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Review Article about Nanotechnology in the Medical Field

Ridha jihad jameel, Idris Mahdi Kadhim, Ruqaiah Razaq Yaseen, Ali Qasim Hamid
Department of Medical physics , College of Science, University of AL_Mustaqbal

Abstract:

Nanotechnology is a modern development and has many applications that include manufacturing molecules or particles at the nanoscale range. Nanotechnology is known as a developed field that involves the manufacture, processing and application of many structures, devices and systems consisting of extremely small units. The unique properties and features of nanoparticles are due to their small size, as well as their chemical composition and structure. Its surface. The distinctive properties and physical changes of different materials in nanoscale materials have allowed for the development of the properties of industrial products, which has resulted in an increase in interest and impact in industrial and medical applications. Nanoparticles have begun to find their way into the environment surrounding us as a result of the limited use of nanotechnology products and nanomaterials. For this reason, attention has been paid to the sources of nanoparticles, their behavior, and their effects in the environment. Various aspirations have also been made for regulating the spread, fate, and behavior of nanomaterials in different environments, in addition to the potential risks of nanoparticles and materials. In particular, the field of nanomedicine is defined as the science and technology of diagnosing, treating and treating painful diseases and injuries, alleviating pain, and maintaining and improving human health using nanostructure materials. Nano diagnosis is a mechanism used to identify disease early or prepare for it at the cellular and molecular level. Nano diagnosis relies primarily on laboratory diagnosis, which in turn increases the efficiency and reliability of Nano diagnosis by using human fluid or tissue samples by using secondary functional devices through which multiple analyzes are performed at the subcellular level. Nanomedicine involves the development of, Devices that are capable of working inside the living body in order to identify the disease early and identify toxic molecules and cancer cells present inside the body. The development of nanotechnology has contributed to changing the medical practices used in preventing, diagnosing, and treating diseases, and we are now living in the era of medical nanotechnology. For example, nanotechnology provides new opportunities for drug carriers inside the body. As well as detecting diseases, Nano-instruments are used as Nano-biosensors due to their sensitivity. These instruments are coated with manufactured antibodies so that they only adhere to DNA, proteins, or other biological particles in the body, and do not adhere

to other molecules. And also in cancer treatment, where gold-coated nanospheres are used to destroy cancer cells. As for medicines and agents, a new term has now been introduced into medical science, which is Nano-biotin, which is the new alternative to antibiotics. Likewise, in the field of surgical operations, the company (Corves) has blamed the manufacture of a small, nanometer-sized robot that is used as an assistant to doctors in critical and dangerous surgical operations, where the doctor can control the robot uses a special device, which helps in completing the process with high efficiency and utmost precision.

Introduction

Nanotechnology is a modern development and has many applications that include manufacturing molecules or particles at the nanoscale range. Nanotechnology is known as a developed field that involves the manufacture, processing and application of many structures, devices and systems consisting of extremely small units. The unique properties and features of nanoparticles are due to their small size, as well as their chemical composition and structure. Its surface. The distinctive properties and physical changes of different materials in nanoscale materials have allowed for the development of the properties of industrial products, which has resulted in an increase in interest and impact in industrial and medical applications. Nanoparticles have begun to find their way into the environment surrounding us as a result of the limited use of nanotechnology products and nanomaterials. For this reason, attention has been paid to the sources of nanoparticles, their behavior, and their effects in the environment. Various aspirations have also been made for regulating the spread, fate, and behavior of nanomaterials in different environments, in addition to the potential risks of nanoparticles and materials [1]. In particular, the field of nanomedicine is defined as the science and technology of diagnosing, treating and treating painful diseases and injuries, alleviating pain, and maintaining and improving human health using nanostructural materials. Nanodiagnosis is a mechanism used to identify disease early or prepare for it at the cellular and molecular level [2]. Nanodiagnosis relies primarily on laboratory diagnosis, which in turn increases the efficiency and reliability of nanodiagnosis by using human fluid or tissue samples by using secondary functional devices through which multiple analyzes are performed at the subcellular level. Nanomedicine involves the development of, Devices that are capable of working inside the living body in order to identify the disease early and identify toxic molecules and cancer cells present inside the body [2]. The development of nanotechnology has contributed to changing the medical practices used in preventing, diagnosing, and treating diseases, and we are now living in the era of medical nanotechnology. For example, nanotechnology provides new opportunities for drug carriers inside the body. As well as detecting diseases, nano-instruments are used as nano-biosensors due to their sensitivity. These instruments are coated with manufactured antibodies so that they only adhere to DNA, proteins, or other biological particles in the body, and do not adhere to other molecules. And also in cancer treatment, where gold-coated nanospheres are used to destroy cancer cells [3]. As for medicines and agents, a new term has now been introduced into medical science, which is nano-biotin, which is the new alternative to antibiotics. Likewise, in the field of surgical operations, the company (Corvus) has blamed the anufacture of a small, nanometer-sized robot that is used as an assistant to doctors in critical and dangerous surgical operations, where the doctor can control the The robot uses a special device, which helps in completing the process with high efficiency and utmost precision [4]. The importance of research.

The importance of this research lies in:

