A Review Article on Cancer

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Abstract- Every year, cancer exacts a devastating toll, claiming millions of lives globally. In medical research, numerous challenges persist, underscoring the imperative for ongoing efforts to enhance cancer therapy. This comprehensive review article delves (research) into the multifaceted landscape of genetic and environmental risk factors influencing cancer. Familial and hereditary factors, along with lifestyle-related i e physical inactivity, obesity, smoking, alcohol consumption and ecological elements, constitute the spectrum of known risk factors associated with cancer. Concurrently, the field witnesses a dynamic evolution in anticancer drug development, characterized by a focus on targeted therapies, immunotherapies and precision medicine. Despite the progress, formidable challenges endure, prominently featuring drug resistance and the pressing need for more efficacious treatments. Genetic predispositions contribute significantly to cancer susceptibility, accentuating the critical need for personalized screening and prevention strategies. The awareness of these influential factors empowers proactive measures in risk reduction and the promotion of overall health.

This review underscores the etiology, categorization of cancer types and the pharmaceutical agents currently prevalent in the market for its treatment.

Keywords: Cancer, Etiology, Cancer types, Genetic risk factors, Environmental risk factors, Pharmaceutical agents, Treatment.

Definition: Cancer is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. These cells can invade and destroy surrounding tissues, forming tumours. There are many types of cancer, and they can occur in virtually any part of the body.

INTRODUCTION

Cancer is the second leading cause of mortality worldwide and a serious problem affecting the health of all human societies. Many lifestyle factors causes cancer which include smoking, diet (fried foods, red meat), alcohol, sun exposure, environmental pollutants, infections, stress, obesity, and physical inactivity. In men, the highest percentage of cancer types occur in prostate, lung and bronchus, colon, rectum, uterine corpus. It is caused by both internal factors (such as inherited mutations, hormones, and immune conditions) and environmental/acquired factors (such as tobacco, diet, radiation, and infectious organisms. Heavy consumption of red meat is a risk factor for several cancers, especially for those of the gastrointestinal tract, but also for colorectal (1,2,3), prostate (4,), bladder (5). breast (6), gastric (7), pancreatic, and oral (8), cancers. (9,10,11.12) Proto-oncogenes are responsible for cell division and growth under normal condition but sometimes the proto-oncogenes changes into oncogenes during genetic mutations which are most dangerous for cell existence (13,14). In this situation if tumour suppressor genes is absent then it leads to uncontrolled cells division.(15).

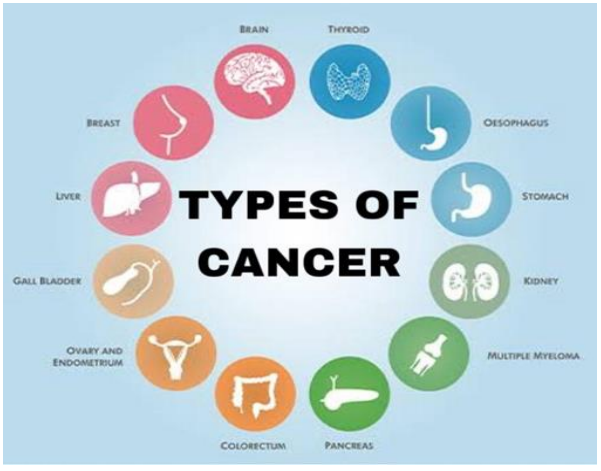
CAUSES OF CANCER

GENETIC FACTORS: Some cancers have a hereditary component, they can be passed down through generations.

ENVIRONMENTAL FACTORS: Exposure to certain substances, such as tobacco smoke, radiation and certain chemicals can increase the risk of developing cancer.

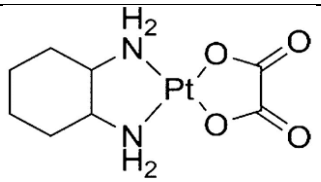
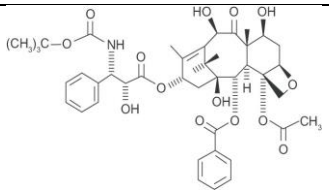
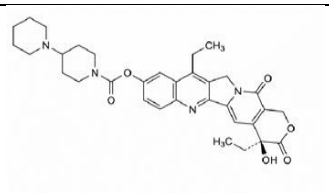
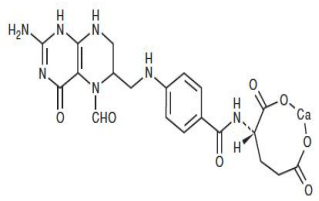
LIFESTYLE FACTORS: Unhealthy lifestyle choices like poor diet, lack of physical activity and excessive alcohol consumption can contribute to the development of cancer.

