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NANOPARTICLES: CREATING AND USING IN CANCER TREATMENT

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This paper is about nanoparticles and which nano is better used for cancer treatment and their differences. Now a nanoparticle or ultrafine particle is usually defined as a particle of matter that is between 1 and 100 nanometers in diameter. Nanoparticles contains a drug molecule called interleukins are attached to immune cells (T-cells). The idea is that when the T-cells reach a tumor the nanoparticles release the drug molecules, which cause the T-cells to reproduce. If enough T-cells are reproduced in the cancer tumor the cancer can be destroyed. Their formed through either the breaking down of larger particles or by the controlled assembled processing. 'Nanoparticles Decrease Endothelial Barriers', there are the first barrier before NPs reach the tumor. There are two main approaches to overcoming the endothelial barrier. The first strategy to conquer the endothelial barrier is to utilize the transcellular transportation system. One of the advantages of nanomaterials is that their size is tunable. The size of NPs used in a drug delivery system should be large enough to prevent their rapid leakage into blood capillaries but small enough to escape capture by fixed macrophages that are lodged in the reticuloendothelial system [1-3].

Within nanomaterials, it's classified into 3 groups according to their composition (fig. 1).

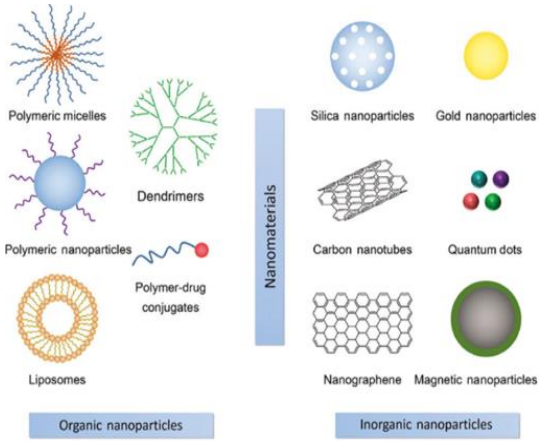

Figure 1 – Nanoparticles classified into their groups

There are four main types of intentionally produced nanomaterials.

Carbon-based, Metal-based, Dendrimers and Nanocomposites. Inorganic nanoparticles are non-toxic, hydrophilic, biocompatible and highly stable compared to organic materials, like [2-3]:

Table 1. – List of differences

Magnetic Nanoparticle	Gold Nanoparticle
Main component: Iron oxide Size: 10-50nm	Main component: Gold Size: 1-100nm
Magnetic nanoparticles (MNPs) have gained immense attention for cancer theragnostic applications due to their unique physic-chemical properties, magnetic resonance imaging (MRI) contrast, facile synthesis, easy surface decorations, low toxicity, and good biodegradability that assist them to serve as outstanding.	Gold nanoparticles absorb incident photons and convert them to heat to destroy cancer cells. Due to their unique optical properties as a result of LSPR, gold nanoparticles absorb light with extremely high efficiency which ensures effective PTT at relatively low radiation energy.
Detecting of cancer, these magnetic nanoparticles are trapped inside due to an externally applied magnetic field as the blood is free to flow through. The magnetic nanoparticles are coated with antibodies targeting cancer cells or proteins. .	Gold nanoparticles are used in resonance scattering dark-field microscopy for the detection of microbial cells and their metabolites, the bio-imaging of tumor cells, and for the detection of receptors on the surface, nanoparticles make them able to target only the cancerous cells
Drug carrier, Magnetic hyperthermia, MRI	Radiotherapy, imaging, drug carrier

In conclusion, we have magnetic nanoparticles it treats local tumors and destroys the cells, and gold nanoparticle because of its outer shell the gold nano shell-antibody complex can be used to cure cancer cells. To know which one is at most the best is impossible as each nanoparticle has its unique way.

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