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Nanomedicine to heal cancer

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ABSTRACT
Cancer is a group of different diseases. It causes when cells divide uncontrollably due to genetic change in the DNA or damage to DNA. It affects the different parts of the body like the lungs, breasts, kidneys, etc. As cancerous cells grow and divide, they turn into a mass or clump together resulting in the formation of a tumour. Cancer leads to cause death worldwide, accounting for nearly 10 million deaths in 2020 or nearly one in six deaths. Today cancer is treated with a wide variety of methods, but this method is often toxic for the body like surgery, chemotherapy, and radiotherapy. It is necessary to enhance tumour cell death without causing much more affection to healthy cell for that nanomedicine are more applicable. Nanomedicine is help to target tumours more effectively with an anti-cancer agent while leaving normal tissue untouched. Nanomedicine is the medical application of nanobiotechnology to treat cancer and it is the usage of nanobiotechnology for treatment, diagnosis, monitoring, and control of the biological system.Nanomedicine has specific advantages over chemotherapy such as biocompatibility reduce toxicity, excellent, stability, enhanced permeability and retention effect, and precise targeting. The ultimate goal of nanomedicine is used to treat the human body at atomic and molecular levels to repair a body like we repair conventional medicine today which is helpful for mankind.
Keywords: *Nanomedicine, cancer, chemotherapy*

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INTRODUCTION

Our body contains trillions of highly specialized cells and each gene is responsible for regulating cell growth and division. But the genetic changes that occur in the cell commence to grow and divide uncontrollably, thereby becoming cancer Proto-oncogene, tumour suppressor, and DNA repair gene is officiated by cancer due to genetic change occurs.

Ahead of this cancer cells grow and divide and form clumping together and the formation of tumour is seen. This tumour is nothing but masses of cancerous cells. Tumour may be malignant means they are capable of spreading. For the formation of cancerous cells, several factors are liable, the most important factor is an environmental factor such as excessive radiation from Sun and chemicals in cigarette smoke. Along with this environmental factor lifestyle, alcohol, diet, infection, and inflammation is also equally causal, and therefore the risk factor of cancer increases. Breast cancer is currently the most prevalent and lung cancer causes the most death. Cancer is accounted for 8.2 million deaths worldwide.

To overcome Cancer disease different conventional therapy, and different medicine introduced in the market. Radiation and chemotherapeutic treatment are currently available. For treating cancer targeted delivery is necessary and also controlled release of drugs is needed nanotherapeutic are being implemented to overcome the limitations of conventional drug delivery systems.

There is some abstraction of conventional therapy is as follows: - Conventional therapy has poor water solubility.By considering the delivery of conventional therapy has a lack of selectivity toward cancerous cells and also kills the healthy cells, which become toxic to that person. Think about resistance, they have multi-drug resistance which will be a risk factor for human beings. This therapy also has a low circulation and half Life.

Considering chemotherapy, kill tumour or cancerous cells but it also adversely affected our body. Chemotherapy increases the stress of everyday life and can become overwhelming. Chemotherapy is also adversely affected the menstrual cycle and triggers early menopause. It weakens the heart muscles especially when a person suffering from a pre-existing heart condition. Disturbing the entire digestive system cause a wide variety of unpleasant symptoms that disturb appetite. It develops sensitivity to

sunlight and also causes hair loss. Decreased urination maybe a sign that chemotherapy is harming the kidney. Tired and achy muscles can interfere with balance, coordination, and motor skill.

By considering all of these unpropitious consequences of chemotherapy nanomedicine is an important key to treating cancer effectively. Nanotherapeutic are being implemented to overcome the limitations of conventional drug delivery systems. Nanoparticle sizes are ranges from 1nm to 100nm (10^{-9}m). This nanoparticle emerges as an important player in modern medicine.[1]. Nanomaterials are not only used in medicine but also in pharmaceuticals. Due to their specific mechanical & electrical behaviour nanomaterial is useable for detection of biological molecule, visualization of disappeared tissue, and innovative therapeutics. This nanomedicine is made up of API (tube pharmaceutical ingredients) such as small molecules that are biologically packaged into nanosized careers made up of excipient link lipids and polymers. Nanomedicine is solid colloidal particles. nanomedicine consists of macromolecular material and can be used therapeutically as are adjuvant in vaccine or drug careers in which active pharmaceutical ingredients are dissolved interrupted in capsulated absorbed or chemically attach.

Nanomedicine is impressively applicable in a multitude of areas and various healthcare applications. Applicable areas include drug delivery, vaccine development for triggering immunity, antibacterial diagnosis, and visualising tools, wearable device, Implants, high throughput screening platforms.

Classification and types of nanoparticles:

Nanomedicine is classified into different classes that are inorganic, organic, and carbon base nanomaterial.

