INTRODUCTION

Cancer is Immunomodulatory disorder and immune system which activate up normal proliferation of normal cell growth. The cells begin to divide without stopping and spread into surrounding tissues. Cancer can start almost anywhere in the human body, which is made up of trillions of cells. Normally, human cells grow and divide to form new cells as the body needs them. When cells grow old or become damaged, they die, and new cells take their place. When cancer develops, however, this orderly process breaks down. As cells become more and more abnormal, old or damaged cells survive when they should die, and new cells form when they are not needed. These extra cells can divide without stopping and may form growths called tumors. Many cancers form solid tumors, which are masses of tissue. Cancers of the blood, such as leukemia’s, generally do not form solid tumors. Cancerous tumors are malignant, which means they can spread into, or invade, nearby tissues. In addition, as these tumors grow, some cancer cells can break off and travel to distant places in the body through the blood or the lymph system and form new tumors far from the original tumor. Unlike malignant tumors, benign tumors do not spread into, or invade, nearby tissues. Benign tumors can sometimes be quite large, however. When removed, they usually don’t grow back, whereas malignant tumors sometimes do. Unlike most benign tumors elsewhere in the body, benign brain tumors can be life threatening. Cancer cells differ from normal cells in many ways that allow them to grow out of control and become invasive. One important difference is that cancer cells are less specialized than normal cells. That is, whereas normal cells mature into very distinct cell types with specific functions, cancer cells do not. This is one reason that, unlike normal cells, cancer cells continue to divide without stopping. In addition, cancer cells are able to ignore signals that normally tell cells to stop dividing or that begin a process known as programmed cell death, or apoptosis, which the body uses to get rid of unneeded cells. Cancer cells may be able to influence the normal cells, molecules, and blood vessels that surround and feed a tumor—an area known as the microenvironment. For instance, cancer cells can induce nearby normal cells to form blood vessels that supply tumors with oxygen and nutrients, which they need to grow. These blood vessels also remove waste products from tumors. Cancer cells are also often able to evade the immune system, a network of organs, tissues, and specialized cells that protects the body from infections and other conditions. Although the immune system normally removes damaged or abnormal cells from the body, some cancer cells are able to hide from the immune system.
Tumors can also use the immune system to stay alive and grow. For example, with the help of certain immune system cells that normally prevent a runaway immune response, cancer cells can actually keep the immune system from killing cancer cells. Cancer is a genetic disease—that is, it is caused by changes to genes that control the way our cells function, especially how they grow and divide. Genetic changes that cause cancer can be inherited from our parents. They can also arise during a person’s lifetime as a result of errors that occur as cells divide or because of damage to DNA caused by certain environmental exposures. Cancer-causing environmental exposures include substances, such as the chemicals in tobacco smoke, and radiation, such as ultraviolet rays from the sun. Each person’s cancer has a unique combination of genetic changes. As the cancer continues to grow, additional changes will occur. Even within the same tumor, different cells may have different genetic changes. In general, cancer cells have more genetic changes, such as mutations in DNA, than normal cells. Some of these changes may have nothing to do with the cancer; they may be the result of the cancer, rather than its cause. The genetic changes that contribute to cancer tend to affect three main types of genes proto onco genes, tumor repressor genes, and DNA repair genes. These changes are sometimes called drivers of cancer. Proto-oncogenes are involved in normal cell growth and division. However, when these genes are altered in certain ways or are more active than normal, they may become cancer-causing genes (or oncogenes), allowing cells to grow and survive when they should not. Tumor suppressor genes are also involved in controlling cell growth and division. Cells with certain alterations in tumor suppressor genes may divide in an uncontrolled manner. DNA repair genes