TYPES OF CANCER ON BASIS OF ORGAN EFFECTED

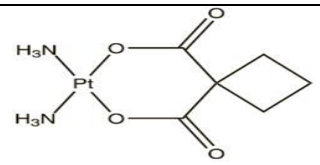
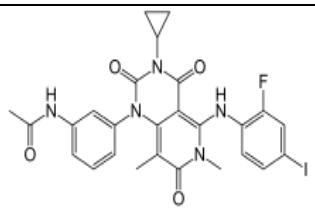
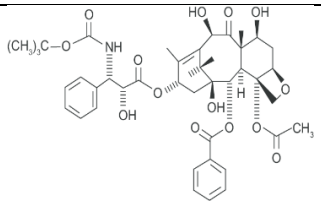


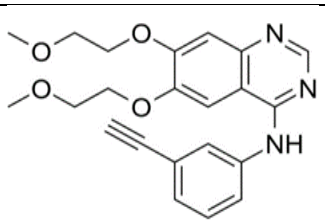
TYPES OF CANCER AND ITS DRUGS

1) DRUGS USED IN COLORECTAL CANCER

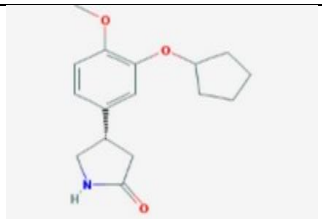
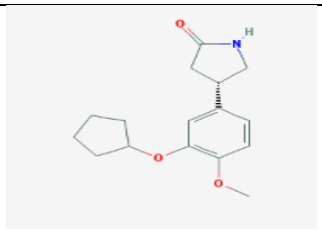
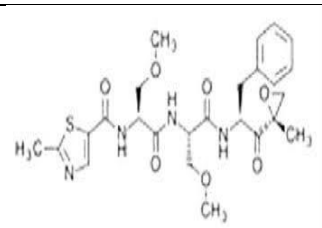
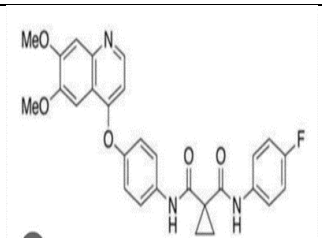
DRUGS	BRAND NAME	CHEMICAL STRUCTURE	MECHANISM OF ACTION	USES
Oxaliplatin	Eloxatin		Oxaliplatin interferes with dna, disrupting its replication and causing cell death in cancer.	1) Oxaliplatin is a medication used to manage and treat metastatic colorectal cancer. 2) Oxaliplatin is a chemotherapy drug that contains platinum, it is used to slow or stop cancer cell growth.
Docetaxel	Taxotere		Docetaxel stabilizes cell structures(microtubules) disrupting cell division and causing cell death.	1) Docetaxel is used to treat many types of cancers like breast cancer, certain stomach cancers, head and neck cancer, lung cancer and prostate cancer. 2) Docetaxel works by stopping the growth and spread of cancer cells.
Irinotecan	Campto		Irinotecan disrupts dna processes, preventing proper repair and replication, ultimately leading to cell growth inhibition and death.	1)Irinotecan is a medication used to manage and treat a variety of solid tumors 2)Irinotecan is used adjunctively with other therapeutic agents against colorectal cancer as a i or ii line treatment
Leucovorin	Wellcovorin		Levocovorin enhances the effectiveness of certain chemotherapy drugs by helping to rescue normal cells from there toxic effects, allowing for more targeted cancer cell distruction.	1) leucovorin is a medication used in the treatment of methotrexate toxicity and chemotherapy regimens. 2) leucovorin is used as an antidote to the harmful effects of methotrexate that is given in high doses. 3) Leucovorin is used to prevent or treat certain kinds of anemia.