1. Knowledge and understanding of nanotechnology.
2. Its various uses in the field of medicine.

3. Knowing the different applications of this wish in this field.

A brief history of nanotechnology, Perhaps someone contemplating nanotechnology will find it difficult to pinpoint a specific era or period in which this technology appeared, as nanotechnology was used by individuals who were interested in processing some ordinary materials. To obtain certain characteristics such as color change without knowing the reason that led to this. Researchers and archaeologists have found that some ancient civilizations used nanomaterials in a number of aspects of life, but it is clear that "among the first to use this technology (without realizing what it was) were the glassmakers in the Middle Ages, who used colloidal gold nanoparticles for coloring," especially in Manufacture of precious and precious vessels [5]. The Arabs and Muslims are considered among the first to use this wish in the manufacture of swords, Talin swords were known for their sharpness and durability. Based on examinations and studies with the electron microscope on samples of the blades of these two swords, it was found that they contain nanomaterials [5]. In the present era, some mechanical solidity has appearedIt.]provides a kind of research that shaped the course of this technology and made it the technology of the future. The lecture of the famous physicist Richard Feynman before the American Physical Society is considered the first beginning of the emergence of nanotechnology when he spoke about the possibility of controlling the rearrangement of the molecules and atoms in matter on a parallel line From a tangent to a smaller and then smaller tangent, Thus, we can build machines and perform processes through which we can produce objects at the molecular level, something that does not contradict the laws of physics. The term nanotechnology appeared for the first time in 1794 in a lecture given by the Japanese scientist Norio Taniguchi at the University of Tokyo. , as a synonymous term for describing manual machines, which was on a small scale at that time, this term was not used, To indicate a fulfilled wish. In 1796 AD, the first use of the term "nano wishing" began in scientific circles after a number of lectures and the appearance of some books published in, This field, especially after the publication of Erin Drexler's famous book "Building Engines". The Long Era of Nano-wishing", where it continues until now. This term has another dimension to include the aspect of industrial dealing with atoms and molecules [6]. Until the end of the day, nanotechnology and its applications were merely philosophy and hypotheses. Far from applied and scientific concerns. Over the past twenty years, modern devices and technologies have made it possible to deal with the world of atoms and nano-particles Scientifically possible, Areas of use of nanotechnology, Nanotechnology in the field of water purification: Providing clean drinking water at affordable prices is one of the challenges of the modern era. That Population growth in the world leads to water scarcity, and the contamination of pollutants Water sources. Nanotechnology has provided innovative solutions for water development, where nano-membranes are used for the purpose of Softening water and removing contaminants such as physical, biological and chemical pollutants. As effectiveness. Nanotechnology uses nanoparticles to provide safe drinking water with a high level of It is useful in what is related to treatment, water desalination, and filtration, as a group of nanomaterials is used in water development, such as carbon nanotubes and alumina fibers (aluminum oxide), which in turn perform a comprehensive nanofiltration and filtration process [9]. Nanotechnology in the field of energy: Nowadays, the main sources of electricity used to meet human needs and activities are fossil fuels, minerals, nuclear sources, and hydroelectric power. In most cases, these things are very dangerous to human life and harmful to the system. It is also expensive, causes damage to areas of environmental importance, causes global warming, depletion of the ozone layer, destruction of the biosphere and the Earth's atmosphere, and environmental destruction. The emergence of nanotechnology in the column last night provided the necessary tools for this [9]. Nanotechnology in the field of food packaging: Nanotechnology can be applied in the fields of food production, processing, safety and packaging. The process of coating nanocomposites can improve food packaging by adding antimicrobial elements directly to the surface of the coated film. Nanocomposites become bulky or dull, Gas permeability in different fillings according to the needs of different products. The count is done from research to apply nanotechnology to the process of

detecting chemical and biological substances in foods [7]. Nanotechnology in the field of agriculture: One of the most important goals of agricultural policy in any country in the world is to improve production and increase the quantity of agricultural products in order to meet the needs of the population. Nanotechnology began to manufacture nanogranules containing fertilizers with pesticides added to combat agricultural pests of all kinds, after studies showed the negative effects. For starters on, Human health and the environment. Fluorine granules also contributed to solving the problem of 50% evaporation of irrigation water and the resulting increase in soil salinity and damage to its fertility. This is done by producing zeolite nanoparticles composed of aluminum and silicon. And oxygen is placed in the soil to store irrigation water within its pores, and returns it slowly when the soil and plants need it. It is also possible to manipulate the genes of plants and animals. This is done by using nanomaterials as a carrier of these genes instead of viruses, with the aim of, Obtaining greater productivity and adding qualities that enable us to grow rice and other crops, Throughout the year[10]. Nanotechnology in the medical field: the greatest, One of the most important areas of normalization for nanotechnology is, and the greatest of which is the direct connection and the health of the human being. Human, Be, It is able to target different cells in the body and also combat the most deadly diseases, In humans, such as cancer [11]. As for nano-sensors, they can be implanted in the brain to enable a quadriplegic to move and walk [12]. There are many applications in the field of manufacturing nano-medical devices, and research indicates that the potential for repairing living cells will emerge later, as well as nano-electronic neural connections, and if this happens, an intimate revolution will occur in the world of treatment. Using this image, it is possible to photograph the cells of the body easily as if we were taking a normal photograph. The Foresight Institute in California was born to develop a general framework for what nanotechnology can do for us in medicine, for people who suffer from certain diseases, and elderly people who suffer due to an incorrect sequence of atoms, which may be caused by time, or any accident, Tools capable of rearranging atoms will also be availa, [13] Unable to allow these people to go beyond that, the wish for nanotechnology has become a fundamental part of medicine.], The traditional methods of treating diseases opened great hopes for the treatment of many diseases. Serious diseases, which is what made researchers believe that nanomedicine is the medicine of the future. Applications of nanotechnology, Nanotechnology to protect against bacteria and germs: During the past years, some companies have been accused of conducting a lot of exciting scientific research on nano-grains of silver metal to determine the extent of their possibility of using them in the field of combating infections and various types of harmful bacteria and viruses. The results of this research were that the crystalline grains of silver metal were able to light up different types of viruses and a variety of bacteria and germs. Due to the reduction of these granules to a frame of less than 5 nanometers, with a decrease in the size of the grains and an increase in their surface area, the atoms of the silver element present in the nucleus of the granules are transferred to the outer surface of the granules, which leads to a significant increase in their chemical activity, as well as in their interaction with the oxygen present in the air. As a result, toxic silver ions are formed, which are responsible for killing germs and viruses. One of the Korean companies specialized in the manufacture of electrical and electronic devices has monopolized the manufacture of household refrigerators covered from the inside with a fine layer of silver metal, in order to kill bacteria. And germs, which are present in order to protect preserved foods from bacterial contamination. It is also one of the companies specialized in the shoe industry, By placing nanofibers of silver metal inside the shoe to prevent blood fungi and bacteria from growing while represents great importance for diabetics who constantly suffer from wearing the shoe. This product ulcers and blood infections from bacterial infections that lead to severe urinary tract infection [14]., Nanotechnology in treating Alzheimer’s disease: million peopleT.he number of people suffering from Alzheimer's disease around the world is about 35, It is one of the diseases that is difficult to detect at an early stage of infection because the signs of the disease are present in the blood, but in small numbers, but with the development of science, it has become, By using nano wish, It is possible to diagnose Alzheimer's disease and treat it early by designing a large number of nanoparticles with high specificity for cells.

