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Review on Applications of Dendrimer-Chemical Compounds in Pharmaceutical and Industrial Fields

Nagham Mahmood Aljamali [1*], Safaa Mohammad Jawad Radhi [2], Wijdan Kamal Noor Al-Qraawy [3]

[1*]Professor, Ph.D., Department of Chemistry, Synthetic Organic Chemistry, Iraq.

[2]Assist. Lecturer. Directorate of Education of Najaf Al-Ashraf, Ministry of Education, Iraq.

[3]Department of Biology, College of Education, Kufa University, Iraq

***Corresponding Author:** Nagham Mahmood Aljamali, Professor, Ph.D., Department of Chemistry, Synthetic Organic Chemistry, Iraq.

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Abstract

This review involved Dendrimer in pharmaceutical applications. Dendrimers are the most important medical nano-polymers in the fields of chemistry and pharmacology, which have been used in many pharmaceutical applications. Many technical applications of many biological elements such as proteins, viruses, or bacteria, including applications of chromatography, optical information technology, sensors, stimulation and drug delivery, require immobilization or immobilization of these biologicals. Here, carbon nanotubes, gold particles and synthetic polymers can be used for such purposes. Here we note that this immobilization process can be achieved mostly through adsorption or chemical bonding or to a lesser extent by incorporating these elements as guests in the host matrices. We also note that in the case of guest and host systems, an optimal method for immobilizing the bio-elements as well as incorporating them into a serial structure based on the nanoscale must be established to facilitate the interactions of the bio-nano-elements within their own environment. This is due to the large number of synthetic or natural polymers available and the advanced and developed methods for processing such systems for nanofibers, rods or tubes etc., this makes the polymers a good base for immobilizing different biomaterials.

Keywords: dendrimer polymer; nano applications; nano medical; nano polymer; drug carrier

Introduction

Nanotubes are used to deliver drugs in therapy in general and in the treatment of cancerous tumors in particular. Their role is to protect drugs from destruction in the bloodstream, to regulate delivery by very specific release kinetics, and, ideally, to provide targeting properties of a vector or a release mechanism by an exogenous or endogenous stimulus. Nanocarriers are rod or tubular in shape rather than spherical in shape, and may offer additional advantages in light of drug delivery systems. These drug carrier particles have the additional choice of axial ratio, curvature, and 'invasive' hydromatic alternation, and can be chemically modified on the inner, outer surface and at the terminal ends selectively [1,2]. Nanotubes equipped with a responsive polymer attached to the open tube allow the tuning of access and release from the tube. In addition, the nanotubes can be equipped to gradually appear in their chemical compounds along the tube. Autonomous small drug release systems have been equipped based on the use of nanotubes or nanofibers. The nanotubes and nanofibers containing fluoro albumin with dog-fluorescein isothiocyanate group were prepared as a treatment model, as well as superparamagnetic nanoparticles composed of iron oxide or nickel ferrite. We note here, A, E that the presence of iron nanoparticles is allowed, and first, as the process of guiding the nanotubes to specific locations in the body by external magnetic fields. Ultraparamagnetic particles are known to exhibit strong interactions with external magnetic fields leading to massive saturation magnetism. In addition, by using periodically varied magnetic fields, the nanoparticles are heated to provide the trigger for drug release [3,4]. The existence of the drug model was established by fluorescent spectroscopy and it is also used in the analysis of the model drug released by nanotubes. There has been a broad interest in the manufacture of nanoelectronic devices that aim to detect concentrations of biomolecules in real time for use in medical diagnostics, which falls under the category of nanomedicine. A parallel line of research also aims to manufacture individual cell-interacting nanoelectronic devices for basic biological research [5,6]. These devices are called nanosensors. Such miniaturization and nanoelectronics scrutiny towards protein sensing in vivo has the potential to enable new inputs into health control, monitoring and defense technology [7,8].