2) DRUGS USED IN LUNG CANCER

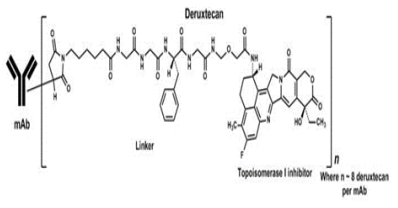
DRUGS	BRAND NAME	CHEMICAL STRUCTURE	MECHANISM OF ACTION	USES
Carboplatin	Paraplatin		Carboplatin interferes with dna replication, disrupting cancer cell growth and causing cell death.	1) Carboplatin is used alone or in combination with other medications to treat cancer of the ovaries 2) Carboplatin is a type of chemotherapy drug. It is a treatment for a number of different cancer types.
Trametinib	Mekinist		Trametinib inhibits a pathway called MEK, disrupting signals that promote cancer cell growth and leading to cell death.	1) Trametinib is used alone or in combination with dabrafenib (tafinlar) to treat certain types of melanoma 2) Trametinib it is also used in combination with dabrafenib to prevent the return of a certain type of melanoma after surgery.
Docetaxel	Taxotere		Docetaxel interfers with cell division by stabilizing microtubules, disrupting the process and causing cancer cell death.	1) Docetaxel medicine is used to treat many types of cancers like breast cancer, certain stomach cancers, head and neck cancer, lung cancer, and prostate cancer. 2) Docetaxel (doe se tax el) is a chemotherapy drug. It targets fast dividing cells, like cancer cells, and causes these cells to die.

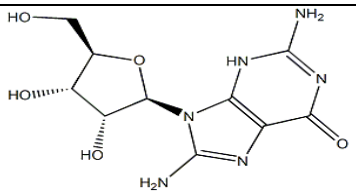
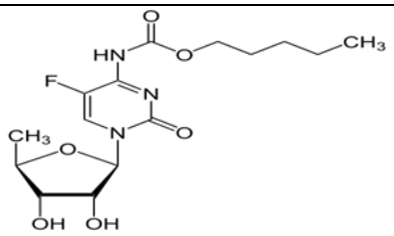
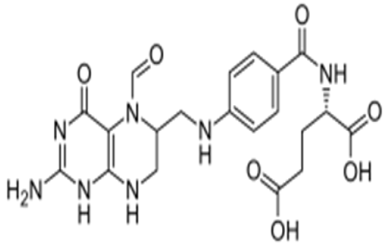
Erlotinib	Tarceva		Erlotinib blocks signals that stimulate cancer cell growth by inhibiting the epidermal growth factor receptor, slowing down the progression of the tumor.	1) Erlotinib is used for the treatment of metastatic non-small cell lung cancer in patients who have certain types of abnormal epidermal growth factor gene mutations. 2) Erlotinib is a medication used in the management and treatment of some types of non-small cell lung cancer and advanced pancreatic cancer.

3) DRUGS USED IN IT LIVER CANCER

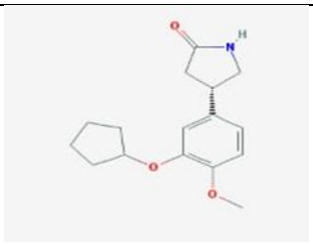
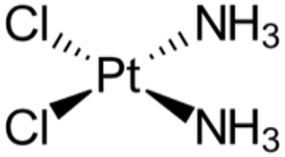
DRUGS	BRAND NAME	CHEMICAL STRUCTURE	MECHANISM OF ACTION	USES
Ramucirumab	Cyramaz		Ramucirumab works by blocking the blood vessel growth that feeds tumors, inhibiting angiogenesis and slowing down cancer cell growth.	1) Ramucirumab is a medication that treats stomach cancer, liver cancer and lung cancer. 2) It is a antibody used to treat certain cancers like adenocarcinoma, metastatic colorectal cancer.
Bevacizumab	Avastin		Bevacizumab inhibits blood vessel formation in tumors by blocking vascular endothelial growth actor, limiting the blood supply and slowing cancer growth.	Bevacizumab injection products are used in combination with other chemotherapy medications to treat certain types of colon and rectal cancer (cancer that begins in the large intestine), non-small cell lung cancer (NSCLC), glioblastoma (a certain type of cancerous brain tumor), renal cell cancer (RCC, a type of cancer)
Nivolumab	Opdivo		Nivolumab enhances the body`s immune response against cancer by blocking a protein called pd1, allowing immune cells to recognize and attack cancer cells more effectively.	Nivolumab is a prescription medicine used to treat adults and children 12 years of age and older with a type of skin cancer called melanoma to help prevent melanoma from coming back after it and lymph nodes that contain cancer have been removed by surgery**.**
Cabozantinib-s-malate	Cabometyx		Cabozantinib-s-malate inhibits the activity of specific proteins involved in tumor growth and blood vessel formation, slowing down the cancer progression .	1) Cabozantinib (cometriq) is used to treat a certain type of thyroid cancer that is getting worse and that has spread to other parts of the body. 2) Cabozantinib (cometriq) is in a class of medications called tyrosine kinase inhibitors.

