Journal of Carcinogenesis
Covering Genesis to Therapeutics

Journal of Carcinogenesis, ISSN: 1477-3163
2024; Vol 23: Issue 1, https://carcinogenesis.com/

Cancer in Unani, Ayurvedic & Allopathic Medicine, Historical foundations, Traditional concept, Herbal therapeutics & Future Direction- A review article

Dr. Jameel Ahmad Mohammad Abbas[1]*, Dr. Aslaaf Nayeem Shaikh[2], Dr. Shaikh Mudassar Shaikh Altaf Maniyar[3], Dr. Asema Mahveen[4], Dr. Mohammad Danish[5], Miss Jyoti Ashok Choudhari[6], Miss Nitisha Yuvraj Rangari[7]

[1] Professor & HOD, Dept. of Pharmaceutics. Delight College of Pharmacy, Pune. (MH) India

[2] Associate Professor, Dept. of Moalajat, Ahmad Greeb Unani Medical College, Akkalkuwa Dist: Nandurabar. (MH) India

[3] Lecturer, Dept. of Moalajat, Iqra Unani Medical College and Hospital, Jalgaon. (MH) India

[4] Associate Professor, Dept. of Ilmul Advia, National Research Institute of Unani Medicine & Skin Disorder, Hyderabad, Telengana, India

[5] Assistant Professor, Dept. of Moalajat, Inamdar Unani Medical College & Hospital, Kalaburagi, Karnataka. India

[6] PG Scholar, Dept. of Pharmaceutical Sciences, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur (MH) India

[7] Lecturer, A.M.C.E.S. Institute of pharmacy, Lonara, Nagpur (MH) India

ABSTRACT

Cancer is a complex group of diseases characterized by uncontrolled cell proliferation, invasion of surrounding tissues, and metastasis to distant organs. It remains a leading cause of morbidity and mortality worldwide, driven by genetic, environmental, and lifestyle-related risk factors. Despite significant advancements in modern oncology, including surgery, radiotherapy, chemotherapy, targeted therapy, and immunotherapy, the global cancer burden continues to rise, highlighting the need for integrated approaches to prevention, diagnosis, and management. This review explores the historical evolution of cancer understanding from ancient civilizations to modern molecular biology. Early descriptions from Egyptian medical papyri and Hippocratic writings laid the foundation for tumor recognition, while the contributions of Galen, Renaissance anatomists, and 19th-century pathologists such as Virchow established cancer as a disease of abnormal cellular proliferation. In modern medicine, cancer is defined as a genetic and molecular disorder, forming the basis of the field of Oncology. The study further compares conceptual frameworks of cancer in traditional systems of medicine, including Ayurveda and Unani, where cancer-like conditions are described as Arbuda, Granthi, and Sartan, attributed to imbalances in biological humors, doshas, and toxic accumulation. These systems emphasize detoxification, restoration of physiological balance, and herbal-based therapeutic interventions. Finally, the review highlights emerging trends in cancer management, including precision medicine, immunotherapy, liquid biopsy, nanotechnology, and artificial intelligence-driven diagnostics. The future of oncology is expected to focus on early detection, personalized treatment, reduced toxicity, and integration of evidence-based traditional therapies with modern medical science to improve patient outcomes and quality of life.

Keywords: *Cancer, Oncology, Ayurveda, Unani medicine, Herbal therapeutics, Immunotherapy, Precision medicine, History of medicine, Integrative oncology.*

How to Cite: Dr. Jameel Ahmad Mohammad Abbas, Dr. Aslaaf Nayeem Shaikh, Dr. Shaikh Mudassar Shaikh Altaf Maniyar, Dr. Asema Mahveen, Dr. Mohammad Danish, Miss Jyoti Ashok Choudhari, Miss Nitisha Yuvraj Rangari, (2024) Cancer in Unani, Ayurvedic & Allopathic Medicine, Historical foundations, Traditional concept, Herbal therapeutics & Future Direction- A review article, *Journal of Carcinogenesis*, *Vol.23, No.1*, 1099-1113

1. INTRODUCTION

Cancer remains one of the most significant health challenges worldwide due to its high incidence, mortality, and economic burden. The disease is characterized by uncontrolled cell growth and the ability of abnormal cells to invade surrounding tissues and spread to distant organs through metastasis. Since metastasis is responsible for most cancer-related deaths, early detection and prevention are critical components of cancer control. 1 The increasing number of cancer cases globally and

in India reflects changes in population demographics, lifestyle patterns, environmental exposures, and improved diagnostic capabilities. The rise in cancer incidence places substantial pressure on healthcare systems, highlighting the need for expanded diagnostic facilities, specialized treatment centers, and trained healthcare professionals. Despite advances in surgery, chemotherapy, radiotherapy, immunotherapy, and targeted therapies, the mortality associated with many cancers remains high, emphasizing the importance of preventive strategies.2

Cancer is widely recognized as a multifactorial disease influenced by genetic, environmental, behavioral, and lifestyle factors. Tobacco use, alcohol consumption, unhealthy diet, obesity, physical inactivity, infections, radiation exposure, and environmental pollutants are among the major risk factors. Therefore, effective cancer prevention requires a comprehensive approach that addresses these multiple determinants rather than focusing solely on treatment after disease onset.3 The passage also highlights the relevance of Ayurveda in cancer prevention and health promotion. Ayurveda emphasizes maintaining balance in the body through proper diet, lifestyle, mental well-being, and environmental harmony. Its preventive approach aligns with modern public health principles that advocate healthy living to reduce the risk of chronic diseases, including cancer. While Ayurveda is not considered a replacement for evidence-based cancer treatment, its concepts may contribute to supportive care, quality of life improvement, and preventive health practices. Continued scientific research is necessary to evaluate the effectiveness and safety of Ayurvedic interventions in cancer management.4 Historically, cancer has been recognized for thousands of years. The earliest documented descriptions in the ancient Egyptian Edwin Smith Papyrus demonstrate that cancer has affected humanity since antiquity. Ancient Greek physicians, particularly Hippocrates, contributed significantly to the understanding of tumors and introduced terminology that forms the basis of the modern word "cancer." The use of surgical excision, cauterization, and local treatments by ancient physicians illustrates the long-standing human effort to manage this disease. Although these early methods were limited by the scientific knowledge and technology of their time, they laid the foundation for the development of modern surgical oncology.5

2. HISTORICAL FOUNDATION OF CANCER

The historical foundation of cancer spans ancient medicine to modern cellular biology, gradually evolving from mystical explanations to a precise scientific understanding.

A. Ancient understanding (before 5th century BCE)

The earliest known descriptions of cancer come from ancient Egypt. The Edwin Smith Papyrus (circa 1600 BCE) describes cases of breast tumors treated with cauterization, noting that some were “incurable.” In this period, cancer was seen as a localized, often fatal swelling, but without understanding of its cause.