Dendrimers:

Dendrimers are unique super-crosslinked synthetic polymers with monodisperse size, well-defined structure, and high-performance terminal surface. It is usually made up of synthetic or natural amino acids, nucleic acids and carbohydrates. The treatments can be loaded relatively easily onto the inner parts of dendrites or the end surface of branches via electrostatic interaction, hydrophobic interactions, hydrogen bonds, chemical bonds, or covalent coupling. Cross-drug conjugation can extend the half-life of drugs. Currently, the use of the manifold in biological systems is limited due to the toxicity of the dendritic and limitations in the methods of its synthesis [9,10]. Wrinkles are also confined to a narrow size range (<15 nm) .

Applications of Dendrimer Polymers:

The axial shell fibers of nanoparticles with fluid axons and solid shells can be used to trap biological elements such as proteins, viruses or bacteria in conditions that do not affect their functioning. This effect can be used among a host of other biosensor applications. For example, Green Fluorescent Protein is immobilized in nanostructured fibers with large surface areas and short analyte distance to approach the sensor protein. As for the use of such fibers for sensor applications, the fluorescence of the axon-cortex fibers has been found to degrade rapidly because the fibers are dipped or immersed in a urea-containing solution: the urea permeates through the wall into the axon where it denatures the green fluorescent crystals (GFP).). Here, this simple experiment reveals that cortical axonal fibers are promising components for preparing biosensors based on their biological components. Polymer nanofibers, coaxial-shell fibres, nanorods and nanotubes provide a platform for a wide range of applications both in the material sciences as well as in the life sciences [11,12]. The biological elements of various synthetic and synthetic elements, bearing special functions, can also be incorporated into these polymer nano-systems while maintaining their specific functions untouched as well. Biosensors, tissue engineering, drug delivery, and enzymatic catalysis are just a few of its many applications. Here, integrating both viruses and bacteria all the way to an organism should pose no problem at all, and the applications of these hybrid systems should be impressive and impressive. Polymers are found in our bodies, in our food and clothing, and in the products we use, and without them, our lives would not be as we know them. Branched polymers (dendrimers) are very important in pharmaceutical processes. Our bodies are made up of important polymers, such as albumins (proteins), sugars and others. But the most important polymer to us, without a doubt, that is in our bodies, is DHA. that. A (DNA) is made of four different monomers called nucleic acids [13-15]. The four acids make up the codes that are translated into the synovium, which is responsible for triggering the various processes in the body. The polymers found naturally in our bodies, or in nature in general, are called "natural polymers". There is another large group of synthetic polymers called "synthetic polymers". This group includes many types of polymers, from which nylon bags, plastic products of all kinds, rubber, kalkar, glues, dyes, paints, coatings and other products are prepared. The qualities of these products are determined by the use of polymers of different types and lengths. Polyethylene is an outstanding example of a synthetic polymer that has changed a lot in our world. This polymer consists of repeating units of an ethylene molecule [16,17]. This polymer has become one of the central polymers in our lives thanks to its cheap cost, light weight and ability to control its properties by changing the length of its chains. Many products can be prepared from this polymer such as nylon bags, tubes, plastic toys and bone saplings [18,19].

Applications of Dendrimer Polymers in Medicine:

