Summary
SUMMARY

Cancer, is the uncontrolled growth and spread of cells, that may affect almost any tissue of the body. Lung, colorectal and stomach cancer are among the five most common cancers in the world for both, men and women. Among men, lung and stomach cancer are the most common cancers worldwide. For women, the most common cancers are breast and cervical cancer.

More than ten million people are diagnosed with cancer every year. The World Health Organization (WHO) has estimated that there will be 15 million new cases every year, by 2020. Cancer, causes six million deaths every year - or 12% of deaths worldwide.

The three most common types of cancer treatment are, surgery, radiotherapy and chemotherapy. Treatment is aimed at removing the cancer cells or destroying them in the body with medicines or other agents.

Cancer chemotherapy is not new. It has been helping people since the early 1950s. The main groups of anticancer drugs are – alkylating agents, nitrosoureas, antimetabolites and mitotic inhibitors. Examples of alkylating agents are – Busulfan, Cisplatin, Cyclophosphamide, Ifosfamide, Dacarbazine, Mechlorethamine and Melphalan. Carmustine and Lomustine constitute the
nitrosoureas. 5-Fluorouracil, Methotrexate, Gemcitabine, Cytarabine and Fludarabine are antimetabolites. Examples of mitotic inhibitors include: Paclitaxel, Docetaxel, Etoposide, Vinblastine and Vincristine. Hormone-like drugs, alter the action or production of female or male hormones. Examples include anti-estrogens (tamoxifen, fulvestrant), aromatase inhibitors (Anastrozole, Letrozole), Progestins (Megestrol acetate), antiandrogens (Bicalutamide, Flutamide) and LHRH agonists (Leuprolide, goserelin).

Although chemotherapy drugs attack reproducing cells, they cannot differentiate between reproducing cells of normal tissues and cancer cells. However, the damage to normal cells can result in side effects. The side effects of chemotherapy may be of physical, physiological, biochemical, cytotoxic or genotoxic nature.

Though, a number of anticancer drugs are available in the market, due to various practical limitations, in the present investigation, Cisplatin, Etoposide, Flutamide and Vincristine sulphate were analysed for their genotoxic and biochemical effects on Swiss albino mice (Mus musculus), which were used as the test system.

The drugs were administered orally and/or intraperitoneally, following standard methods. The doses were equivalent to the therapeutic dosage used for human beings, which varied depending upon for the respective
anticancer drug.

The results indicate that, Etoposide, Flutamide and Vincristine sulphate showed an increase in the sperm-head abnormalities, while, Cisplatin also showed a similar behaviour, but the effect wore off, after the highest dose. Thus, these anticancer drugs may be considered as testicular toxins, causing damage to germ cells, leading to abortion, infertility and genetic diseases.

In the micronucleus test, the mice treated with Cisplatin and Flutamide showed an increase in the incidence of micronuclei. Vincristine sulphate showed a decrease in the number of micronuclei with increasing dosage which can be attributed to less availability of the drug. Etoposide did not show any dose dependence.

In the chromosomal aberrations assay there was a dose dependent increase in the number of chromosomal aberrations in the bone marrow cells of mice, treated with Flutamide, Cisplatin and Etoposide. However, Vincristine sulphate did not show any dose-dependence, though the number of aberrations was significantly higher than that of the control group.

In the biochemical studies, the antioxidant enzymes, Catalase and Glutathione reductase showed either, an increase or a decrease in their activities, in all the three tissues, exposed to the above mentioned drugs.