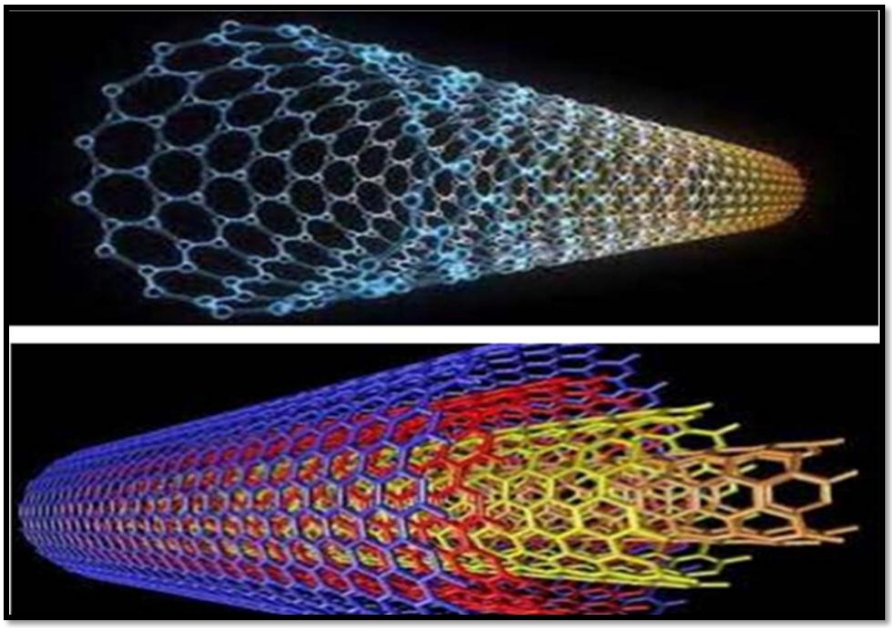
Capillary lining in the brain [15]. Nanotechnology in dentistry: The use of nanotechnology in dentistry aims to maintain dental health through the use of nanomaterials and biotechnology, which includes tissue engineering and dental nanorobots. The science aims to provide dental nanorobots capable of using specific movement mechanisms that allow them to swim through human tissue. And achieving a goal to enter cells safely and deal with the environment, and this is controlled, Nanobots use a special computer to carry out a set of programmed instructions. Or, the dentist himself continues to send commands directly to these robots, Cursing Via audio signals or other means [16]. Toothpaste or mouthwash can be enhanced with nanorobots that are launched once a day. In the mouth to remove constantly formed tartar layers, and to get rid of materials, The organic matter is placed in the teeth and transformed into harmless and odorless rising vapors [19]. Disease detection: Nano nanowires are used as nano-organisms due to their high sensitivity and very small size. These nanowires are coated with manufactured antibodies so that, It only attaches to DNA, proteins, or other biological particles in the body, and does not attach to other molecules. When these proteins or others bind to the coated nanowires, their conductivity will change, and thus this nanobiosensor can be used to detect a large number of diseases Its initial stages, This is done by introducing large numbers of nanowires into the body, which are coated with antibodies representing different sensors [15].

Nano sensors

Nanobots:Robotic systems have greatly expanded the ability of humans to sense, interact with, And LMD manipulate and transform the world around us. In particular, the fulfillment of various wishes led to... Revolutionizing medical applications of robotic desires towards improving healthcare. While industrial robots were developed primarily to automate manufacturing tasks, Both routine and dangerous on a large scale, medical robotic devices are designed to treat and cure, diseases. So, and on C For different environments and operations, Unlike traditional “durable” robots, which are built with large mechanical systems, medical robots need miniature parts and smart materials to perform simple, automated operations. And mating with the human body [19].

Nano-nephrology: Eddy disorders are multistep processes that involve the accumulation of a variety of molecular changes. The cellular function of kidney cells and the areas surrounding them is affected, With these partial changes. Many genetic changes, such as mutations, aneuploidies, and others, have been linked to various kidney diseases. In terms of the progression of kidney function, kidney disease is separated into acute kidney injury (AKI) and chronic kidney disease (CKD). AKI is defined as a high level of creatinine in the blood. Low blood volume, urinary tract obstruction, and drug poisoning are the most common causes. Specific irregularities in the structure and function of the kidneys are termed kidney disease, Chronic. The most common causes of chronic kidney

