A Review of Invasive Ductal Carcinoma Breast Cancer and the Mechanism of Cyclophosphamide as an Effective Chemotherapeutic Agent

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Introduction

Cyclophosphamide or cytoxan is considered one of the most successful chemotherapy drugs which was synthesized in 1958. Cytoxan is an inactive synthetic chemotherapy drug that works as an alkylating agent which results in DNA cross linkage. The S phase of the cell cycle is the main issue that inhibits normal cell division. The other areas of cell cycle are also affected which can lead to apoptosis of the cell. Cytoxan also has an immunosuppressive effect which suppresses the body’s immune response. Cytoxan can treat different types of lymphomas and leukemias in addition to neuroblastoma, retinoblastoma, Ewing’s sarcoma, rhabdomyosarcoma, breast, lung, ovarian, testicular, and endometrial cancer. The drug is usually given through an IV, but it can be given orally or injected directly into the muscle.

Background on Breast Cancer

Invasive ductal carcinoma (IDC) is the most common form of breast cancer which makes up 80% of breast cancer cases. IDC can also be called infiltrating ductal carcinoma. IDC starts in the milk ducts of the breast, but slowly starts invading the surrounding fatty tissue of the breast outside the duct. BRCA1 is a gene mutation found on the q arm of chromosome 17, and BRCA 2 is a gene mutation found on the q arm of chromosome 13. Both of these genes increase the risk for developing breast cancer, which IDC is on of the breast cancers linked to the BRCA mutations.

Future Treatment

Utidelone is a phase III chemotherapy drug designed to treat metastatic breast cancer. Utdelone is currently being researched as a replacement in patients who have developed resistance to taxanes and anthracyclines, some of the most common drugs used in the treatment of breast cancer. Utdelone is an analogue of the epothilone class of chemotherapy drugs, such as ixabepilone. Like other epothilones, Utdelone prevents the growth of mitotic spindles by promoting the formation and preventing the degradation of microtubules bunches. This action causes failure in the mitosis phase of the cell cycle, resulting in apoptosis. Being that it is produced by the myxobacterium S. Cellulosum, Utdelone can also be produced cheaper and more efficiently than other chemotherapy drugs.

Cytok in as Chemotherapy

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How Cell Cycle is Impacted

(i) Persistence of the crosslinks in G 1 phase.
(ii) Collapse of the stalled replication fork due to the presence of crosslinks in S phase.
(iii) Insufficient or excess repair of the crosslinks in G 2 phase.
(iv) Mitotic catastrophe or incomplete cytokinesis in M phase.
(v) Multi-nucleation in the tetraploid G 1 phase.

Cytok in metabolism by Madondo, M. T.

Cytok in by Vaccinatioist

Cell Cycle by Richard Wheeler