are involved in fixing damaged DNA. Cells with mutations in these genes tend to develop additional mutations in other genes. Together, these mutations may cause the cells to become cancer. As scientists have learned more about the molecular changes that lead to cancer, they have found that certain mutations commonly occur in many types of cancer. Because of this, cancers are sometimes characterized by the types of genetic alterations that are believed to be driving them, not just by where they develop in the body and how the cancer cells look under the microscope. When cells divide, they reproduce themselves exactly. One cell divides into 2 identical cells, and then 2 cells divide into 4, and so on. In adults, cells normally grow and divide to produce more cells only when the body needs them to replace aging or damaged cells. Many cells live for a given amount of time and then are programmed to die by a process called apoptosis. This turnover of cells helps keep the body healthy. Cells of different tissues and
organs divide at different rates. For example, skin cells divide relatively quickly, whereas nerve cells divide very slowly or not at all once they mature. Cancer can start in any cell in the body. The cell starts out normal, but then changes. It is thought that a normal cell needs several injuries (mutations) before it will change into a cancer cell. These injuries to the cell affect how it grows, works, reproduces and dies. They may cause the cell to continue to grow and divide out of control instead of dying when it should. Although there are many different types of cancer, they all start because of uncontrolled, abnormal growth of cells. The DNA molecules inside the cell that program genetic information. DNA determines the structure, function and behavior of a cell in our cells is packed into rod-shaped structures called chromosomes the part of a cell that contains DNA (genetic information). There are 46 chromosomes in most cells of a person's body. Chromosome pairs 1 through 22 are called autosomes and look the same in males and females. Chromosome pair 23 is the sex chromosomes and is different for males and females. Females have 2 X chromosomes, and males have an X and a Y chromosome. Chromosomes are located in the nucleus of the cell. A copy of each chromosome is inherited from each parent. Our bodies are made up of many tiny units called cells, which are arranged into tissues and organs. Tissue and organ growth (in children) and repair (in adults) are generally the result of cells growing in size and dividing into 2 cells in a controlled manner. Chemical signals tell the cells to divide or stop dividing. Normally, the orders for cell growth are clear and our cells obey. When cells divide, they reproduce themselves exactly. One cell divides into 2 identical cells, and then 2 cells divide into 4, and so on. In adults, cells normally grow and divide to produce more cells only when the body needs them to replace aging or damaged cells. Many cells live for a given amount of time and then are programmed to die by a process called apoptosis. This turnover of cells helps keep the body healthy. Cells of different tissues and organs divide at different rates. For example, skin cells divide relatively quickly, whereas nerve cells divide very slowly or not at all once they mature.

Nanoparticles are particles between 1 and 100 nanometers in size. In nanotechnology, a particle is defined as a small object that behaves as a whole unit with respect to its transport and properties. Particles are further classified according to diameter. Ultrafine particles are the same as Nanoparticles and between 1 and 100 nanometers in size, fine particles are sized between 100 and 2,500 nanometers, and coarse particles cover a range between 2,500 and 10,000 nanometers. Nanoparticles research is currently an area of intense scientific interest due to a wide variety of
potential applications in biomedical, optical and electronic fields. Nano clusters have at least one dimension between 1 and 10 nanometers and a narrow size distribution. Nan powders are agglomerates of ultrafine particles, Nanoparticles, or nanoclusters. Nanometer-sized Single crystals, or single domain ultrafine particles, are often referred to as nanocrystals. During last two decades, considerable attention has given to the development of novel drug delivery system (NDDS). The rational for control drug delivery is to alter the pharmacokinetics and pharmacodynamics of drug substance in order to improve the therapeutic efficacy and safety through the use of novel drug delivery system. Besides more traditional matrix or reservoir