**Nanoparticles in Medicine**

Nanoparticles is the science studying material whose particles in the range of 1-100 nanometer. Material when be in this range will have physical and chemical properties differ than when material in normal range (bulk) because of small size and high surface to its volume ratio. The new features of nanomaterial made it used in diagnostic and therapeutic cases leading to birth a new science called NANOMEDICINE.

Nanoparticles in medicine is divided into three parts:

1. Therapeutic
2. Diagnosis
3. Drug delivery

**Drug delivery**

Nanoparticles are designed such that they are attracted to infected tissue and held by drugs; by this method drugs can treat infected organs and don`t hit healthy tissues. The drugs are then delivered to infected cells directly [1].

Heat is used to treat cancer like breast cancer tumor. Nanoparticles were used with cancer tumor as in this example: gold tube nanoparticles were inserted into the cancer tumor. DNA will go to attach to these nanoparticles. DNA series with chemotherapy drug stuck to nanogold tubes. As infrared is turn on, nanogold tubes will absorbs infrared rays turning them to heat. This heat will release chemotherapy drug and destroy the cancer tumor cell [1].

Researchers at north Carolina developed a network of nanoparticles that is injected in blood of diabetic patient; this network releases insulin when glucose level rises maintaining blood sugar constant several days in vitro tests [2] [3].

Spanish scientists found a nanodevice containing nanoparticles and drugs against aging. The nanoparticles shoot selected types from these drugs inside aged tissues and cells [4]; these nanoparticles are mesoporous [1].

Protein fights skin cells aging, and skin creams contain it to fight skin aging. Some of researchers used liposome, which is “a spherical vesicle having at least one lipid bilayer”[5], as nano liposome capsule containing protein with skin cream to deliver or give protein to skin cells [2].

Some researchers made capsules from porous plastic where they are encapsulated by nano carbon tubes. Therapeutic drugs are attached to the nanotubes. The capsules are thrown in blood stream. When there is a problem somewhere, chemistry of blood changes and a signal is shot; then, the drugs are released on defected organ. The capsules are called “biocapsules” by Nasa. The biocapsules can carry insulin to release it in pancreas of diabetic patients and chemotherapy drug for cancer tumor [2].

Another example, damaged heart tissue needs cardiac stem cells to be treated, so researchers at north Carolina state university developed nanovesicles that are attracted to heart injured tissues holding cardiac stem cells to deliver them to the heart tissues in order to be treated [1].

**Treatment**

In internal bleeding, researchers at western reserve university succeeded in lab tests from manufacturing nanopolymer that work as platelet. This synthetic platelet can be injected in the blood stream and reduces bleeding in this case [1].

From the most modern application of nanomedicine is Nano robot; it is a machine or tools inserted inside human body to treating tissues or replacing cells or something by a new one. They are in the range 0.1 to 10 micrometer. Nanorobots are used in diagnosing and treating cancer, removal kidney`s stone, clearing damaged cells in DNA series, and also in surgery by introducing nanorobot semi-autonomous or under control by a surgeon from vascular system or cavities of human body[6][7].