Recently Cancer is extensively found worldwide. It is the leading cause of death and disability in the world, behind only heart disease. Based on the statistical research report of different groups, cancer accounts for one out of every eight deaths annually. More and more people die from cancer every year around the world than other diseases like AIDS, tuberculosis and malaria combined. Cancer is a broad term used for a group of chronic diseases characterized by the uncontrolled growth of abnormal cells within the body. Cancer cells grow, divide and die in the unpredictable fashion as compare to normal cells. Characteristic of cancer cell is to spread and invade in other body organ (for example, spreading from the blood to the lymph nodes or from the lungs to the liver). Cancer classified on the basis of source of infection or site where initially abnormal cell developed —for example, metastatic liver cancer that has spread to the kidneys is still called liver cancer, not kidney cancer. Not all, but majority of cancers spread and result in death. Choices for the treatment of cancer depend on type of cancer and the stage of the tumor, e.g. where cancer occurs, tumor mass, spreading speed in to neighboring tissues and whether it shows metastasis or not. Based on different parameter different treatment options can be preferred. Some types of treatments are available for cancer. On the basis of use it can be classified into: Surgery, Radiotherapy, Hormonal therapy, Biological therapy, Chemotherapy etc. Among all therapy chemotherapy drugs can be classified based on factors such as mechanism of action, their chemical structure, and their relationship to another drug. Alkylating agents one of the biggest class of these drugs, directly damage DNA to prevent the cancer cell from reproducing. These agents act nonspecifically on all phases of the cell cycle. N-mustards were among the very earliest class of anticancer agents developed, and perhaps most extensively studied of the DNA alkylating agents.

Coumarin and pyrimidines have very long association with various animal species and other organisms throughout evolution may account for the extraordinary range of biochemical and pharmacological activities of these chemicals in mammalian and other biological systems. The coumarins and pyrimidines that were studied have diverse biological properties and various
effects on the different cellular systems. Keeping in mind we have decided to synthesize novel DNA alkylating agents bearing coumarin and pyrimidine moiety. We have synthesized a library of novel 4-((4-(bis(2-chloroethyl) amino)phenyl) amino)-3-nitro-2H-chromen-2-one derivatives and 4-((4-(bis(2-chloroethyl)amino)phenyl)amino)-2-imino-6-isopropyl-N-aryl-1,2 dihydropyrimidine-5 carboxamide derivatives. The chemical constitution of the compounds was illustrated by UV, IR, $^1$HNMR, $^{13}$C NMR and Mass spectra. All the compounds were screened for their antimicrobial activity. Microorganisms used for the screening were *Staphylococcus aureus* (ATCC29737), *Exiguobacterium GSD1*, *Escherichia coli* (NCIM2931), *Serratia GSD2*, *Candida albicans* (MTCC 227), and *Aspergillus Niger* (MTCC 282). It was observed that most of the compounds showed enhanced activities than the parent intermediate, which indicated that the incorporation of aniline mustard moiety to the molecule was beneficial to the antimicrobial activity. The results also suggested that the substitution in chromen ring of coumarin derivatives had an important effect on their antimicrobial activity. Also substituted pyrimidine coupled with aniline mustard had an improved antimicrobial activity. In vitro cytotoxicity study performed on Prostate cancer cell line PC3 and Cervical cancer cell line HeLa. The result of cytotoxicity suggested that the incorporation of aniline mustard with parent compound shows the better anticancer activity. Genotoxicity study revealed that the tested compound show significant genotoxic effect. Result of single cell gel electrophoresis suggested that tail DNA % more than 95 % at 80 µg/ml concentration of coumarin derivatives shows good genotoxic effect compare to positive control Mitomycin C, same way pyrimidine derivatives also show good genotoxicity with more than 95% DNA in the tail portion at 80µg/ml. Chromosome aberration study showed moderate chromosome aberration. Chromosome aberration number of various compounds was found quite good compare to Mitomycin C. The result of Sister Chromatid Exchange suggests all compounds show moderate SCE’s up to 20.