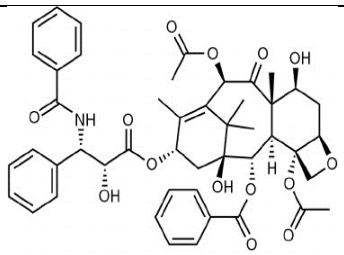
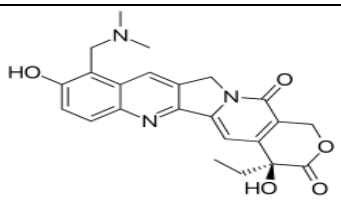
4) DRUGS USED IN STOMACH CANCER

DRUGS	BRAND NAME	CHEMICAL STRUCTURE	MECHANISM OF ACTION	USES
Trastuzumab deruxtecan	Enhertu		Trastuzumab deruxtecan works by attaching to her2 receptors on cancer cells and delivering a drug to kill those cells.	1) It is used to treat breast cancer, stomach cancer, non small cell drug cancer that have specific her2 gene mutations . 2) Its specifically indicated for patients who have recived prior anti –her2 therapy.

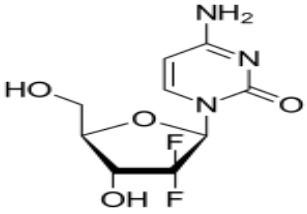
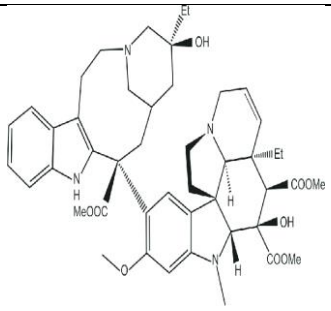
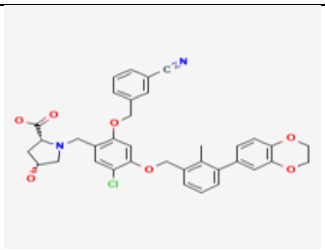
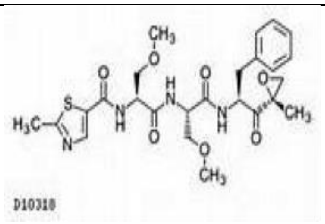
Trastuzumab	Herceptin		Trastuzumab works by blocking her2 receptors on cancer cells, inhibiting their growth and promoting immune system attack against them.	1) Trastuzumab is a monoclonal antibody that is commonly used in the treatment of certain types of cancer, including stomach (gastric) cancer. 2) Trastuzumab is commonly used in combination with chemotherapy for the treatment of metastatic gastric cancer that overexpresses the her2 protein.
Capecitabine	Xeloda		Capecitabine coverts into 5-flurouracil in the body. 5-flurouracil interfers with the growth of cancer cells by disrupting their DNA synthesis, leading to cell death.	1) Capecitabine is used to treat certain types of cancer (such as breast, colon, rectal, stomach, esophageal, pancreatic cancer). It works by slowing or stopping the growth of cancer cells. 2) Capecitabine is an oral chemotherapy drug that is used in the treatment of various cancers, including stomach (gastric) cancer.
Leucovorin	Wellcovorin		Leucovorin helps enhance the effects of certain chemotherapy drugs by providing a form of folate, supporting the normal function of healthy cells and improving the efficacy of cancer treatment.	1) Leucovorin is used as an antidote to the harmful effects of methotrexate (a cancer medicine) that is given in high doses. 2) The combination of leucovorin and fluorouracil is known as folfox (folinic acid, fluorouracil, and oxaliplatin) and is commonly used in the treatment of various gastrointestinal cancers, including stomach cancer.

