Understanding chemotherapy: A comprehensive overview.

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Description

Chemotherapy, often referred to as "chemo," is a widely recognized and crucial treatment modality in the fight against cancer. It plays a significant role in the management and potential eradication of cancerous cells within the human body. This article provides a comprehensive overview of chemotherapy, covering its mechanism, types, administration, side effects, and it's vital role in cancer treatment.

Mechanism of chemotherapy

Chemotherapy involves the use of drugs that are designed to target and destroy rapidly dividing cells, which is a characteristic of cancer cells. These drugs disrupt the cancer cells' ability to grow and divide, ultimately leading to their death. Chemotherapy is unique in that it not only affects cancer cells but can also impact normal, healthy cells that also divide rapidly, such as those in the bone marrow, digestive system, and hair follicles.

Types of chemotherapy

Chemotherapy drugs can be categorized based on their mode of action, chemical structure, and their impact on specific phases of the cell cycle. The main types include:

Alkylating agents: These drugs directly damage the DNA within the cancer cells, preventing them from dividing and growing.

Antimetabolites: They interfere with the cancer cells' DNA and RNA production, hindering their ability to replicate.

Antitumor antibiotics: These drugs block important enzymes needed for DNA replication, leading to cell death.

Plant alkaloids: Derived from plants, they disrupt microtubules, essential for cell division.

Topoisomerase inhibitors: They interfere with enzymes necessary for DNA repair and replication.

Hormone therapy: This approach utilizes drugs to alter hormone levels, which can slow or stop the growth of hormone-sensitive tumors.

Administration of chemotherapy

Chemotherapy can be administered in various ways, including:

Oral administration: Some chemotherapy drugs are available in pill or liquid form and can be taken orally.

Intravenous (IV) infusion: Drugs are directly infused into a vein, allowing for a quick and precise delivery into the bloodstream.

Injections: Chemotherapy drugs can be injected into the muscles or under the skin.

Intrathecal or intra-ventricular administration: Chemotherapy can be delivered directly into the cerebrospinal fluid through a lumbar puncture or a reservoir.

Side effects of chemotherapy

While chemotherapy is a powerful tool in fighting cancer, it can also cause side effects due to its impact on rapidly dividing healthy cells. Common side effects may include:

Nausea and vomiting: Chemotherapy can trigger feelings of nausea and vomiting, although anti-nausea medications can help manage these symptoms.

Fatigue: Patients may experience extreme tiredness and a lack of energy.

Hair loss: Chemotherapy often leads to temporary hair loss.

Suppressed immune system: Chemotherapy can lower the body's immune response, making patients more susceptible to infections.

Anemia and fatigue: Chemotherapy can reduce red blood cell counts, leading to fatigue and shortness of breath.

Conclusion

Chemotherapy remains a cornerstone in the treatment of cancer, offering hope to millions of individuals diagnosed with this devastating disease. Advances in medical research and technology continue to improve the effectiveness of chemotherapy while minimizing its side effects. As science progresses, the future of chemotherapy holds promising developments, striving for enhanced precision and reduced adverse effects, ultimately improving the quality of life for cancer patients worldwide.

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