNA adduct formation in human mammary epithelial cells. Carcinogenesis 21(11):2123-28.

Baskar R, KA Lee, R Yeo & KW Yeoh, 2012. Cancer and radiation therapy: current advances and future directions. International journal of medical sciences 9(3):193.

Biswas SJ & AR Khuda-Bukhsh, 2004. Evaluation of protective potentials of a potentized homeopathic drug, *Chelidonium majus*, during azo dye induced hepatocarcinogenesis in mice. Indian journal of experimental biology, 42(7):698–714

Biswas SJ & AR Khuda-Bukhsh, 2002. Effect of a homeopathic drug, Chelidonium, in amelioration of p-DAB induced hepatocarcinogenesis in mice. BMC Complementary and Alternative Medicine 2(1):1-12.

Biswas SJ, N Bhattacharjee & AR Khuda-Bukhsh, 2008. Efficacy of a plant extract (*Chelidonium majus* L.) in combating induced hepatocarcinogenesis in mice. Food and Chemical Toxicology 46(5):1474-87.

Biswas SJ, S Pathak, N Bhattacharjee, JK Das & AR Khuda-Bukhsh, 2005. Efficacy of the Potentized Homeopathic Drug, Carcinosin 200, Fed Alone and in Combination with Another Drug, Chelidonium 200, in Amelioration of p-Dimethylaminoazobenzene–Induced Hepatocarcinogenesis in Mice. Journal of Alternative & Complementary Medicine 11(5):839-54.

Black LI, TC Clarke, PM Barnes, BJ Stussman & RL Nahin, 2015. Use of complementary health approaches among children aged 4e17 Years in the United States: national health Interview survey. National Health Statistics Reports 78:1-19.

Briggs J, 2014. Building the evidence base for integrative approaches to care of cancer survivors. Journal of National Cancer Institute Monographs 50:288.

Calfee-Mason KG, BT Spear & HP Glauert , 2002. Vitamin E inhibits hepatic NF-κB activation in rats administered the hepatic tumor promoter, phenobarbital. The Journal of Nutrition 132(10):3178-85.

Chatterjee A., J Biswas, A Chatterjee, S Bhattacharya, B Mukhopadhyay & S Mandal, 2018. Psorinum therapy in treating stomach, gall bladder, pancreatic, and liver cancers: a prospective clinical study. Evidence-Based Complementary and Alternative Medicine 6803672. https://doi.org/10.1155/2018/6803672

Clarke TC, LI Black, BJ Stussman, PM Barnes & RL Nahin, 2015. Trends in the use of complementary health approaches among adults: United States, 2002-2012. National Health Statistics Reports 79:1-16.

Downer SM, MM Cody, P McCluskey, PD Wilson, SJ Arnott, TA Lister & ML Slevin, 1994. Pursuit and practice of complementary therapies by cancer patients receiving conventional treatment. British Medical Journal 309(6947):86-89.

Ernst E, MH Pittler, B Wider & K Boddy, 2006. The Desktop Guide to Complementary and Alternative Medicine. second ed. Edinburgh: Elsevier Mosby.

Fisher P, 2012. What Is Homeopathy? An Introduction. Frontiers in Bioscience 4:1669-1682.

Frenkel M, BM Mishra, S Sen, P Yang, A Pawlus, L Vence, A Leblanc, L Cohen, P Banerji & P Banerji, 2010. Cytotoxic effects of ultra-diluted remedies on breast cancer cells. International Journal of Oncology 36(2):395-03.

Gilca, M., L Gaman, E Panait, I Stoian & V Atanasiu, 2010. *Chelidonium majus*–an integrative review: traditional knowledge versus modern findings. Complementary Medicine Research,17(5):241-48.

Hamilton E, 1982. The flora homeopathica: illustrations and descriptions of the medicinal plants used as homeopathic remedies. B. Jain Publishers, New Delhi, pp443-447.

Hering C, 1883 The homoeopathic domestic physician, 7th ed, Boericke, FE (Ed). Hahnemann Publishing House, Philadelphia 387. Available: http://books.google.com/books?

IARC, 2012. Colorectal cancer estimated incidence, mortality, and prevalence worldwide in 2012. Lyon, France: World Health Organization.

Jonas, WB, & JS Levin, 1999. Introduction: models of medicine and healing. Essentials of Complementary and Alternative Medicine. edited 1-15.