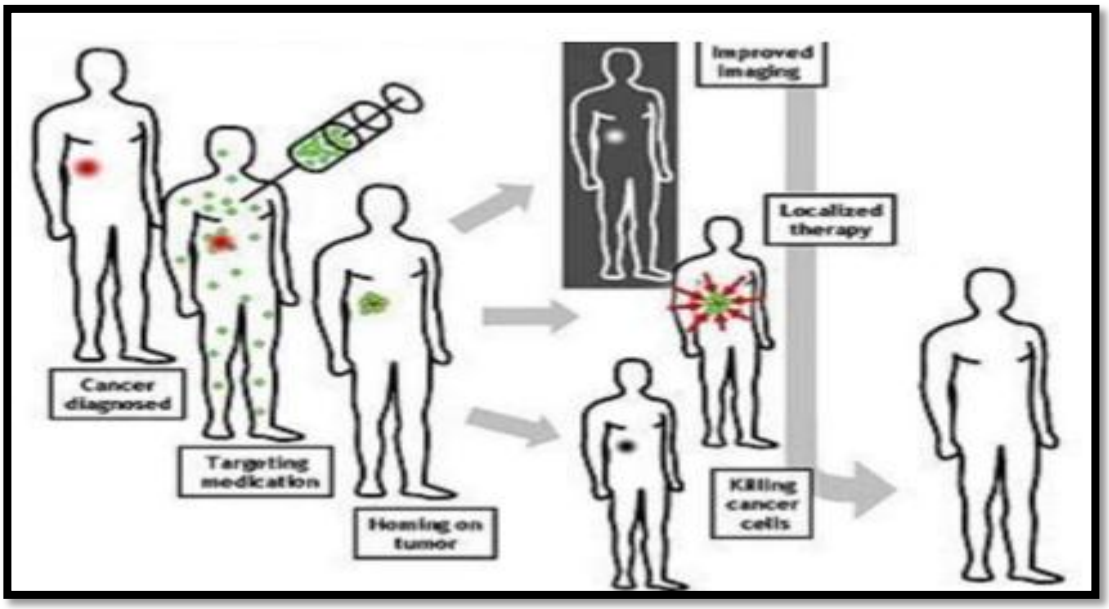
disease include diabetes, High blood pressure and primary glomerular disease. In terms of definition, cause, and treatment methods, they are very different. Chronic kidney disease (CKD) is a global health concern that affects more than 10% of the population, with a higher prevalence among older adults. Patients with chronic kidney disease usually suffer from a number of, A large number of problems and negative results, which places great financial pressure on everyone, Infected persons and society as a whole. Autosomal dominant polycystic kidney disease (ADPKD) is a typical genetic disorder. Early detection of chronic kidney disease and rapid recovery from the disease have become public health priorities. There is evidence that nanoparticles are involved in the formation of kidney stones and disease. Polycystic kidney and gallstones. Cholecystitis and prostatitis, Ovarian cancer and other diseases [17]., Silver nanoparticles: They are very small granules whose diameter does not exceed five nanometers. They are added to antibiotics to increase their effectiveness, and their properties have recently been studied. Surface plasmon resonance of silver nanoparticles for agglomeration, absorption, and formation. Silver in small concentrations is considered safe for human cells because it is capable of killing more than six hundred types of bacteria and other types of viruses, such as hepatitis C virus and bird flu, without causing any harm to the human body. Socks, shoes, and refrigerators are also covered with a dense coating to prevent the growth of fungi and bacteria. Inside and inside it, for the purpose of preventing the occurrence of mold and moisture, especially for diabetics who suffer from permanent ulcers in their blood, but it is resistant to the majority of bacteria and viruses. It is also widely used in disinfecting water and food in daily life and in combating infections in medicine. The optical properties of silver nanoparticles have received much attention due to their optical capabilities and advanced sensors [20]. Carbon nanotubes: It is a functional carbon fiber that combines the three elements: carbon, nano, and tube. It is widely used as a material in the electrical circuit for lithium-ion batteries, which has been used in the production of flexible and durable stents that are not rejected by the immune system, along with metal tubes that are placed inside the arteries. For the body and what is currently used, Which accumulates cholesterol inside of which cholesterol accumulates, which prevents the entry of blood carrying oxygen and nutrients to all parts of the body, in addition to making biological nano-sensors that move with the blood and provide us with information about the mechanism of cholesterol formation inside the arteries and veins by sending signals that can be received and analyzed by devices outside the body. With the aim of creating a medicine for each case individually, to replace the general treatment with this specific treatment [21].



{2_2} Carbon nanotubes

Fulluron: Or what is called carbon globules, it is considered the third form of carbon after granite Diamonds were produced in 1770 and their molecule consists of sixty carbon atoms. It's like a blood ball, but half, They are interconnected with each other, so that they form a geometric shape (Nm) and has thirty-two faces, twelve of which are due to its phase, which does not exceed 1 (five), The twenty-twentieth hexagonal shape[21]. fulluran {carbon spheres}, And its most important applications: A_ Production of medicines to treat encephalopathy caused by Alzheimer's disease and neuropathy the movement. B_ It is used as antioxidants, when the free radicals that cause oxidation inside the human body are neutralized with one of the valence electrons of the carbon atoms that make up fulluron. His discovery was the result of cooperation between three American chemists: Robert Cole, Harold Curto, and Richard Small. A: We replace the diseased genes that cause hereditary diseases for which there is no cure with healthy genes. Because the diseased genes come from the affected person and pass them on to his generations after him.

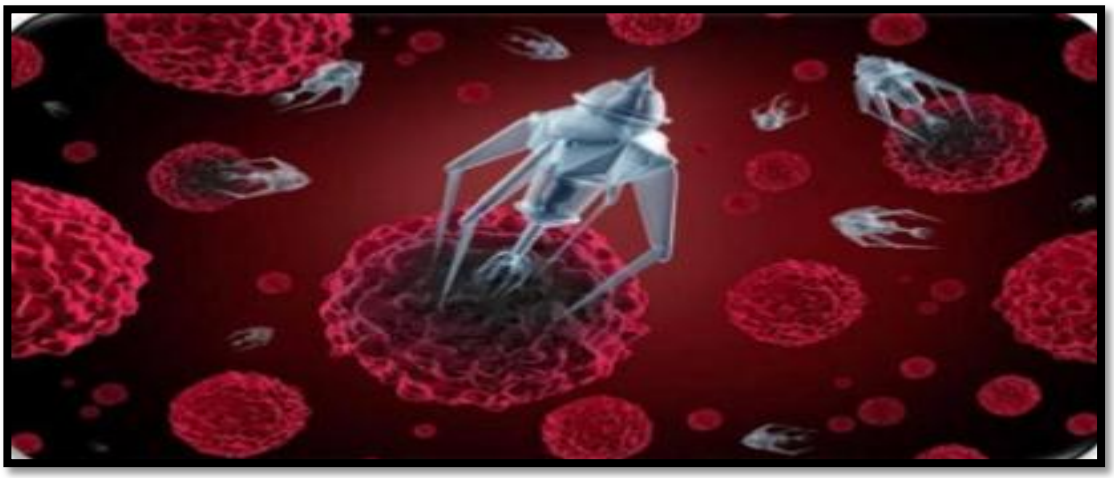
Repairing damaged cells: In the traditional treatment methods used in medicine and surgery, doctors treat damaged tissues and cells using various surgical operations and various medications, including: The situation is different if you use machines to rebuild damaged cells using blue needles. In particular, it does not lead to small cells, but rather the durable machines enter the cells that are intended to be entered. In this modern method, we benefit from the fact that the body's cells show reactions to external engines, whatever they may be. If the nano engines reach them, Or the subtle motors showed this reaction, which changes the function of the cells and takes them from illness to recovery, and this method appears to be a direct method in treatment [22]. Cancer:



{3_3} An illustrative diagram explaining how nanoparticles can be used to treat cancer.