5) DRUGS USED IN CERVICAL CANCER

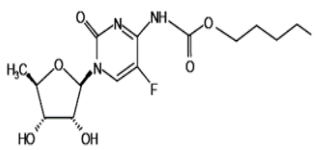
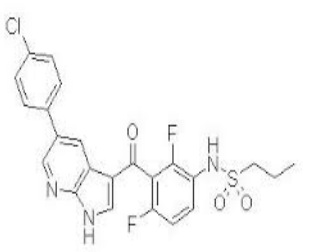
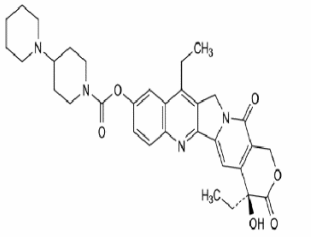
DRUGS	BRAND NAME	CHEMICAL STRUCTURE	MECHANISM OF ACTION	USES
Bevacizumab	Avastin		Bevacizumab works by inhibiting the formation of new blood vessels (angiogenesis), thereby restricting the blood supply to tumors and impeding their growth.	1) Bevacizumab injection products are used in combination with other chemotherapy medications to treat certain types of colon and rectal cancer. 2) Bevacizumab has been studied and used in combination with chemotherapy, such as paclitaxel and cisplatin, for the treatment of metastatic cervical cancer.
Kemoplat injection	Cisplatin		Cisplatin, an injection chemotherapy drug, damages DNA in cancer cells, preventing their ability to divide and growth.	1) Cisplatin injection is used to treat advanced cancer of the bladder, ovaries, or testicles. 2) Cisplatin is commonly included in combination chemotherapy regimens for the treatment of advanced or metastatic cervical cancer.

Paclitaxel	Taxol		Paclitaxel works by stabilizing microtubules in cancer cells, disrupting their normal function during cell division and leading to cell death.	1) Paclitaxel injection is used to treat advanced cancer of the ovaries, breast, non-small cell lung cancer, and kaposi sarcoma. 2) Paclitaxel is often used concurrently with radiation therapy in the treatment of locally advanced cervical cancer.
Topotecan	Hycamtin		Topotecan, a chemotherapy drug, interferes with DNAreplication in cancer cells, preventing their ability to divide and grow.	1) Topotecan injection is used to treat patients with metastatic cancer of the ovaries. 2) Topotecan is used as a second-line treatment for cervical cancer.

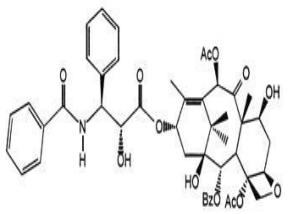
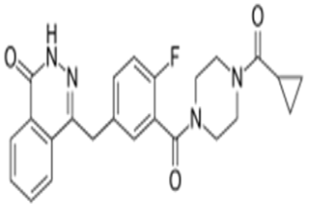
6) DRUGS USED IN IT BLADDER CANCER

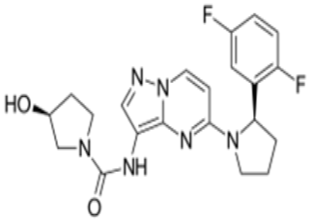
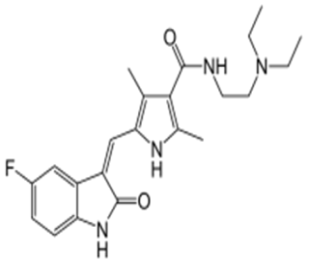
DRUGS	BRAND NAME	CHEMICAL STRUCTURE	MECHANISM OF ACTION	USES
Gemcitabine	Gemzar		Gemcitabine interferes with the DNA synthesis process in cancer cells, disrupting their ability to replicate and leading to cell death.	1) Gemcitabine is a chemotherapy drug used as a treatment for different types of cancer, including bladder and breast cancer. 2) Gemcitabine may be combined with radiation therapy (chemoradiation) as part of the treatment for bladder cancer.
Vinblastin	Velban		Vinblatin works by disrupting the assembly of microtubules during cell division, preventing proper formation of the mitotic spindle. This inhibits cell mitosis and ultimately leads to cell cycle arrest, hindering cancer cells proliferation.	1)Vinblastine, when combined with other drugs, may be used in the management of locally advanced bladder cancer that has invaded surrounding tissues but is not amenable to surgical removal alone. 2) In cases of metastatic bladder cancer, vinblastine may be used in combination with other chemotherapy agents as part of palliative care.
Atezolizumab	Tecentriq		Atezolizumab enhances the body`s immune response against cancer by blocking a protein called pd-l1, allowing immune cells to better recognize and attack cancer cells.	1) Atezolizumab is an immune checkpoint inhibitor used in the treatment of bladder cancer. 2) Atezolizumab is approved as a first-line treatment for locally advanced or metastatic urothelial carcinoma, which is the most common type of bladder cancer.
Nivolumab	Opdivo		Nivolumab boosts the body`s immune system to fight cancer by blocking a protein called pd-1, allowing immune cells to better target and destroy cancer cells.	1)Nivolumab is commonly used as a second-line treatment for patients with metastatic urothelial carcinoma (bladder cancer). 2)Nivolumab is being explored as a potential treatment option for patients with BCG-refractory non-muscle invasive bladder cancer.