Ancient Greek medicine (foundation of the term “cancer”) the word “cancer” comes from the Greek physician Hippocrates (460–370 BCE), often called the “Father of Medicine.” He used the terms: “karkinos” (crab) and “carcinoma” because tumors and surrounding swollen veins resembled a crab’s legs. Later, Galen (129–216 CE), a Roman physician, expanded the theory and believed cancer was caused by an imbalance of black bile (part of the humoral theory). This idea dominated medicine for over 1,000 years.

B. Middle Ages (500–1500 CE)

During this period:

- Medical knowledge was limited in Europe
- Cancer was still explained through humoral imbalance
- Treatment included herbal remedies, cauterization, and surgery (rare and risky)

There was little advancement in understanding the disease mechanism.

C. Renaissance and early modern period (1500–1800 CE)

Major progress began as anatomy improved:

- Surgeons started observing tumors directly
- John Hunter (18th century surgeon) suggested that cancer could be surgically removed and might not always return immediately
- Cancer began to be seen as a localized disease rather than a systemic imbalance

D. 19th century: cellular theory revolution

A major turning point came with the development of cell theory. The German pathologist Rudolf Virchow (1821–1902) proposed:

- Cancer originates from abnormal cells
- Disease spreads through cellular proliferation

This replaced humoral theory and became the foundation of modern oncology.

E. 20th century: scientific oncology

Modern understanding expanded rapidly:

- Discovery of radiation therapy (Marie Curie's work on radioactivity)
- Development of chemotherapy
- Identification of carcinogens (smoking, chemicals, radiation)
- Understanding of DNA mutations and oncogenes

Cancer became defined as a genetic disease of uncontrolled cell division, forming the basis of modern Oncology.

F. Modern era (21st century)

Today, cancer research focuses on:

- Genomics (cancer DNA mapping)
- Immunotherapy
- Targeted drug therapy
- Precision medicine (individualized treatment)

Cancer is now understood as a multi-step genetic and molecular disease, not a single condition.

3. CANCER IN ANCIENT GREEK.

A. Hippocratic Physicians and Cancer Treatment (After the 4th Century BC)

The Hippocratic physicians made significant contributions to the early understanding of cancer through careful clinical observation. Although they lacked detailed anatomical knowledge and modern diagnostic tools, they recognized that certain cancers were aggressive, difficult to treat, and often associated with poor outcomes. Their observations demonstrated an advanced awareness of the natural progression of malignant diseases. One of their most important contributions was their cautious attitude toward surgical treatment. They believed that non-ulcerated cancers were generally incurable and that surgery often caused more harm than benefit. In an era without anesthesia, antiseptic techniques, or effective control of bleeding and infection, surgical procedures carried a high risk of complications and death. Therefore, avoiding surgery was often a practical and compassionate decision. The Hippocratic approach also reflects an early understanding of medical ethics. By considering whether treatment would improve or worsen a patient's condition, they emphasized the principle of minimizing harm and preserving quality of life. This patient-centered perspective remains an important aspect of modern medical practice. However, their belief that many cancers were incurable limited the use of potentially beneficial interventions. Advances in medical science have transformed cancer management, with modern oncology offering effective treatments through surgery, chemotherapy, radiotherapy, targeted therapy, and immunotherapy. As a result, many cancers that were once considered untreatable can now be cured or successfully controlled. Overall, the Hippocratic physicians laid an important foundation for cancer care by emphasizing careful observation, thoughtful decision-making, and concern for patient welfare, principles that continue to influence modern medicine. 8,9,10

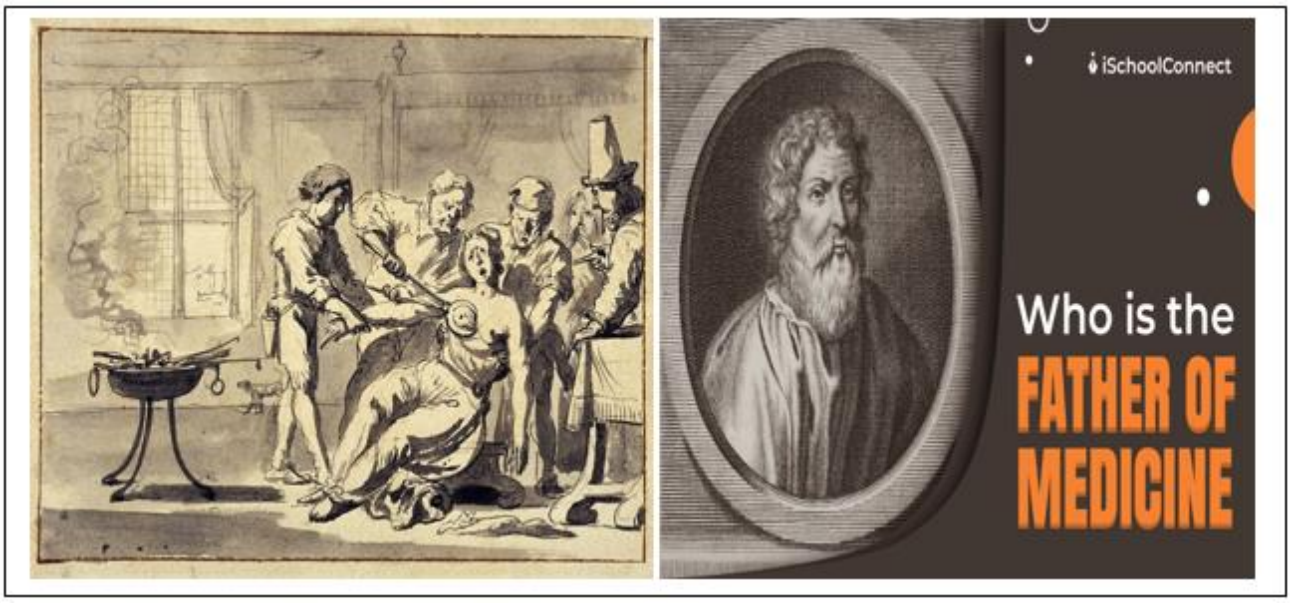


Fig. 01 Cancer Treatment in Hippocratic Era 460 BC

B. Archigenes of Apamea (1st–2nd Century AD)

The account of Archigenes of Apamea provides valuable insight into the development of cancer surgery in ancient medicine. His surgical approach demonstrates a remarkably advanced understanding of several principles that remain

central to modern oncological practice. Despite the limitations of medical knowledge and technology during his time, Archigenes emphasized careful patient selection, early diagnosis, complete tumor removal, hemorrhage control, and postoperative care. One of the most significant aspects of his approach was the recognition of the importance of early diagnosis. Archigenes believed that cancers detected in their initial stages could sometimes be managed with medicinal therapies, potentially avoiding the need for surgery. This concept closely parallels modern oncology, where early detection is associated with better outcomes, less extensive treatment, and improved survival rates. Archigenes also understood that surgery was not appropriate for every patient. His emphasis on patient selection suggests an awareness that treatment decisions should be individualized according to the patient's condition and the characteristics of the disease. This reflects a principle that remains fundamental in contemporary cancer management. Another notable contribution was his insistence on complete tumor excision. By recommending removal of the entire growth along with any attached membranes, Archigenes demonstrated an early understanding that residual diseased tissue could lead to recurrence. This concept is similar to the modern surgical objective of achieving clear margins during cancer resection to minimize the risk of tumor re-growth.