While the small size of nanoparticles gives them properties that represent great benefit in oncology, especially in the field of imaging. When quantum patterns are used, Nanoparticles with trapping properties, including size-tunable light emission, Associated eMxcReIptcioann obtain images, For magnetic resonance imaging, For tumors. Because nanoparticles are more fine than dyes, The organ only needs one light source to excite and glow. This means more variability and at a lower cost Using quantum fluorescent patterns produces images, Organic dyes are used today as a contrast medium or what is called the shaded material. However, the downside is that the quantum patterns are often. They are made of completely toxic elements, Another nanoproperty, which is the high surface area to volume ratio, allows many functional groups to be attached to the nanoparticle, which seeks to bind to some cancer cells. This, in addition to the small size of the nanoparticles

(10nm-100nm), allows these particles to preferentially accumulate in tumor beds (because tumors have an effective lymphatic drainage system). The hope is that a new cancer treatment of treatment will one day replace radiation and chemotherapy in the tumors. Cancer. The treatment method attaches microscopic nanoparticles to cancer cells and then "cooks" the tumors inside the body using radio waves, then heats up the nanoparticles and nearby (cancer) cells only. You can test the sensor, which contains thousands of nanowires capable of detecting proteins as well as other biomarkers left by tumors. Cancer, in addition to its ability to detect and diagnose cancer in the early stages using a few patterns of the patient's blood. Research has found that nanostructures with a diameter of 120 nm and plated with gold are used to treat cancerous tumors in mice. The goal of using these nanoguides is to bind to cancer cells by uniting and attaching antibodies or peptide to the surface of the nanoguide. Exposing the tissue affected by a cancerous tumor to radiation using infrared laser rays, which penetrate the flesh without heating it, results in heating the gold sufficiently to cause the death of the cancer cells [23].



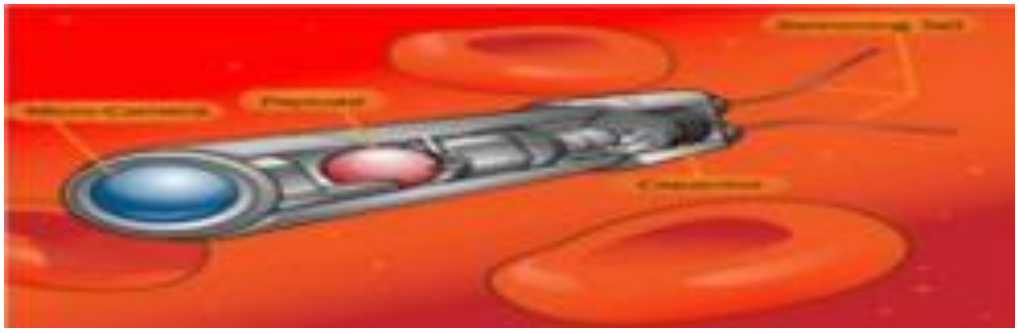
{3_4} The nanostructure

Diabetes: Nanomedicine research has been able to contribute to the treatment of diabetics, and in this field, a researcher at the University of Illinois in the United States has developed a device that can be implanted in the body to compensate diabetics for insulin deficiency. Laboratory experiments proved that diabetic mice that had the device implanted in their bodies were able to live for several weeks without insulin, and without any signs of rejection of the device by the cells. The body, which opens the door to surprises that will change many paths in the lives of millions of patients, and it is certain that these devices will be put on the market sometime [24]. Medicines and drugs: A new term has now been introduced into medical science: nanobutton, which is a new alternative to antibiotics. At Hang Bang University in Seoul, researchers were able to introduce nano-silver into antibiotics, and it is known that silver is capable of 650 mt. A microbial bacterium without harming the human body. This hope will solve many of the problems of bacteria resistant to antibiotics that have caused mutations that transform the effect of the antibiotic on these bacteria, as nanobutton penetrates the cell wall of bacteria or cells infected with the virus, allowing water to enter the cells. So it fills [25].