7) DRUGS USED IN ESOPHAGEAL CANCER

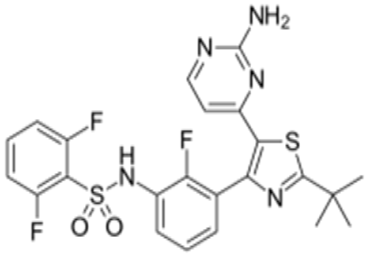
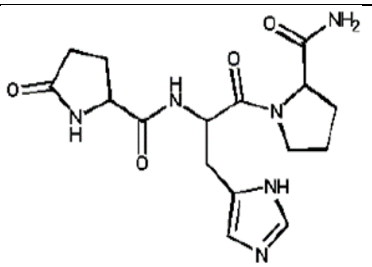
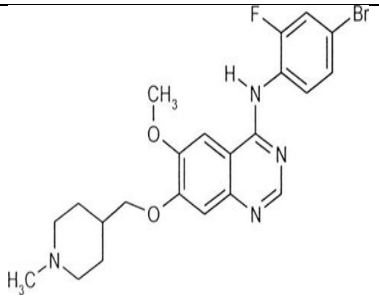
DRUGS	BRAND NAME	CHEMICAL STRUCTURE	MECHANISM OF ACTION	USES
Capecitabine	Xeloda		Capecitabine is a prodrug that gets converted into 5-flurouracil (5-fu) in the body. 5-fu interferes with DNA synthesis, inhibiting the growth of cancer cells.	1) Capecitabine is an oral chemotherapy drug that is commonly used in the treatment of various cancers, including esophageal cancer. 2) Capecitabine is often used in combination with platinum-based chemotherapy drugs, such as cisplatin or oxaliplatin, for the treatment of esophageal cancer.
Ipilimumab	Yervoy		Iplimumab is a monoclonal antibody that works by blocking the protein cla-4 on t cells, enhancing the immune system`s ability to attack and destroy cancer cells.	1) Ipilimumab may be studied in combination with other immunotherapies, chemotherapy, for esophageal cancer. 2) Ipilimumab is often used in combination with nivolumab, a immune checkpoint inhibitor, which enhance the immune response against cancer cells.
Irinotecan	Campto		Irinotecan inhibits an enzyme called topoisomerase 1, disrupting DNA replication and repair in cancer cells, ultimately leading to cell death.	1) Irinotecan may be used in combination with other chemotherapy drugs for the treatment of metastatic esophageal cancer, for which combinations include drugs such as cisplatin or fluorouracil. 2) Irinotecan may be used as second-line therapy if in the case esophageal cancer doesn't respond to initial treatment.