Fig. 02 Cancer in Archigenes of Apamea Era

His methods for controlling postoperative bleeding through cauterization highlight an important surgical innovation. In the absence of modern hemostatic techniques, cauterization provided an effective means of preventing excessive blood loss and improving surgical outcomes. Similarly, the use of sutures and herbal poultices for wound management indicates an appreciation of the importance of proper wound healing and protection against complications. Furthermore, Archigenes recognized that successful treatment extended beyond the operation itself. His recommendations for cleaning, dressing, and monitoring the wound for several days after surgery demonstrate an early understanding of postoperative care and the need to prevent inflammation and infection. This holistic approach reflects principles that continue to guide surgical practice today. Overall, Archigenes' contributions represent a significant milestone in the history of cancer treatment. His emphasis on early diagnosis, complete tumor removal, bleeding control, and postoperative management reveals a sophisticated surgical philosophy that anticipated several key concepts of modern oncological surgery. 11

C. Galen (2nd Century AD)

Galen was one of the most influential physicians of the ancient world and played a major role in shaping the understanding of cancer and tumors. His work was based on the humoral theory, which dominated medical thought for centuries and provided a systematic framework for explaining disease. Galen observed that cancer could develop in different parts of the body but appeared particularly common in the breasts of women, especially those with absent or irregular menstruation.

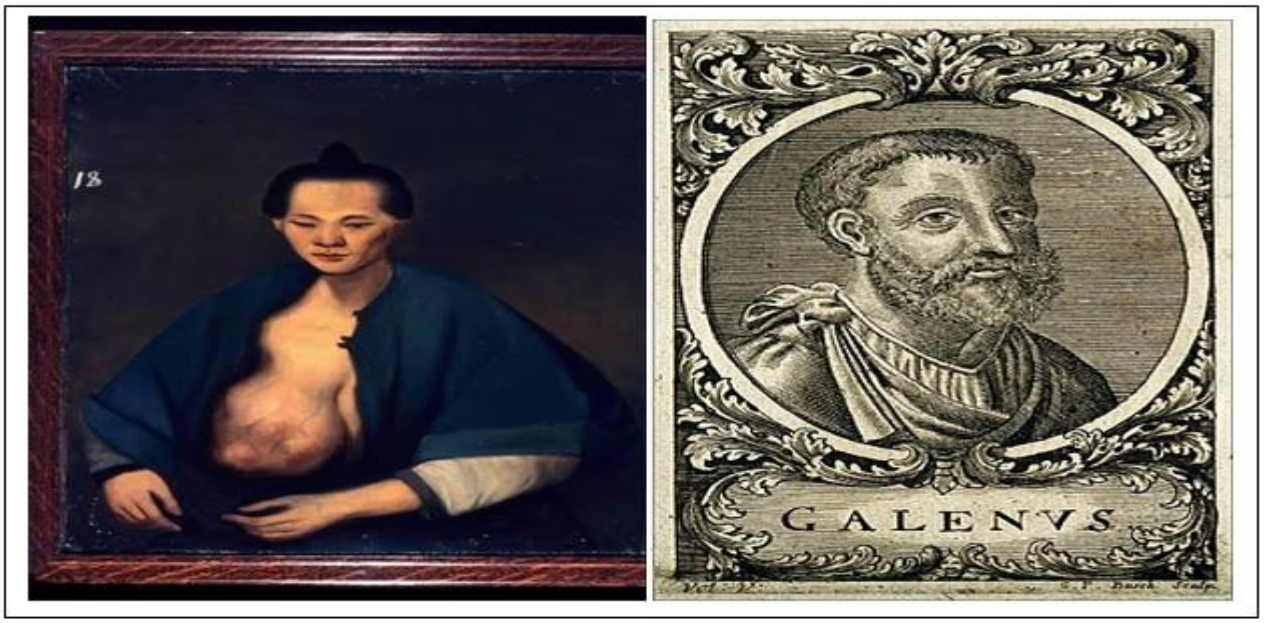


Fig. 03 Breast Cancer in Galen Era

According to Galen, cancer was caused by the accumulation of black bile, one of the four bodily humors. He believed that dysfunction of the liver and spleen resulted in excessive production and retention of black bile, which accumulated in tissues and formed cancerous growths. While modern medicine has disproved this theory and attributes cancer to genetic and cellular abnormalities, Galen's explanation represented the most comprehensive medical model available during his time. One of Galen's most lasting contributions was his detailed description of the appearance of cancerous tumors. He observed that enlarged veins surrounding a tumor resembled the legs of a crab, leading to the use of the Greek term karkinos (crab) for the disease. This terminology eventually evolved into the modern word "cancer." His observations highlight the importance of careful physical examination in the recognition and classification of diseases. Galen also described ulcerated cancers as producing dark, foul-smelling discharges, which he interpreted as evidence of excess black bile. Although this interpretation was incorrect, it reflects his attempt to correlate clinical signs with underlying disease mechanisms. His systematic approach encouraged physicians to carefully observe and categorize pathological conditions.Historically, Galen's work was highly significant because it established a structured framework for understanding tumors and influenced medical practice for nearly 1,500 years. His treatise, On Tumors Against Nature, contributed to the classification of abnormal growths and promoted careful clinical observation. However, the long-standing dominance of the humoral theory also delayed the discovery of the true biological basis of cancer until advances in pathology, anatomy, and cellular biology emerged in later centuries. 12,13