Protein and peptides have many vital roles within the human body, and their potential to treat many diseases and disorders has been discovered. These relatively large macromolecules are known as biopharmaceuticals. The targeted and/or controlled delivery of these drugs using nanomaterials, including nanoparticles, has become an emerging field called nano biopharmaceutics, and then these products have been called nano biopharmaceuticals. Nanomaterials behave differently from other particles of similar size. Hence, it is necessary to develop specialized approaches to test and control their effects on human health and the environment. The Organization for Economic Co-operation and Development (OECD Chemicals Committee) established the Working Party on Manufactured Nanomaterials with the aim of addressing this issue and studying the practices of OECD member countries, bearing in mind the safety of Nanomaterials. While nanotechnologies are expected to result in many developments and updates in the various fields of health and healthcare, which often include drug delivery methods, new treatments for cancers, and early disease detection methods, they may also have undesirable effects. The increased rate of uptake is the main concern associated with synthetic nanoparticles [20,21]. The ratio of the surface area of the material to the volume ratio increases if it is converted into nanomaterials. A larger surface area (surface area per unit weight) increases the rate of absorption through the skin, lungs, or gastrointestinal tract, which can lead to undesirable effects on the lungs as well as other organs. However, the molecules must be absorbed in sufficient quantities to cause health risks. With the increasing use of nanomaterials worldwide, concerns have also been raised about safety issues for both operator and user. To address these concerns, the Swedish Karolinska Institute conducted a study in which the human lung epithelial cells were exposed to several nanomaterials. The results, published in 2008, showed that iron oxide nanoparticles did little to no damage to the nuclear nucleus but were not toxic. The zinc oxide nanoparticles were slightly worse. While titanium dioxide caused damage to DNA only. However, carbon nanotubes have caused damage at lower levels. As for copper oxide, it was found to be the worst harmful, in addition to that it was the only nano-material known by researchers to have clear health risks [21-25].

Dendrimer Industrial Polymers in Medical Applications:

Synthetic polymers are man-made polymers. From the point of view of utility can be classified into four main categories: thermoplastics, thermoplastic elastomers, elastomers and synthetic fibres. They are commonly found in a variety of consumer products such as money, glue, etc. A wide range of synthetic polymers are available with main chain as well as sub chain variations. The basis for common industrial polymers such as polyethylene is composed of carbon-carbon bonds, while heterogeneous polymers such as plastics and polyesters are composed of other elements such as oxygen and nitrogen that are introduced to the base for installation. Silicon also makes similar materials without the need for carbon atoms, such as silicon and siloxane connections; Accordingly, these compounds are considered inorganic. Coordination polymers may contain some metals in their basic structure with non-covalent bonds. Some well-known household synthetic polymers include: nylons in textiles and fabrics, Teflon in non-stick pans, Bakelite for switches, PVC in pipes, etc. Generic PET bottles are made from the synthetic polymer, Polyethylene Terephthalate. The kits are mostly made of plastic and the covers are made of synthetic polymers such as polythene and the tires are made from Bona rubber [25,26]. However, due to the environmental issues caused by these mostly non-biodegradable synthetic polymers, often synthesized from petroleum, alternatives such as bioplastics are being considered. But it is expensive when compared to synthetic polymers

Polymer nanoparticles are synthetic polymers with a size of 10 to 100 nanometers. Common synthetic polymeric nanoparticles include polyacrylamide, poly acrylate, and chitosan. Drug molecules can be incorporated either during or after polymerization [27-30]. Depending on the chemistry of the polymerization, the drug can be covalently bonded, encapsulated in a hydrophobic core, or electrically conjugated [31-34]. Common synthetic strategies for polymeric nanoparticles include microfluidic approaches [35,36]. electrophoresis, high pressure homogenization, and emulsion-based interfacial polymerization. The biodegradability of the polymer is an important [36,37]. aspect to consider when selecting the appropriate nanoparticle chemistry [38,39]. Nano-carriers composed of biodegradable polymers undergo hydrolysis in the body, resulting in small, biocompatible molecules such as lactic acid and glycolic acid. Polymeric nanoparticles can be created by self-assembly or other methods [40]. such as Repetition of Particles [41,42]. in Un hydrated Templates (PRINT) which allow the composition, size and shape of nanoparticles [43-45]. to be customized using small templates., Figures (1-11).