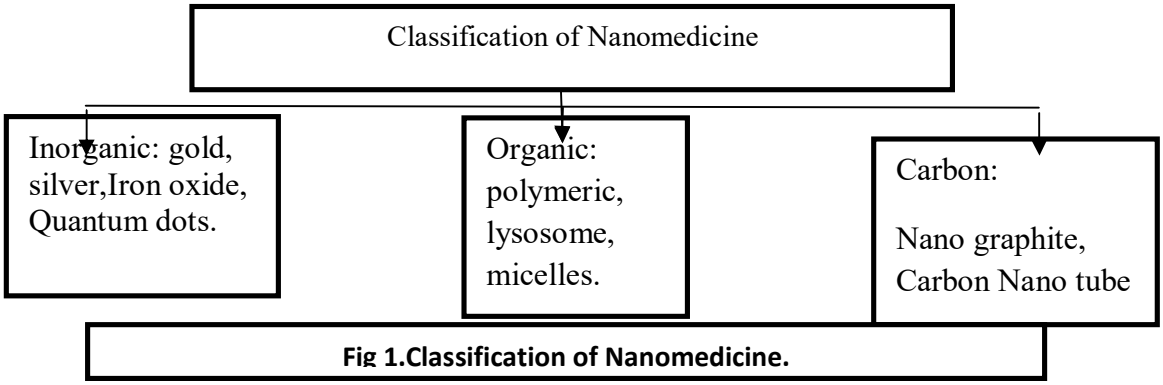

Fig 1.Classification of Nanomedicine.

Organic Nanomedicine polymeric, liposomes, and micelles and inorganic nanomedicine include gold, silica, and iron oxide.

Liposomes are small spherical vehicles composed of liquid by layer surrounding the aqueous inner phase. liposomes are composed of phospholipids or cholesterol. Which are used to encapsulate various active drugs. Amikacin is a liposome-based pharmaceutical modified PEGylated liposome increase improves drug solubility. Extended circulating and also increases drug stability.[2].

Dendrimers have branch structures and small sizes which help in tumour-destroying therapy into a cell without activating an immune response. This shows remarkable properties in anticancer therapies and also in visualizing diagnostic images. They are main nanocarrier with fluorescent lables.[3].

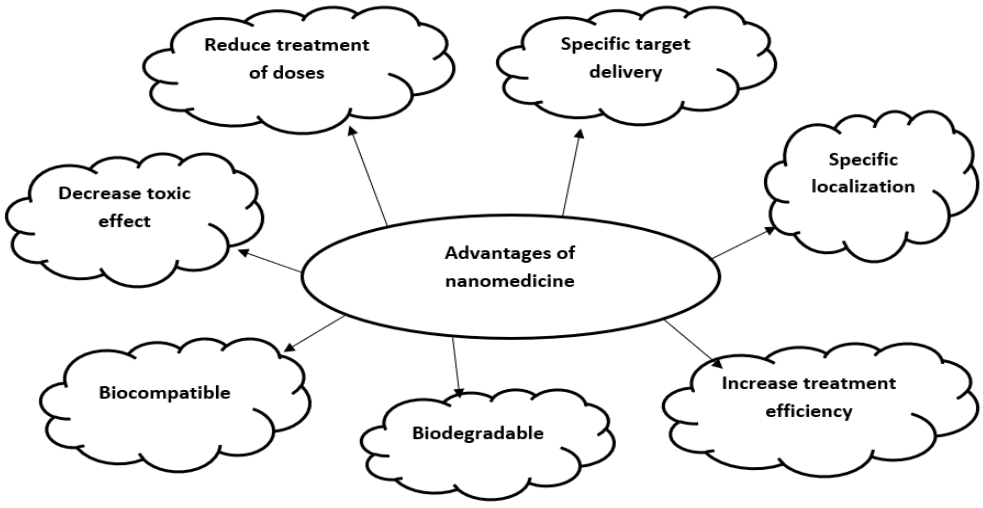

Fig.2. Advantages of nanomedicine

Polymeric VPs, append different drug delivery techniques like conjugation and entrapment of drugs, products that stimulate the immune response system, imaging modalities, and the agnostic**.**[4].
Micelles assist the body to absorb lipid and fat-soluble vitamins. Biocompatibility and biodegradability are two foremost prerequisites in designing these micelles carriers for clinical applications. It is widely used in drug delivery careers for a series of different molecules, low molecular mass, hydrophobic drugs, proteins, and genes.[5].
Gold nanomedicine inorganic nanoparticles are attractive for the construction of emerging agents. It is effectively applicable in vaccines.[6].
Quantum dots (QD) are semiconductor crystals that glow when stimulated by an external source such as UV light.[7]
Silver Nanoparticles are applicable with great potential in visualizing probs, drug delivery and antimicrobial agents. AgNPs have distinct biochemical functions and also disjunct optical and physical properties.[8].
Carbon base nanomedicine has been widely investigated as a catalyst and key component of the hydrogen storage system. Due to their intrinsic characteristics, carbon-based materials are desired materials as an electrode in capacitors and batteries. Due to environmental and health issues carbon based nanoparticles limitedly used.[9][10].

CONCLUSION

Nanomedicine is applied as an alternative treatment for anti-cancer agents. Due to the small size of nanomedicine specific targeting of cancerous cells is achieved. Nanomedicine decreases the toxic effect on the body and it also reduces the doses of treatment. nanomedicine can effectively develop in the medical field which the potential to enable early detection. Due to nanomedicine health can be improved and also reduces environmental pollution.

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