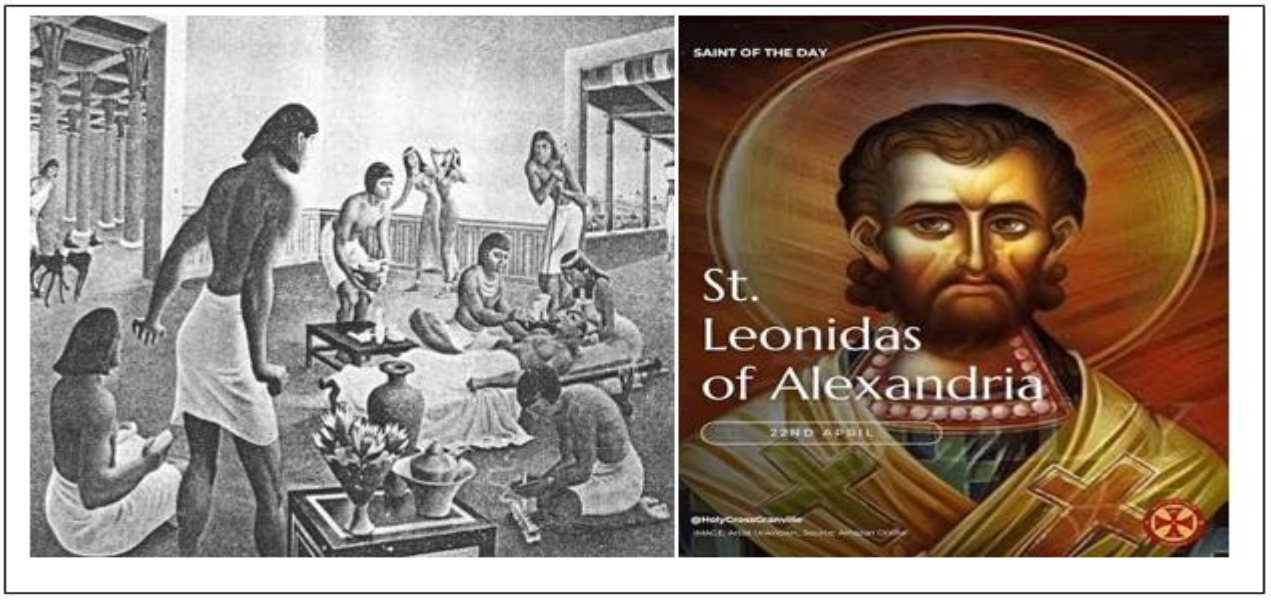


Fig. 04 Breast Cancer in Leonidas Alexandria

D. Leonides of Alexandria (Circa 2nd Century AD)

Leonides of Alexandria made important contributions to the diagnosis and surgical treatment of breast cancer, representing a significant advancement in ancient oncology. His work demonstrates a sophisticated understanding of tumor classification, clinical diagnosis, and surgical management that was remarkable for his time. One of Leonides' most notable achievements was his ability to distinguish between scirrhus, a hard breast tumor that was not necessarily malignant, and true breast cancer. This differentiation reflects an early attempt to classify tumors based on their clinical characteristics. He also identified nipple retraction as a key sign of malignancy, an observation that remains clinically relevant in modern medicine and is still recognized as an important indicator of breast cancer.Unlike many earlier physicians who discouraged surgical intervention, Leonides supported surgery in carefully selected patients. However, he exercised sound clinical judgment by advising against operations when the tumor had spread extensively throughout the breast or become attached to the chest wall. This suggests an understanding that advanced disease was unlikely to be cured by surgery and that treatment risks could outweigh potential benefits. For localized tumors, Leonides recommended amputation of the breast, making his procedure one of the earliest documented forms of mastectomy. Significantly, he advised making the incision through healthy tissue surrounding the tumor. This recommendation indicates an awareness that cancer should be removed together with adjacent tissue to reduce the risk of leaving diseased tissue behind, a concept similar to the modern oncological principle of achieving clear surgical margins.A distinctive feature of his technique was the alternating use of incision and cauterization. Since ancient surgeons lacked modern methods of controlling bleeding, cauterization was essential for achieving hemostasis and allowing the operation to proceed safely. Although extensive cauterization would be considered traumatic by modern standards, it represented an effective and practical solution in the surgical environment of the time. Leonides' work is historically significant because it combined careful clinical observation with a structured surgical approach. His recognition of important signs of breast cancer, differentiation between tumor types, attention to complete tumor removal, and management of surgical bleeding demonstrate a remarkably advanced understanding of cancer treatment. These contributions helped lay the foundation for later developments in breast cancer surgery and highlight the evolution of oncological principles long before the advent of modern medical science. . 14

E. Paulus Aegineta (7th Century AD)

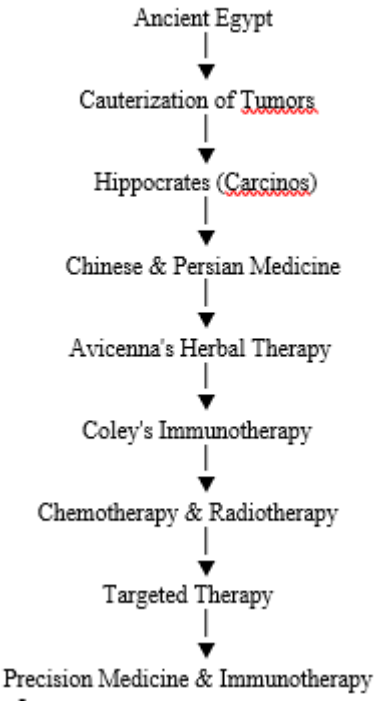
The writings of Paulus Aegineta, Galen, Archigenes of Apamea, Leonides of Alexandria, and the Hippocratic physicians provide valuable insights into the early understanding and surgical treatment of cancer. Although their explanations were based on ancient theories such as the concept of black bile, many of their clinical observations were remarkably accurate. 15 Paulus Aegineta described cancer as a painful, irregular, and dark swelling that could occur with or without ulceration. He believed that cancers of the uterus were too dangerous to operate on but supported surgical treatment for external cancers, especially those of the breast. He preferred complete tumor excision over extensive cauterization and emphasized removing the tumor and its roots.17

Table 01 Evolution of Cancer Understanding and Treatment through History

Period / Year	Civilization / Scholar	Landmark Contribution	Significance in Cancer History
3000–2000 BCE	Ancient Egyptians	Breast tumors and ulcers treated by cauterization	Earliest documented cancer treatment
1200 BCE	Ancient Sudan	Evidence of metastatic cancer found in human skeletons	Oldest physical evidence of malignant cancer
3000 Years Ago	Ancient India	Panchakarma protocols included heat-based therapies	Early use of thermal treatment in disease management
460–370 BCE	Hippocrates	Introduced terms *Carcinos* and *Carcinoma*	Foundation of cancer terminology
1st Century CE	Aulus Cornelius Celsus	Advocated hot baths and heat therapy	Recognition of thermal sensitivity of tumors
375 CE	Ge Hong	Detailed clinical description of breast cancer	First written Chinese account of cancer
980–1037 CE	Avicenna	Described cancer spread and herbal treatment (Hindiba)	Early concept of metastasis
1893–1936 CE	William B. Coley	Developed Coley's Toxin (bacterial immunotherapy)	Foundation of modern cancer immunotherapy

Period / Year	Civilization / Scholar	Landmark Contribution	Significance in Cancer History
20th Century	Modern Oncology	Surgery, Radiotherapy, Chemotherapy	Standardized cancer management
21st Century	Precision Oncology	Immunotherapy, Targeted Therapy, Gene Therapy	Personalized cancer treatment