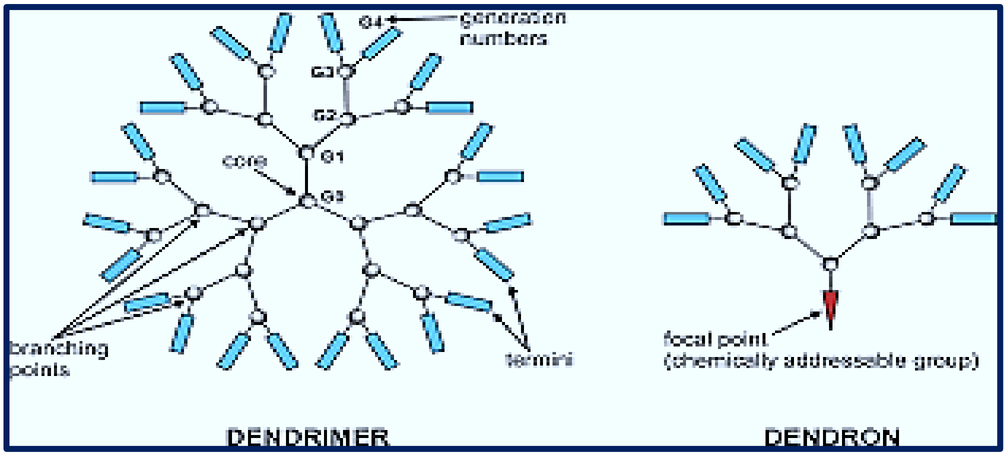

Figure 1: *Dendrimer Polymers*

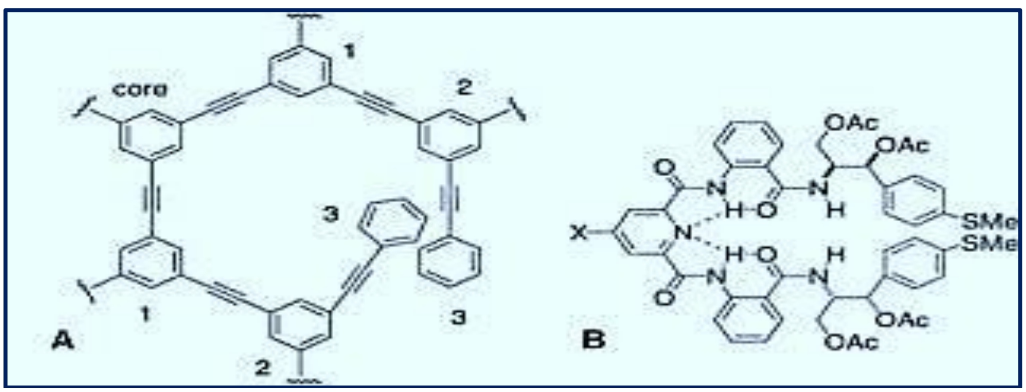

Figure 2: *Structure of Type from Dendrimer Polymer*