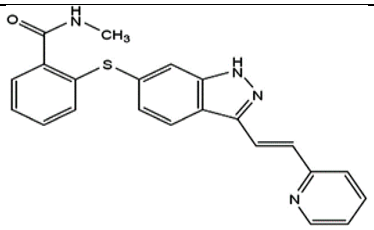
8) DRUGS USED IN PANCREATIC CANCER

DRUGS	BRAND NAME	CHEMICAL STRUCTURE	MECHANISM OF ACTION	USES
Abraxane	Nab paclitaxel		Abraxane moa involves paclitaxel, a chemotherapy drug that interferes with cell division, combined with albumin to enhance drug delivery. This formation helps target cancer cells and inhibits their growth.	1) Abraxane (nab-paclitaxel) is a chemotherapy drug that plays a significant role in the treatment of pancreatic cancer. 2) It is often used in combination with another chemotherapy drug, gemcitabine.
Olaparib	Lynparza		Olaparib works by inhibiting a specific enzyme, poly (ADP-RIBOSE) polymerase(parp), by blocking parp, olaparib interferes with the repair of damaged DNA in cancer cells, leading to their death.	1) Olaparib, a parp inhibitor, used as a first-line maintenance treatment of germline BRCA-mutated metastatic pancreatic ductal adenocarcinoma (MPDAC) 2) Olaparib is a poly ADP-RIBOSE polymerase (parp) inhibitor, and its mechanism of action involves targeting cancer cells with deficiencies in DNA repair mechanisms, particularly those with brca1 or brca2 mutations.

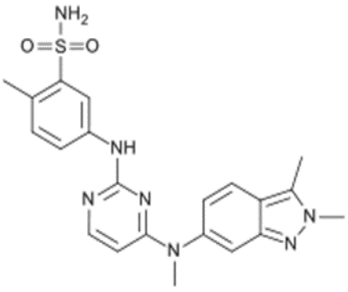
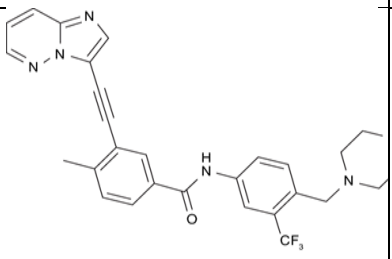
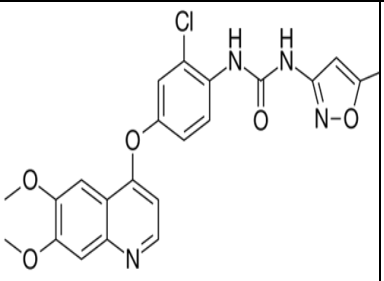
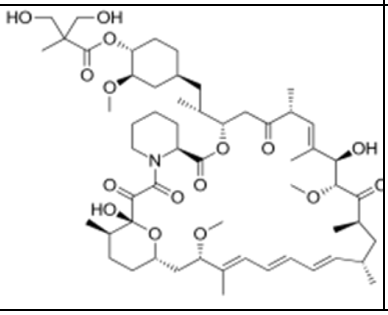
Larotrectinib	Vitrakvi		Larotrectinib is a tyrosine kinase inhibitor that targets the TRK fusion proteins, blocking signals that promote cancer cell growth. It is used in cancers with specific genetic alterations involving NTRK genes.	1) Larotrectinib is used for the treatment of solid tumors in adult and pediatric patients that harbor NTRK gene fusions. 2) Larotrectinib drug can be used in treatment of many cancers.
Sunitinib	Sutent		Sunitinib is a tyrosine kinase inhibitor that works by blocking signals in cancer cells, primarily targeting receptors like VEGFR, PDGFR and others. By inhibiting these signals, it helps to slow down the growth of blood vessels and tumor cells in certain cancers.	1) Sunitinib was approved for the treatment of progressive, well differentiated pancreatic neuroendocrine tumors in patients with unresectable, metastatic diseases. 2) Sunitinib is commonly used in the treatment of renal cell carcinoma(kidney cancer), gastrointestinal stromal tumors.