Historical Milestones in Cancer Treatment



4. AYURVEDIC CONCEPT OF CANCER

Cancer is not described directly in Ayurveda, but conditions similar to cancer are explained as Arbuda (tumor) and Granthi (swelling). Arbuda is considered the closest Ayurvedic equivalent of a malignant tumor. It is described as a large, hard, deep-seated, slowly growing mass that is difficult to cure and may recur. According to Ayurveda, cancer develops due to the imbalance of the three Doshas Vata, Pitta, and Kapha along with the vitiation of Rakta (blood), Mamsa (muscle), and other body tissues. Kapha promotes abnormal tissue growth, Pitta causes inflammation and tissue destruction, and Vata contributes to the spread and progression of the disease. Ayurveda also attributes cancer development to the accumulation of Ama (toxic metabolic waste) caused by impaired digestion (Agni). Ama obstructs body channels (Srotas) and leads to abnormal tissue growth. Major causes include unhealthy diet, sedentary lifestyle, stress, suppression of natural urges, and exposure to toxins. Prevention focuses on maintaining a balanced diet, healthy lifestyle, regular exercise, proper digestion, and mental well-being. Ayurvedic management aims to restore Dosha balance, remove Ama, improve digestion, and strengthen immunity through therapies such as Panchakarma and Rasayana. Ayurveda is mainly used as a supportive approach alongside modern cancer treatment. 7

5. CANCER IN ALLOPATHIC SYSTEM OF MEDICINE

In the allopathic system of medicine (also called modern Western medicine), cancer is understood as a group of diseases characterized by uncontrolled, abnormal cell growth that can invade nearby tissues and spread (metastasize) to distant organs.In modern medicine, cancer arises due to genetic mutations in cells that disrupt normal control of:

- Cell division (cells multiply too fast)
- Cell death (damaged cells don't die when they should)
- DNA repair mechanisms

These abnormal cells form a tumor (except in blood cancers like leukemia), which can be:

- Benign: non-spreading, localized growth

- Malignant: invasive and capable of spreading

This entire field of study and treatment is part of Oncology.

A. Types of cancer

Allopathic medicine classifies cancer based on tissue of origin, such as:

- Carcinoma (skin, lungs, breast, colon)
- Sarcoma (bone, muscle, connective tissue)
- Leukemia (blood and bone marrow)
- Lymphoma (lymphatic system)

A general term for this disease is Cancer.

B. Diagnosis in allopathic medicine

Doctors use evidence-based methods such as:

- Physical examination
- Blood tests (tumor markers in some cases)
- Imaging (CT scan, MRI, PET scan)
- Biopsy (confirming cancer under microscope)

Allopathic medicine uses scientifically tested treatments, often combined depending on cancer type and stage:

- Surgery: removal of tumor
- Radiation therapy: destroys cancer cells using high-energy rays
- Chemotherapy: drugs that kill or slow cancer cells
- Targeted therapy: drugs that act on specific cancer cell mechanisms
- Immunotherapy: boosts the immune system to fight cancer
- Hormone therapy: used in cancers like breast or prostate cancer

The allopathic approach is based on:

- Evidence from clinical trials
- Standard treatment protocols
- Early detection and prevention strategies (screening)

6. CANCER HISTORY IN INDIA

Table 02. Cancer from Ancient to modern Era

Period	Key Developments
Ancient Period (Before 1600)	No formal medical classification of cancer. Conditions resembling tumors described in traditional systems like Ayurveda as Arbuda and Granthi.
Colonial Era (1700s–1800s)	Introduction of modern Western medicine in India. First recorded clinical descriptions of cancer cases in hospitals established by the British.
1900–1940s	Limited cancer awareness. Cancer cases mostly diagnosed late. Basic surgical treatments introduced in major cities like Kolkata, Mumbai, and Chennai.
1941	Formation of Indian Cancer Research Centre (ICRC**)** in Mumbai (now part of ACTREC under Tata Memorial Centre system).
1950s–1960s	Expansion of cancer hospitals and research. Growth of radiotherapy services in India.
1967	Establishment of Indian Council of Medical Research National Cancer Registry Programme (ICMR-NCRP**)** begins groundwork for cancer data collection.
1981	Launch of formal National Cancer Registry Programme (NCRP**)** under ICMR to track cancer incidence in India.
1990s	Rapid increase in cancer cases reported. Awareness programs and tobacco-control discussions begin.
2000–2010	Expansion of cancer centers across India. Introduction of advanced treatments like Chemotherapy protocols and modern radiotherapy.
2010–2020	Rising burden of cancer documented (over 1 million new cases annually). Focus on Prevention, screening (breast, cervical, oral cancers).

Period	Key Developments
2020–Present	Growth of precision medicine, immunotherapy, and AI-based diagnostics. Government programs like NPCDCS (National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke) strengthen screening and early detection.

In 2019, the World Health Organization reported that cancer was the leading or second leading cause of death before age 70 in 112 out of 183 countries and ranked third or fourth in 23 additional countries 23. By 2020, global cancer incidence rates were 19% higher in men compared to women, with men also experiencing a significantly higher mortality rate (120.8 per 100,000) compared to 84.2 per 100,000 for women, a 43% difference. In 2022, there were approximately 19.97 million new cancer cases and 9.74 million cancer deaths worldwide. Lung cancer was the most commonly diagnosed cancer (12.4%), followed by breast (11.5%), colorectal (9.6%), prostate (7.3%), and stomach cancers (4.8%). It also accounted for the most deaths (18.7%), followed by colorectal (9.3%) and liver cancers (7.8%). Breast cancer had the highest five-year prevalence rate at 15.3 per 100,000, followed by colorectal and prostate cancers at 10.8 per 100,000 each. 21-24

Table 03. Historical Evolution of Cancer Understanding and Treatment

Era	Key Concepts	Major Contributors	Treatment Approaches	Limitations
Ancient Era	Cancer viewed as imbalance of bodily humors	Hippocrates, Galen, Unani Scholars	Herbal remedies, dietary regulation, surgery	Limited scientific understanding
Medieval Era	Development of traditional medical systems	Ibn Sina (Avicenna), Al-Razi	Compound herbal formulations, cauterization	Lack of diagnostic tools
Modern Era	Cellular and molecular basis of cancer	Virchow, Watson & Crick	Chemotherapy, Radiotherapy, Surgery	Toxicity and resistance
Contemporary Era	Precision medicine and targeted therapy	Modern Oncologists	Immunotherapy, Gene Therapy, Personalized Medicine	High cost, variable response

Table 04. Unani Perspective of Cancer (Sartan)

Unani Concept	Description	Modern Correlation
Sartan	Hard, painful swelling with progressive growth	Malignant tumor
Su-e-Mizaj	Abnormal temperament of tissues	Cellular dysregulation
Akhlat-e-Fasida	Corrupted humors	Oxidative stress and inflammation
Tadeel-e-Mizaj	Restoration of normal temperament	Supportive and preventive therapy
Ilaj-bit-Tadbeer	Regimental therapy	Lifestyle modifications

Table 05. Emerging Therapeutic Strategies in Cancer Management

Strategy	Mechanism of Action	Examples	Advantages	Challenges
Chemotherapy	Cytotoxic action on rapidly dividing cells	Cisplatin, Doxorubicin	Widely available	Toxicity
Targeted Therapy	Targets specific molecular pathways	Imatinib, Trastuzumab	High specificity	Drug resistance
Immunotherapy	Enhances immune response	Pembrolizumab, Nivolumab	Long-term benefit	Immune-related adverse effects
Gene Therapy	Genetic modification of cells	CAR-T Therapy	Personalized treatment	High cost

Strategy	Mechanism of Action	Examples	Advantages	Challenges
Herbal Therapy	Antioxidant and anti-inflammatory effects	Curcumin, Amla, Nigella sativa	Low toxicity	Need for clinical validation

Table 06. Future Directions in Integrative Oncology

Area	Current Status	Future Prospects
Artificial Intelligence	Cancer diagnosis support	Predictive oncology
Nanomedicine	Targeted drug delivery	Precision nanotherapeutics
Biomarkers	Early detection	Personalized cancer risk assessment
Integrative Medicine	Complementary therapies	Evidence-based holistic care
Genomics	Tumor profiling	Individualized treatment plans

7. ROLE OF ISLAMIC AND ARAB PLANTS IN CANCER

Table 07. Islamic and Arabic Plants used in treatment of cancer.