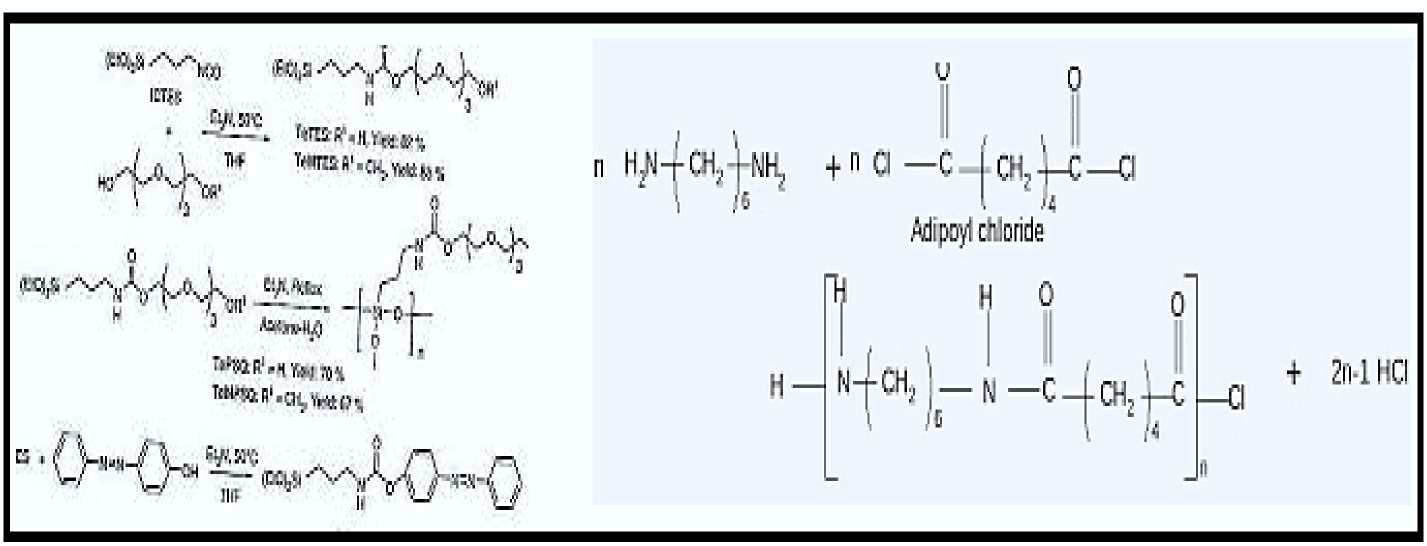

Figure 3: *Type of Ester-Polymer Compounds*

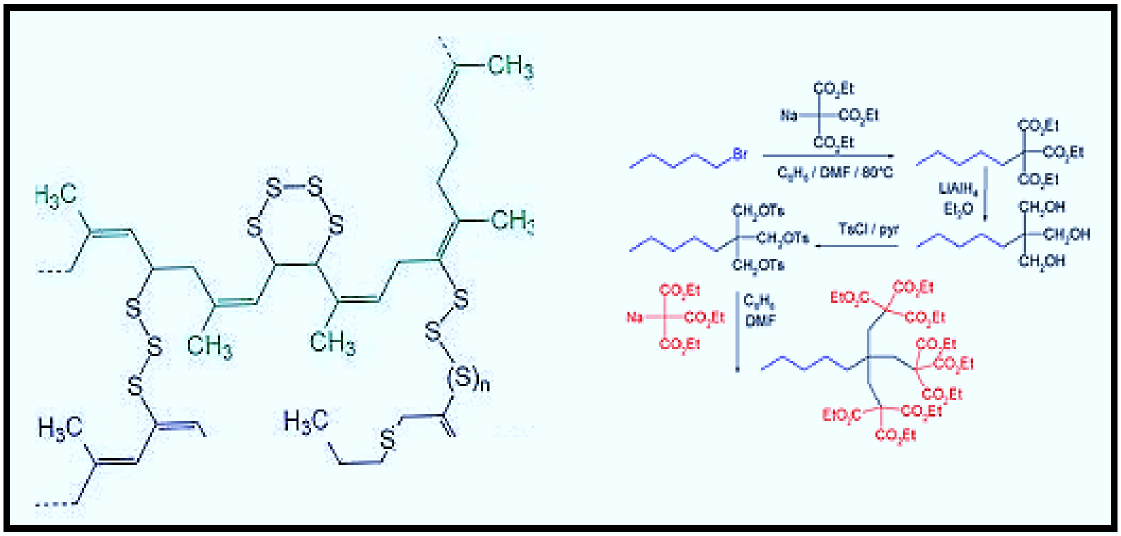

Figure 4: *Structure of Type from Sulfur-Dendrimer Compounds*