drug delivery system, colloidal drug delivery system has gained in popularity. The major colloidal drug delivery system includes liposome and polymeric Nanoparticles. These systems have been investigated primarily for site specific drug delivery, for controlled drug delivery, and also for the enhancement of dissolution rate/bioavailability of poorly water-soluble drugs. The primary routes of administration under investigation are parental route however other routes such as the oral, ocular, or topical routes are also being investigated. In era of oral drug delivery system, microcapsule, Nanoparticles, liposome and neosome are better options to conventional dosage form. Nanoparticles are colloidal polymer particles of a size below 1mm3-4 and hold promise as drug delivery for parenteral and ocular administration as well as adjuvant for vaccines. Due to their greater stability and due to their easier Manufacturing they offer advantages over other colloidal Carriers such as liposome and cell ghosts. They offer advantages like increased bioavailability, site specific Drug delivery, sustained release of drug over longer Period of time, retention of dosage form in entire length of gastrointestinal tract and convenient to patient due to Reduction in frequent dosing. Cyclophosphamide also known as cytophosphane, is a nitrogen mustard alkylating agent from the oxazaphosphinans group and used to treat cancers and auto immune disorders. Cyclophosphamide has severe and life-threatening adverse effects, including acute myeloid leukemia, alopecia bladder cancer, dysuria, lupus nephritis and hemorrhagic cystis Neutroponia, Pneumonitis, Fibrosis especially at higher doses. Cyclophosphamide metabolites are primarily excreted in the urine, and drug dosing should be appropriately adjusted in the setting of renal dysfunction. Drugs altering hepatic microsomal enzyme activity (e.g. rifampin,) may result in accelerated metabolism of cyclophosphamide into its active metabolites, increasing both pharmacologic and toxic effects of the drug. Cyclophosphamide reduces plasma Pseudocholine esterase activity and may result in prolonged neuromuscular blockade when
administered concurrently with succinylcholine. Tricyclic antidepressants and other anti cholinergic agents can result in delayed bladder emptying and prolonged bladder exposure to acrolein. The main effect of cyclophosphamide is due to its metabolite phosphoramide mustard. This metabolite is only formed in cells that have low levels of ALDH. Phosphoramide mustard forms DNA crosslinks both between and within DNA strands at guanine N-7 positions. This is irreversible and leads to cell apoptosis. Cyclophosphamide has relatively little typical chemotherapy toxicity as ALDHs are present in relatively large concentrations in bone marrow stem cells, liver and intestinal epithelium. ALDHs protect these actively proliferating tissues against toxic effects of phosphoramide mustard and acrolein by converting aldophosphamide to carboxyphosphamide that does not give rise to the toxic metabolites phosphoramide mustard and acrolein. Cyclophosphamide induces beneficial immunomodulatory effects in adaptive immunotherapy. Suggested mechanisms include Elimination of T regulatory cells (CD4+CD25+ T cells) in naive and tumor-bearing hosts. Induction of T cell growth factors, such as type I IFNs, Enhanced grafting of adoptively transferred tumor-reactive effector T cells by the creation of an immunologic space niche. Thus, cyclophosphamide preconditioning of recipient hosts (for donor T cells) has been used to enhance immunity in naïve hosts, and to enhance adoptive T cell immunotherapy regimens, as well as active vaccination strategies, inducing objective antitumor immunity. Gum Ghatti is a complex polysaccharide of high molecular weight. It occurs in nature as a mixed calcium, magnesium, potassium and sodium salt. Complete hydrolysis has shown that it is composed of L-arabinose, D-galactose, D-mannose, D-xylose and D-glucoronic acid in a molar ratio of 10:6:2:1:2 plus traces less than 1% of 6-deoxyhexose. Gum Ghatti (Indian gum) is a complex water-soluble polysaccharide; Gum Ghatti is amorphous, translucent exudates of the Anogeissus latifolia tree of the Combretaceae family. The tree is quite large and is found abundantly in the dry, deciduous forests of India. The gum has a glassy fracture and frequently occurs in rounded tears, which are normally less than 1 cm in diameter, but it more often occurs in larger vermiform masses. Ghatti has a bland taste and practically no order. Only about 90% of the gum disperses in water, and this portion forms a colloidal dispersion.