Plant (Scientific Name)	Common Name	Reported Anticancer / Pharmacological Activities	Key Cancer Models / Effects	References
Acacia seyal	Acacia	Cytotoxic and chemopreventive potential	HepG2, MCF-7, A549, HCT-116 cell lines	25-27
Acorus calamus	Sweet flag	Antiproliferative, antioxidant, neuroprotective	Inhibits human & mouse cancer cell lines	26-28
Agaricus campestris	Mushroom	Antitumor, cytotoxic, metabolic modulation	HEp-2, MCF-7, HO-8910, 7721	29-33
Allium ascalonicum	Leek	Anti-angiogenic, anti-proliferative, apoptotic	Jurkat, K562, HeLa cell lines	34-35
Allium cepa	Onion	Chemopreventive, antioxidant, anti-inflammatory	Reduced risk: breast, lung, colorectal, stomach cancers	36-37
Allium sativum	Garlic	Strong chemopreventive, immune modulation	GI cancers, prostate, breast cancer risk reduction	38-39
Aloe vera	Aloe	Radioprotective, antiproliferative, wound healing	Neuroblastoma, melanoma cell lines	40-41
Anethum graveolens	Dill	Chemopreventive agent (bioactive compounds)	Anethofuran-mediated anticancer activity	42
Apium graveolens	Celery	Apoptosis induction, enzyme inhibition	BGC-823 gastric cancer cell line	43-44
Artemisia absinthium	Wormwood	Anti-inflammatory, apoptosis induction	MCF-7 breast cancer, TNF-α inhibition	45-46
Arum palaestinum	Palestine arum	Cytotoxic, tumor growth inhibition	MCF-7, leukemia cells, prostate tumor models	47-48

8. CANCER & FUTURE DIRECTION

1. Cancers most likely to be cured or highly controlled first
These cancers already show strong success with modern treatments and are expected to improve further with advances in

Oncology.

A. Blood cancers (Leukemia, Lymphoma, Myeloma)
- Cancer cells are in the bloodstream or bone marrow, so they are accessible.
- Drugs and immune therapies can directly reach them without needing to penetrate solid tissue.
- Their biology is often more uniform compared to solid tumors.

Current breakthroughs
- Immunotherapy (CAR-T cell therapy): Patient's immune cells are modified to hunt cancer cells.
- Bone marrow / stem cell transplant replaces diseased blood-forming cells.
- Targeted drugs (like tyrosine kinase inhibitors) block cancer signaling.

Future direction
- " Off-the-shelf " immune therapies (no personalized cell manufacturing delay)
- Higher cure rates even in relapsed cases
- Possibly long-term remission for many patients

B. Breast cancer
- Often detected early through screening (mammography).
- Many subtypes are well understood:
  - Hormone receptor-positive
  - HER2-positive
  - Triple-negative

Current treatment advances
- Hormone therapy (blocks estrogen effects)
- Targeted drugs (HER2 inhibitors)
- Improved surgery + radiotherapy combinations

Future direction
- Treatment based on exact tumor genetics (precision medicine)
- Less chemotherapy, more targeted therapy
- High long-term survival, especially if detected early

C. Prostate cancer
- Many prostate cancers grow very slowly over years
- Some never become life-threatening

Current approach
- PSA blood test for detection
- Hormone therapy (androgen deprivation)
- Active surveillance (monitoring instead of immediate treatment)

Future direction
- Avoiding overtreatment (treat only aggressive forms)
- Better imaging to detect early spread
- Long-term disease control with minimal side effects

D. Lung cancer (especially non-smoker genetic types)
Outcomes are improving
- Discovery of specific genetic mutations:
  - EGFR
  - ALK
  - ROS1

Treatment advances
- Targeted oral drugs that block cancer pathways
- Immunotherapy improving survival in advanced cases
- Better CT screening for early detection

Future direction
- Matching every patient to mutation-specific drugs
- Early detection through blood tests (liquid biopsy)
- Turning some advanced cases into manageable disease

E. Childhood cancers (especially leukemia)
- Strong response to chemotherapy
- Children can tolerate intensive treatment better than adults
- Well-standardized treatment protocols worldwide

Current success
- Many childhood leukemias already have high cure rates (70–90% in some types)

Future direction
- Reduced chemotherapy toxicity
- More immune-based treatments
- Better prevention of long-term side effects (growth, fertility, heart health)

2. Cancers difficult to cure
These cancers are challenging due to location, late detection, or biological aggressiveness.
A. Brain cancer (Glioblastoma)
- Brain is protected by the blood-brain barrier, which blocks many drugs.
- Tumor cells spread into normal brain tissue (cannot be fully removed surgically).
- Very fast mutation rate → drug resistance develops quickly.

Current treatment
- Surgery (partial removal)
- Radiation therapy
- Temozolomide chemotherapy

Future hope
- Nanoparticles that cross the blood-brain barrier
- Gene editing approaches
- Personalized vaccines targeting tumor mutations

B. Pancreatic cancer
- Usually diagnosed very late
- Symptoms appear only when disease is advanced
- Tumor is surrounded by dense fibrous tissue (hard for drugs to penetrate)

Biological challenges
- Highly aggressive mutation profile
- Early spread to liver and other organs

Future direction
- Liquid biopsy for early detection
- Stromal-targeting drugs (break tumor protective barrier)
- Combination immunotherapy strategies

C. Liver cancer (Hepatocellular carcinoma)
- Often occurs in damaged liver (cirrhosis, hepatitis B/C)
- Liver function limits use of strong drugs or surgery
- High recurrence even after treatment

Current treatment
- Surgery or liver transplant (limited cases)
- Targeted therapy and immunotherapy

Future direction
- Better antiviral prevention (hepatitis control)

- Early detection via blood markers
- Improved transplant and regeneration techniques

D. Stomach & esophageal cancers
- Symptoms appear late (difficulty swallowing, weight loss)
- Often already spread to lymph nodes at diagnosis