Khuda-Bukhsh AR, 2014. Compendium of Abstracts of Studies on extracts, homeopathy, and high dilution.

Loudon I, 2006. A brief history of homeopathy. Journal of the Royal Society of Medicine 99(12):607-610.

Mao JJ & L Cohen, 2014. Advancing the science of integrative oncology to inform patient-centered care for cancer survivors. Journal of the National Cancer Institute 50: 283-304.

Milazzo S, N Russell & E Ernst, 2006. Efficacy of homeopathic therapy in cancer treatment. European Journal of Cancer 42(3):282-89.

Molassiotis, A, P Fernadez-Ortega, D Pud, G Ozden, JA Scott, V Panteli & E Patiraki, 2005. Use of complementary and alternative medicine in cancer patients: a European survey. Annals of Oncology 16(4):655-663.

Mondal, J, A Samadder & AR Khuda-Bukhsh, 2016. Psorinum 6× triggers apoptosis signals in human lung cancer cells. Journal of Integrative Medicine 14(2):143-153.

Montfort H, 2000. A new homeopathic approach to neoplastic diseases: from cell destruction to carcinogen-induced apoptosis. British Homoeopathic Journal 89(2):78–83.

Moongkarndi P, N Kosem, S Kaslungka, O Luanratana & N Pongpan, 2004. Antiproliferation, antioxidation, and induction of apoptosis by *Garcinia mangostona* (Mangosteen) on Skbr3 Human Breast Cancer Cell Line. Journal of Ethnopharmacology 90:161-66.

Mueller M, 2012. Is homeopathy an effective cancer treatment? The American Homeopath 20:14-28.

Nahin RL, PM Barnes, BJ Stussman & B Bloom, 2009. National health statistics reports. Hyattsville, MD: National Center for Health Statistics. 1:1-4.

Othonos, A., 2010. An Introduction to Homeopathic Medicine. Free eBooks.net. http://hdl.handle.net/123456789/3381

Pathak S, J Kumar Das, S Jyoti Biswas & AR Khuda-Bukhsh, 2006. Protective potentials of a potentized homeopathic drug, Lycopodium-30, in ameliorating azo dye induced hepatocarcinogenesis in mice. Molecular and Cellular Biochemistry 285:121-31.

Pathak, S, Multani AS, Banerji P & Banerji P, 2003. Ruta 6 selectively induces cell death in brain cancer cells but proliferation in normal peripheral blood lymphocytes: A novel treatment for human brain cancer. International journal of oncology 23(4):975-982.

Paul S, SS Bhattacharyya, A Samaddar, N Boujedaini & AR Khuda-Bukhsh, 2011. Anticancer potentials of root extract of Polygala senega against benzo[a] pyrene induced lung cancer in mice. Zhong xi yi jie he xue bao = Journal of Chinese integrative medicine 9(3): 320-327.

Rowland JH & A O'Mara, 2014. Survivorship care planning: a unique opportunity to champion integrative oncology. Journal of the National Cancer Institute 50:285.

Hahnemann SC, 1851. Essay on a new curative principle for ascertaining the curative power of drugs with a few glances at those hitherto employed (1796) In the Lesser writings of Samuel Hahnemann tr Dudgeon. London.

Sikdar S, A Mukherjee, K Bishayee, A Paul, SK Saha, S Ghosh & AR Khuda-Bukhsh, 2013. Post-cancer Treatment with Condurango 30C Shows Amelioration of Benzo [a] pyrene-induced Lung Cancer in Rats Through the Molecular Pathway of Caspa-se-3-mediated Apoptosis Induction: Anti-lung cancer potential of Condurango 30C in rats. Journal of pharmacopuncture 16(3): 11.

Sikdar S, SK Saha & AR Khuda-Bukhsh, 2014. Relative Apoptosis-inducing Potential of Homeopathic Condurango 6C and 30C in H460 Lung Cancer Cells In vitro: -Apoptosis-induction by homeopathic Condurango in H460 cells. Journal of Pharmacopuncture 17(1):59.

Yang SC, SN Jenq, ZC Kang & H Lee, 2000. Identification of benzo [a] pyrene 7, 8-diol 9,10-epoxide N2-deoxyguanosine in human lung adenocarcinoma cells exposed to cooking oil fumes from frying fish under domestic conditions. Chemical Research in Toxicology 13(10):1046-50.