9) DRUGS USED FOR THYROID CANCER

DRUGS	BRAND NAME	CHEMICAL STRUCTURE	MECHANISM OF ACTION	USES
Dabrafenib	Tafinlar		Dabrafenib is a tyrosine kinase inhibitor that specifically targets the mutated form of the (BRAF murine sarcoma viral oncogene homolog b) protein in cancer cells. By inhibiting this braf protein,it interferes with the signals that promote cancer cell growth and division, slowing down the progression of certain cancers	1) Dabrafenib and trametinib block key proteins in the MAPK pathway in cancer cells, inhibiting cell signaling and causing cancer cell death 2) The selective BRAF inhibitor dabrafenib is well tolerated and active against BRAF-mutant differentiated thyroid cancer.
Thyrogen alfa	Sanofi Genzyme		Thyrotropin also known as thyroid- stimulating hormone (TSH), stimulates the thyroid gland to produce and release thyroid hormone (T3 and T4). This regulation helps maintain proper metabolism and energy levels in the body.	1) Thyrogen (thyrotropin alfa) used to help identify thyroid disease by testing the blood for a hormone called thyroglobulin in the patients with thyroid cancer. 2) Thyrotropin alfa injection used with radioactive iodine to remove any remaining diseased thyroid tissue in patients with thyroid cancer who have had most or all of their thyroid gland removed.
Vandetanib	Caprelsa		Vandetanib works by inhibiting certain receptors, including vascular endothelial growth factor receptor (VEGFR), epidermal growth factor receptor (EGFR), and the rearranged during transfection (ret) kinase. By blocking these receptors, vandetanib helps to suppress the growth and spread of cancer cells, particularly in	1) Vandetanib is an antineoplastic kinase inhibitor used to treat symptomatic medullary thyroid cancer in patients with metastatic disease. 2) Vandetanib also exhibits anti-angiogenic effects, meaning it can inhibit the formation of new blood vessels that tumors need for their growth.

			conditions like advanced medullary thyroid cancer.	
Axitinib	Inlyta		Axitinib helps by blocking the action of vascular endothelial growth factor receptors (VEGFR), which were involved in promoting the growth of blood vessels. By inhibiting these supply to cancer cells, restricting their ability to grow and spread.	1) Axitinib primarily known as a tyrosine kinase inhibitor that is used in the treatment of advanced renal cell carcinoma. 2) Axitinib has activity and a manageable safety profile which represents an additional treatment option for patients with advanced thyroid cancer.

10) DRUGS USED IN KIDNEY CANCER

DRUGS	BRAND NAME	CHEMICAL STRUCTURE	MECHANISM OF ACTION	USES
Pazopanib	Votrient		Pazopanib hinders cancer growth by targeting vasculae endothelial growth factor receptors (VEGFR), platelet-derived growth factor receptors (PDGFR) and c-kit receptors. By blocking these receptors, pazopanib helps to impede the formation of new blood vessels that tumors need to grow, thereby suppressing cancer progression.	1) Pazopanib was a targeted cancer drug which was used for treatment of kidney cancer and sarcoma. 2) Pazopanib approved for the treatment of advanced renal cell carcinoma, which is the most common type of kidney cancer in adults.
Ponatinib	Iclusig		Ponatinib works by inhibiting certain proteins, including bcr-abl, which associated with chronic myeloid leukemia(CML). By blocking these proteins, ponatinib helps to control the growth of cancer cells.	1) ponatinib primarily known for its use in the treatment of certain types of leukemia. 2) Ponatinib indicated for the treatment of Philadelphia chromosome-positive acute lymphoblastic leukemia.
Tivozanib	Fotivda		Tivozanib works by inhibiting vascular endothelial growth factor receptors (vegfr), which plays a role in blood vessel formation. By blocking these receptors, tivozanib helps to restrict the growth of blood vessels around tumors, slowing down cancer progression, especially in certain types of kidney cancer.	1)Tivozanib a tyrosine kinase inhibitor primarily used for the treatment of advanced renal cell carcinoma (RCC), which was a type of kidney cancer. 2)Tivozanib primarily used for the treatment of advanced renal cell carcinoma (RCC).
Temsirolimus	Torisel		Temsirolimus works by inhibiting a protein called mtor(mammalian target of rapamycin), which involved in cell growth and division. By blocking mtor,temsirolimus helps to slow down the growth of cancer cells.	1)Temsirolimus is an mTOR inhibitor indicated for the treatment of advanced renal cell carcinoma in patients with poor prognostic features. 2) Temsirolimus may be used as a single agent or in combination with other targeted therapies.

CONCLUSION

On the basis of the studies described above, we propose that the understanding of cancer encompasses a complex interplay between genetic and environmental factors, with lifestyle choices such as smoking and alcohol consumption playing pivotal roles. Genetic predispositions can elevate the risk of certain cancers, emphasizing the importance of personalized screening and prevention strategies. Awareness of these influences allows for proactive measures in reducing risks and promoting overall health. In the last decades, some mechanisms of gastric cancerogenesis have been elucidated, which has resulted in the primary and secondary prevention, such as healthy lifestyle and H. pylori eradication.

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