Treatment challenges
- Complex lymphatic spread
- Surgical removal difficult in advanced stages

Future direction
- Endoscopic early detection programs
- Better screening in high-risk regions
- Targeted and immune therapies

E. Metastatic (stage 4) cancers
- Cancer spreads to multiple organs
- Tumor cells become genetically diverse (heterogeneous)
- Resistance to therapy develops quickly

Current approach
- Combination therapy (chemo + immunotherapy + targeted drugs)
- Palliative care for quality of life

Future direction
- Multi-target therapies attacking different mutations at once
- Continuous monitoring using blood-based DNA tests
- Turning cancer into long-term controlled condition

9. DISCUSSION

Cancer continues to represent one of the most challenging diseases in global healthcare due to its biological complexity, late-stage detection in many cases, and ability to develop resistance to therapy. Although modern oncology has achieved remarkable progress through surgery, chemotherapy, radiotherapy, targeted therapy, and immunotherapy, the increasing global cancer burden indicates that treatment alone is insufficient without strong emphasis on prevention, early detection, and integrative care strategies. From a historical perspective, the understanding of cancer has evolved from ancient descriptive observations to a molecular and genetic framework. Early Egyptian and Greek physicians recognized tumors as abnormal growths and attempted surgical or topical interventions, although their explanations were largely based on humoral theory. The transition from humoral concepts to cellular pathology, particularly through the work of Rudolf Virchow, marked a critical turning point by establishing cancer as a disease of abnormal cellular proliferation. In the modern era, advances in molecular biology have further clarified cancer as a genetic disorder driven by mutations, epigenetic changes, and dysregulated signaling pathways. Traditional medical systems such as Ayurveda and Unani medicine provide alternative conceptualizations of cancer-like diseases, including Arbuda, Granthi, and Sartan. These conditions are understood as manifestations of doshic imbalance, impaired digestion (Agni dysfunction), and accumulation of toxic metabolites (Ama), leading to tissue overgrowth and systemic disturbance. While these frameworks differ fundamentally from modern biomedical explanations, they emphasize prevention through lifestyle regulation, dietary control, detoxification, and maintenance of physiological balance. Such principles align broadly with contemporary public health strategies aimed at reducing modifiable cancer risk factors such as diet, obesity, stress, and sedentary behavior. Herbal medicine, particularly from Islamic, Arabic, and traditional systems, offers a rich source of bioactive compounds with potential anticancer properties. Numerous plant-derived substances have demonstrated cytotoxic, antioxidant, anti-inflammatory, and chemopreventive effects in experimental studies. However, despite promising preclinical findings, most herbal agents lack robust clinical evidence regarding efficacy, safety, dosage standardization, and long-term outcomes. Therefore, integration of traditional herbal knowledge with modern pharmacological validation is essential before their incorporation into mainstream oncology practice.

10. CONCLUSION

Cancer remains a major global health challenge due to its complex, multifactorial nature involving genetic mutations, environmental exposures, and lifestyle-related risk factors. Despite significant progress in modern oncology through

surgery, radiotherapy, chemotherapy, targeted therapy, and immunotherapy, the rising global burden of cancer highlights the need for continued emphasis on prevention, early detection, and improved therapeutic strategies. The historical evolution of cancer demonstrates a gradual transformation from ancient descriptive and humoral interpretations to a modern molecular and genetic understanding. Early medical traditions, including Egyptian, Greek, Ayurvedic, and Unani systems, provided foundational clinical observations and conceptual frameworks for tumor-like conditions, even though their explanatory models differ from contemporary biomedical science. These traditional systems emphasize holistic health, balance of physiological functions, and disease prevention through lifestyle regulation. Ayurveda and Unani medicine offer complementary perspectives on cancer-like conditions such as Arbuda, Granthi, and Sartan, which are attributed to systemic imbalance, impaired metabolism, and accumulation of toxic byproducts. While these concepts are not directly equivalent to modern oncological definitions, they reflect early attempts to understand chronic and proliferative diseases. Their emphasis on diet, lifestyle, detoxification, and strengthening of host resilience aligns broadly with modern preventive medicine. Herbal medicine, particularly from Ayurvedic and Islamic-Arabic traditions, continues to be an important source of bioactive compounds with potential anticancer, antioxidant, and immunomodulatory properties. However, most evidence remains preclinical, and further rigorous clinical studies are necessary to establish their safety, efficacy, and standardization before integration into mainstream oncology practice.

REFERENCES

1. Ferlay J, Cancer statistics for the year 2020: An overview. Int J Cancer. 2021 Apr 5; doi: 10.1002/ijc.33588. Epub ahead of print. PMID: 33818764. Ma X, Yu H. Global burden of cancer. Yale J Biol Med 2006;79:85-94.
2. Mathur P, Cancer statistics, 2020: Report from national cancer registry programme, India. JCO Glob Oncol. 2020;6:1063–75.
3. D'Souza ND, Murthy NS, Aras RY. Projection of cancer incident cases for India -till 2026. Asian Pac J Cancer Prev. 2013;14:4379–86.
4. Danaei G, Vander Hoorn S, Lopez AD, Murray CJ, Ezzati M Comparative Risk Assessment collaborating group (Cancers) Causes of cancer in the world: Comparative risk assessment of nine behavioural and environmental risk factors. Lancet. 2005;366:1784–93.
5. Balachandran P, Govindarajan R. Cancer – An Ayurvedic perspective. Pharmacol Res. 2005;51:19–30.
6. Garodia P, From ancient medicine to modern medicine: Ayurvedic concepts of health and their role in inflammation and cancer. J Soc Integr Oncol. 2007;5:25–37.
7. Sumantran VN, Tillu G. Cancer, inflammation, and insights from Ayurveda. Evid Based Complement Alternat Med 2012. 2012:306346
8. Weiss L. Early concepts of cancer. Cancer Metastasis Rev. 2000;19:205–217.
9. Hippocrate. Prorrhétique II. In: Littré E, editor. Oeuvres complètesd'Hippocrate. Vol. 9. Paris: J. B. Baillière; 1861. p. 32.
10. Hippocrate. Aphorismes VI. In: Littré E, editor. Oeuvres complètesd'Hippocrate. Vol. 4. Paris: J. B. Baillière; 1844. p. 572.
11. Daremberg Ch. Oeuvres d'Oribase. Vol. 4. Paris: ImprimerieNationale; 1862. p. 244.
12. Galen. Ad glauconeum de methodomedendi. In: Kuhn CG, editor. Opera Omnia. Vol. 11. Lipsiae: Car. Cnoblochii; 1826. p. 139–41.
13. Galen. De atra bile. In: Kuhn CG, editor. Opera omnia. Vol. 5. Leipzig: Fock; 1823. p. 116–8.
14. Zervos S. Gynaekologie des aëtios. Leipzig: Fock; 1901. p. 1–18.
15. Adams F. The seven books of Paulus Aegineta. Vol. 2. London: Sydenham Society; 1844. p. 332.
16. Vogl T, Transarterial chemoembolization (TACE) with mitomycin C and gemcitabin for liver metastases in breast cancer. EurRadiol.
17. Esser S, Stapper G, Diest PJ, Bosch MA, Klaessens JH, Mali WP, et al. Ultrasound-guided laser-induced thermal therapy for small palpable invasive breast carcinomas: a feasibility study. Ann SurgOncol. 2009;16(8):2259–2263
18. Comparative study on Charaka Nidana Sthana with other classics. Sukumar BS, Sukumar BS. https://ijapr.in/index.php/ijapr/article/view/255/240 Int J Ayur Pharma Res. 2014;2:1–8.
19. History of the growing burden of cancer in India: from antiquity to the 21st century. Smith RD, Mallath MK. J Glob Oncol. 2019;5:1–15.
20. Katdare N. Improving Oncology Worldwide. Sustainable Development Goals Series. Cham, Switzerland: Springer; 2022. Obstacles and optimisation of oncology services in India; pp. 107–115.
21. Shah S. The Tata Group: From Torchbearers to Trailblazers. Gurugram, India: Penguin Random House India Private Limited; 2018.
22. Nations within a nation: variations in epidemiological transition across the states of India, 1990-2016 in the Global Burden of Disease Study. Lancet. 2017;390:2437–2460. doi: 10.1016/S0140-6736(17)32804-0.
23. Global cancer statistics 2020: Globocan estimates of incidence and mortality worldwide for 36 cancers in 185 countries. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. CA Cancer J Clin. 2021;71:209–249.
24. The ever-increasing importance of cancer as a leading cause of premature death worldwide. Bray F, Laversanne