{2_6} Medicines and agents

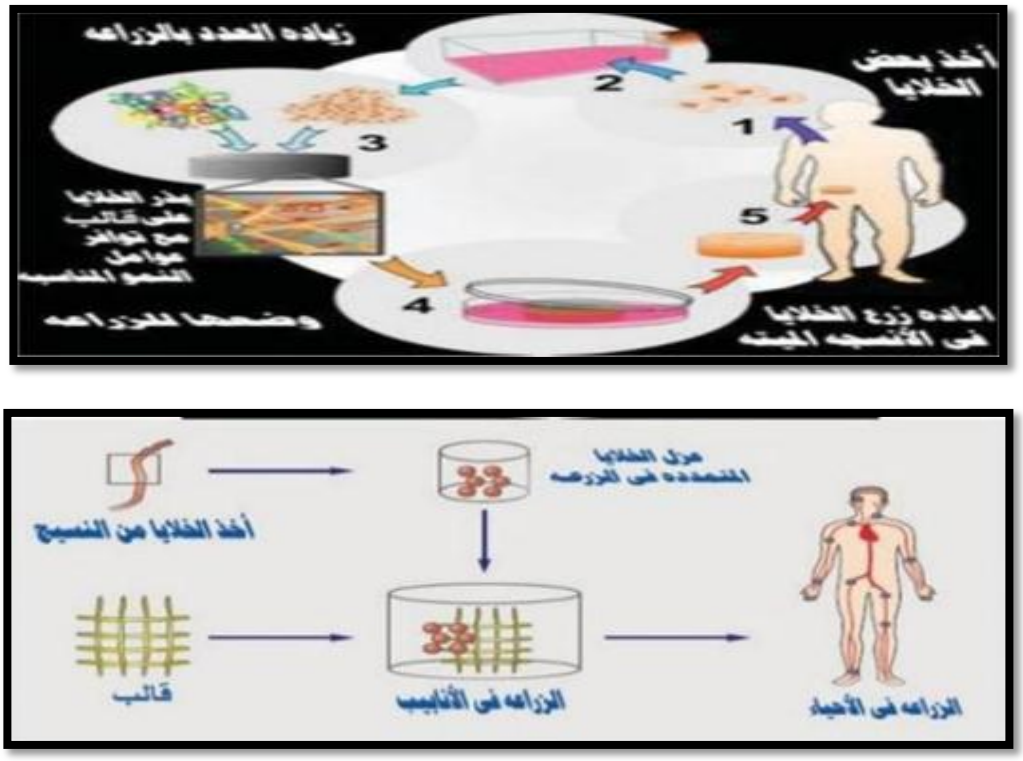
Tools used in nanotechnology in the medical field: A) The dendrimer is a molecule loaded with vitamins that is largely absorbed from, The tip of cancer cells due to their availability and supply of a large number of receptors, With the necessary medications without negative effects. b) Equipment used in imaging cells, bacteria, viruses and molecular units. C) Carbon particles are shaped to produce materials that are 100 times harder than steel, even though their weight is one-sixth the weight of steel and more than copper in terms of conductivity. It can be safely used in some medical applications such as drug delivery systems. D) In the use of nanotubes in medicine, such as...Nanotubes Fullerenese) Painless devices that include micro electrical systems (MEMS) which contain miniature moving parts for surgical operations and pulse regulating devices. And Microfluidics (for DNA testing). Microarrays, which are used to detect millions of For pathogenic bacteria. Medical imaging: Nano imaging enables researchers and doctors to examine any movement occurring in living tissue within the human body. Doctors here are able to identify the movement of the drug within the diseased tissue, although studying some of the body's cells is difficult, and hence they resort to Scientists have to color them, and there is another problem, which is that the cells that emit light waves of different lengths do not always work in the same way or in one way, which makes medical imaging operations face problems in terms of correct diagnosis. Scientists were able to solve this problem by using some Nano particles that show different reactions to different wave frequencies arising naturally from the difference in wavelength [26], as in the following figure:

{2_7}Nano particles



Tissue engineering:

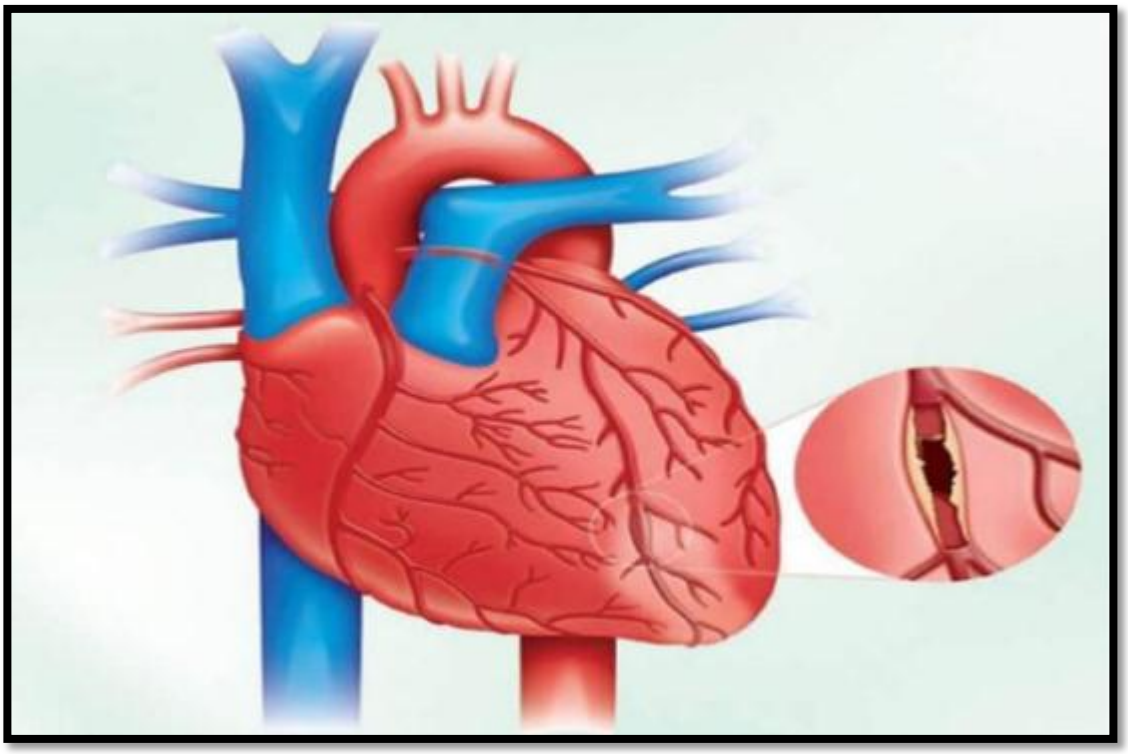
Nanotechnology can help in the process of remanufacturing or repairing damaged tissues, the process of nanoparticles. artificially stimulated cell proliferation, and tissue engineering is exploited by What is an alternative to ants or organs? May that wish become one day and growth factors. And artificial organs. On the other hand, tissue engineering remains subject to the controversial debate surrounding the use of stem cells [29].



{2_8} Tissue engineering

Using nanotechnology as an aid in surgical operations: Corvus Company is responsible for manufacturing visual transformers (a small robot the size of a nanometer) that is used as an assistant to doctors in critical and dangerous surgical operations. The doctor can control the robot using a special device, which helps in the success of the operation with high efficiency and a perfect suit. It is better than traditional methods and is very risk-free. .urge, The surgeon uses a joystick to control the robot arm that holds the devices, The guide and a miniature camera are used to turn big movements into small ones. It provides more surgical evidence [29]. Protein and peptide delivery: Protein and peptide play many vital roles within the human body, as their potential ability to treat many diseases and disorders has been discovered[28]. I knew you were born and In the name of biopharmaceuticals, the delivery process has become simpler Relatively large molecules, Targeting and controlling these drugs using nanomaterials, including particles, is called field [27].anobiopharmaceuticals. Emerging, Nanotechnology is a Diagnosis: The main goal is to detect the disease at the earliest possible stages so that it can be eliminated and even cause symptoms or complications using nanotechnology. Bioassays for measuring the presence or activity of the tested materials become faster and more flexible. Magnetic nanoparticles can be combined with appropriate antibodies and Using them as markers of the presence of specific molecules or microbes, and similarly using gold particles combined with small sections of DNA to identify sequences of genes in a sample. Hanan too Nano-thumb for DNA analysis, Which directly converts the sequence of its units into electrical signals, and by using nano-particles and rays as contrast agents as an alternative to dye, we obtain magnetic and ultrasonic resonance images with better contrast and distribution. Indeed, luminous nanoparticles can help the surgeon during the surgical procedure to identify the location of the tumor and thus make the[.easier]

process of eradicating it easier. Nano-core heart stents: Surgeons resort to using so-called stents for the purpose of opening and widening the arteries of patients with severe constriction in their area due to the continuous accumulation of cholesterol plaques on their inner walls, which prevents the flow of oxygenated blood[30]. These stents are small, cylindrical tubes made of free metals that allow blood to pass through During which they are installed in the affected artery permanently, in addition to the fact that the metal stents prevent the accumulation of fat pads on the inner walls of the arteries, which enables the arteries to build new tissue on the inner surface, despite the presence of many problems, that result from the use of these stents, such as the occurrence of blood contamination or A stroke or bleeding, the most dangerous of which is represented by the immune system's rejection of the metal stent material and its permanent resistance to it, forming a component that accumulates on the inner walls of the artery and thus disrupts the flow of blood inside it. Nanotechnology has made a major contribution to finding practical solutions to overcome these problems by covering the surfaces of the stent tubes with fine nanoplates. Ghee is also a polymer. Carbon nanotubes are used to produce stents that have excellent flexibility and durability, in addition to the body's immune system not being resistant to them [31].



{2_9} Al-Malla

Surgery:It was also used at Rice University (meat welding with the aim of merging two pieces of chicken meat into one). The two pieces of chicken meat were combined by contact by raining a green liquid containing gold-plated nanoscale along the contact line between the two pieces. This was then followed by directing laser beams. Infrared along the contact line as well, which leads to the fusion of both stabs at their contact line together. This solves, Difficulties in blood flow resulting from the surgeon's attempt to re-regulate the arteries that were punctured by the patient during a kidney or heart transplant for him or her. Urge He can weld together the flesh of an artery completely and perfectly [32].

Pharmaceutical nanoparticle systems administered via the eye: It was observed that poly alkyl cyanoacrylate nanoparticles were unable to enter the well-organized elastic epithelium, although they caused some minor damage to the epithelial cells. And in view, To install better elastic epithelial cells,

it is necessary, To envelop The dimensions of the cylinder are within the range of micrometers. It is evident in this case as well, The surface of the nanoparticle has important implications for drug delivery across the elastic epithelium. It was observed in experiments conducted using systems coated with indomethacin, which contains radioactive carbon-14, that the substance penetrates the epithelium via the cellular pathway. Also, the systems coated with chitosan are well absorbed by the eye, and this nano- granule coater was able to attach A cyclospoin permanently to the mucous membrane of the eye without exposure. Internal ocular tissues are at risk by avoiding systemic absorption. These long-lived ants are due to the retention of chitosan nanoparticles in the eye [33]. Pharmaceutical nanoparticle systems administered intranasally: Nasal administration has been shown to be particularly effective for small peptides. It has been shown that the drug is transported through the drug due to better absorption and lower enzymatic activity in the nasal mucosa. Studies have shown that the drug-nano-pellet system is able to cross the nasal epithelium at a speed that is linked to its hydration with the nano-pellet formulation [34].

Conclusion

1. Detection of diseases, as nano-instruments are used as nano-biosensors due to their sensitivity. These instruments are coated with manufactured antibodies so that they only adhere to biological particles, DNA, proteins, or biological particles. others in the body, and do not attach to other molecules. Likewise, in cancer treatment, gold- coated nanospheres are used to destroy cancer cells.
2. In medicines and agents, nanotechnology was used as a new alternative to antibiotics, and the term nanobiotin was given to it. Likewise, in the field of surgical operations, a small nanometer-sized robot was manufactured that is used as an assistant to doctors in critical and dangerous surgical operations. The doctor can control the robot using a special device, which helps in completing the work ! High efficiency and utmost convenience.
3. Nanotechnology provides a new source of drug carriers within the human body, which is readily available, To target different cells in the body, as well as confront the most deadly diseases in humans, such as cancer. As for nano-sensors, they can be implanted in the brain to enable a quadriplegic to move and walk.
4. It was observed that nanoparticles of alkyl poly cyanoacrylate are unable to enter the well-organized elastic epithelium, although they cause some minor damage to the epithelial cells. To install better elastic epithelial cells, it is necessary, And in view, encapsulationIt is within the range of a micrometer. In this case it also appears that there is, The dimensions of N, The surface of the nanoparticle has important implications for drug delivery across the elastic epithelium.
5. The use of gold-plated nano-clips to combine two cuts of meat to solve the difficulties of blood flow resulting from the surgeon’s attempt to re-dilate the arteries that were cut by the patient during a kidney or heart transplant for him or her.
6. By using a nano-coupler, DNA is analyzed by converting the sequence of its units directly into electrical signals, using nano-particles as contrast agents as an alternative. Ultrasound is different from dye, we obtain MRI images with better contrast and distribution.
7. Nanotechnology has provided innovative solutions for water development, where nano-membranes are used for the purpose, Softening water and removing contaminants such as physical, biological and chemical pollutants. It is useful in what is related to treatment, water desalination, and filtration, as a group of nanomaterials is used in water development, such as carbon nanotubes and alumina fibers (aluminum oxide), which in turn perform a comprehensive nanofiltration and filtration process. Using nanotechnology, nanograins were manufactured

containing fertilizers and pesticides to_8 combat agricultural pests of all kinds, after studies showed the effects, The negative effects of pesticides on human health and the environment. It is also possible to manipulate the genes of plants and animals by using nanomaterials as a carrier of these genes instead of, Viruses, with the aim of obtaining greater production and adding qualities that enable us to cultivate, Rice and others throughout the year.