M, Cancer. 2021;127:3029–3030. doi: 10.1002/cncr.33587.
25. Al-Assaf S, Phillips G, Sasaki Y, Katayama T. Google Patent; US20060240166 A1. Apr 9. 2004.
26. El-Hallouty S.M., Fayad W., Hasabo A.A. In vitro anticancer activity of some Egyptian plant extracts against different human cancer cell lines. Int J Pharm Tech Res. 2015;8:267–272.
27. Mehrotra S. Anticellular and immunosuppressive properties of ethanolic extract of Acorus calamus rhizome. Int Immunopharmacol. 2003;3:53–61. doi: 10.1016/s1567-5769(02)00212-6
28. Manikandan S., Srikumar R., Parthasarathy N.J., Devi R.S. Protective effect of Acorus calamus LINN on free radical scavengers and lipid peroxidation in discrete regions of brain against noise stress exposed rat. Biol Pharm Bull. 2005;28:2327–2330.
29. Shi-feng L.I., Gui-chen C., Yu-rong B.I. Studies on antioxidative and antitumor activities for two wild edible fungi. Edible Fungi China. 2005;3
30. Fortes R.C., Immunological, hematological, and glycaemia effects of dietary supplementation with Agaricus sylvaticus on patients' colorectal cancer. Exp Biol Med (Maywood) 2009;234:53–62. doi: 10.3181/0806-RM-193.
31. Seyfi P., Mostafaie A., In vitro and in vivo anti-angiogenesis effect of shallot (Allium ascalonicum): a heat-stable and flavonoid-rich fraction of shallot extract potently inhibits angiogenesis. Toxicol In Vitro. 2010;24:1655–1661
32. Mohammadi-Motlagh Hamid-Reza, Mostafaie A., Mansouri K. Anticancer and anti-inflammatory activities of shallot (Allium ascalonicum) extract. Arch Med Sci. 2011;7:38–44.
33. Mei X., Wang M.C., Xu H.X. Garlic and gastric cancer-the effect of garlic on nitrite and nitrate in gastric juice. Acta Nutr Sin. 1982;4:53–56
34. Takezaki T., Tajima K. Comparative study of lifestyles of residents in high and low risk areas for gastric cancer in Jiangsu Province, China; with special reference to allium vegetables. J Epidemiol. 1999;9:297–305. doi: 10.2188/jea.9.297.
35. Dorant E., Van den Brandt P.A., Goldbohm R.A., Sturmans F. Consumption of onions and a reduced risk of stomach carcinoma. Gastroenterol. 1996;110:12–20.
36. Steinmetz K.A., Potter J.D. Vegetables, fruit & colon cancer in the Iowa Women's health study. Am J Epidemiol. 1994;139:1–15. doi: 10.1093/oxfordjournals.aje.a116921
37. Ekins S., Present and future in vitro approaches for drug metabolism. J Pharmacol Toxicol Methods. 2000;44:313–324.
38. Sue Heggie, Bryant Guy, Tripcony Lee. A Phase III study on the efficacy of topical aloe vera gel on irradiated breast tissue. Cancer Nurs. 2002;25:442–451.
39. Olsen D.L., Raub W.J., Bradley C. The effect of aloe vera gel/mild soap versus mild soap alone in preventing skin reactions in patients undergoing radiation therapy. Oncol Nurs Forum. 2001;28:543–547.
40. Zheng G.Q., carvone and limonene: potential cancer chemoprotective agents from dill weed oil and caraway oil. Plant Med. 1992;5:338–341. doi: 10.1055/s-2006-961480.
41. Zheng G., pyrene-induced forestomach cancer in mice by natural phthalides from celery seed oil. Nutr Cancer. 1993;19
42. Momina R.A., Naira M.G. Antioxidant, cyclooxygenase and topoisomerase inhibitory compounds from Apium graveolens Linn. Seeds. Phytomedicine. 2002;9:312–318. doi: 10.1078/0944-7113-00131.
43. Shafi G.,Artemisia absinthium (AA): a novel potential complementary and alternative medicine for breast cancer. Mol Biol Rep. 2012;39:7373–7379. doi: 10.1007/s11033-012-1569-0.
44. Krebs S., Omer T.N., Omer B. Wormwood (Artemisia absinthium) suppresses tumor necrosis factor alpha and accelerates healing in patients with Crohn's disease – a controlled clinical trial. Phytomedicine. 2010;17:305–309. doi: 10.1016/j.phymed.2009.10.013.
45. El-Desouky S.K., A new pyrrole alkaloid isolated from Arum palaestinum Boiss. and its biological activities. Arch Pharma Res. 2007;30:927–931. Article Drug Discovery.
46. El-Desouky S.K., Ryu S.Y., Kim Young-Kyoon. Piperazirum, a novel bioactive alkaloid from Arum palaestinum Boiss. Tetrahedron Lett. 2007;48:4015–4017
47. Kapadia G.J., Chemoprevention of lung and skin cancer by Beta vulgaris (beet) root extract. Cancer Lett. 1996;100:211–214.
48. Govind J.K., Cytotoxic effect of the red beetroot (Beta vulgaris L.) extract compared to doxorubicin (Adriamycin) in the human prostate (PC-3) and breast (MCF-7) cancer cell lines. Anticancer Agents Med Chem. 2011;11:280–284. (Formerly Current Medicinal Chemistry - Anti-Cancer Agents)