References

1. Taha Kamal Abdullah, Ahmed Ibrahim Al-Badri, "What is nanotechnology," University of Sudan Science and Technology.
2. Opinion on biological therapy, 2003 - Taylor & Francis Applications of nanotechnology are also vast and medical.
3. A scientific paper by Assistant Lecturer Taif Hussein Amin entitled: Nanotechnology and its applications. In the field of medicine. Surendiran A, Sandhiya S, Pradhan SC, Adithan C. Novel applications of nanotechnology in medicine. Indian Journal of .Medical Research. 2009 Dec 1
4. The carbon nanostructure in the Damascus sword dating back to the seventeenth century. In English, a copy archived on October 14, 2016 on the Way Pan Machine.
5. Al-Salihi and Al-Duwayan, Damahm Saleh Al-Salihi and Abdullah Saleh Al-Duwayan, presented in
6. The Nano Wish, published on the occasion of the Nano Research Workshop in Universities, University Cerqueira, Miguel A., António A. Vicente, and Lorenzo M. Pastrana. "Nanotechnology in food packaging: opportunities and challenges." Nanomaterials for food packaging (2018)
7. Al-Mullan Saud, Riyadh, Kingdom of Saudi Arabia, 2009 AD. Serrano, Elena, Guillermo Rus, and Javier Garcia-Martinez. MLA "Nanotechnology for sustainable energy." Renewable and Sustainable Energy Reviews 13.9 (2009)
8. Kunduru, Konda Reddy, et al. "Nanotechnology for water purification: applications of nanotechnology methods in wastewater treatment." Water purification (2017)
9. Usman, Muhammad, et al. "Nanotechnology in agriculture: Current status, challenges and future opportunities." Science of the total environment 721 (2020)
10. David H Geho, Clinton D Jones, Emanuel F Petricoin and Lance A Liotta. Nanoparticles: Potential biomarker harvesters. Current opin-ion in Chemical Biology. 2006
11. D. Khaled Lassem Jadavi, The Use of Nanotechnology in the Development of Arab Industrial Technological Equipment, Arab Organization for Industrial Development and Mining and the Islamic
12. Development Bank, Rabat, Morocco, 2006 AD. Prospects of Science, March 2006. at WWW. Sc
13. Prospects.com Singh, Rajni, MS Smitha, and Surinder P. Singh. "The role Prospects of Science, March 2006. at WWW.
14. nanotechnology in combating multi-drug resistant bacteria." Journal of nanoscience and nanotechnology 14.7 (2014) Ling, Tan Sook, et al. "The potential benefits of
15. nanotechnology in treating Alzheimer's disease." BioMed research international 2021 Bhardwaj, Archana, et al. "Nanotechnology in dentistry:
16. Present and future." Journal of international oral health: JIOH 6.1 (2014)

17. AlKahtani, Rawan N. “The implications and applications of -19”.nanotechnology in dentistry: A review
18. The Saudi dental journal 30.2 (2018)
19. Li, Jinxing, et al. “Micro/nanorobots for biomedicine: -19 Delivery, MLA surgery, sensing, and detoxification.”Science.robotics 2.4 (2017): eaam6431
20. Tamana Nano Gate. MERLIN, J.P.; LI, Xiaogang. Role of nanotechnology and -17 their ISO 690 perspectives in the treatment of kidney diseases. Frontiers in Genetics, 2022, 12
21. Hassan Ezz El-Din Bellal, “Nanoscale and Its Applications,” 2013 AD Abdollahiyan, Parinaz, Fatemeh Oroojalian, and Ahad
22. Mokhtarzadeh. "The triad of nanotechnology, cell signaling, and scaffold implantation for the successful repair of damaged organs: An overview on soft-tissue engineering." Journal of controlled release 332 (2021)
23. Cuenca, Alex G., et al. "Emerging implications of -23 nanotechnologies on cancer diagnostics and therapeutics.” Cancer 107.3 (2006)
24. DiSanto, Rocco Michael, Vinayak Subramanian, and Zhen -24 Gu. "Recent advances in nanotechnology for diabetes treatment." Wiley Interdisciplinary Reviews: Nanomedicine and Nanobiotechnology 7.4 (2015)
25. Thrall, James H. “Nanotechnology and medicine.” Radiology -25 230.2 (2004)
26. Cormode, David P., et al. "Nanotechnology in medical -26 Imaging: probe design and applications." Arteriosclerosis, thrombosis, and vascular biology 29.7 (2009)
27. Yu, Mikyung, et al. "Nanotechnology for protein delivery: Overview and perspectives." Journal of controlled release 240 (2016)
28. Kingsley, J. Danie, et al. “Nanotechnology for tissue engineering: need, techniques and applications." journal of pharmacy research 7.2 (2013)
29. Abaszadeh, Farzad, et al. “Nanotechnology development in Surgical applications: recent trends and developments." European Journal of Medical Research 28.1 (2023)
30. Surendiran, A., et al. "Novel applications of nanotechnology in medicine." Indian Journal of Medical Research 130.6 (2009)
31. Demohamed Sherif Al-Iskandarani, “Nanotechnology for a better tomorrow.”
32. Loizidou, M., and A. M. Seifalian. "Nanotechnology and its -32 applications in surgery." Journal of British Surgery 97.4 (2010)
33. Almeida, Hugo, et al. "Nanoparticles in ocular drug delivery -33 systems for topical administration: promises and challenges." Current pharmaceutical design 21.36 (2015)
34. Ali, Javed, et al. "Potential of nanoparticulate drug delivery systems by intranasal administration." Current pharmaceutical design 16.14 (2010)