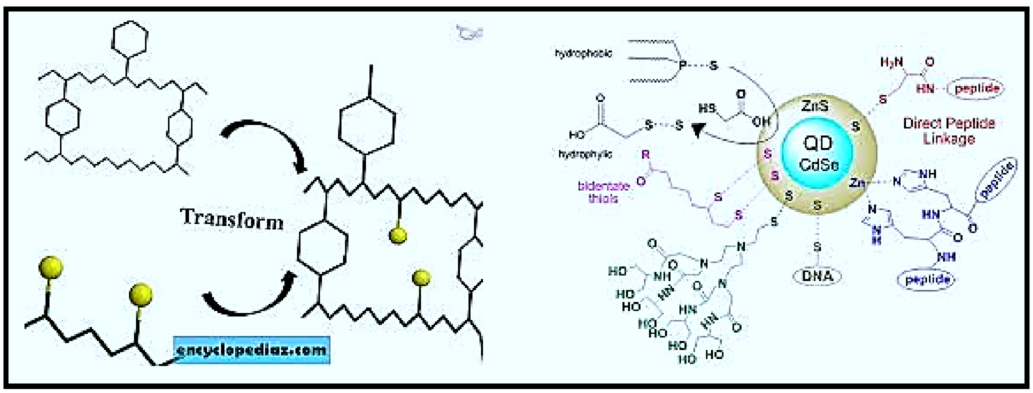

Figure 5: *Type of Bio-Dendrimer Compounds*

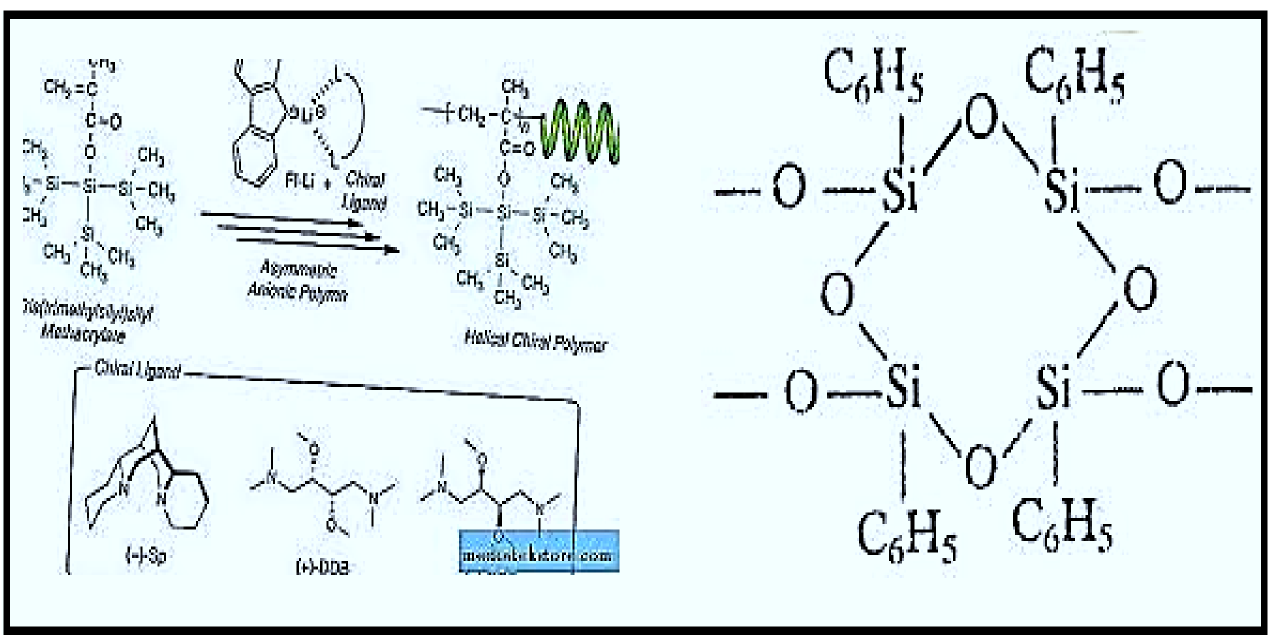

Figure 6: *Type of Metallic-Polymer Compounds*

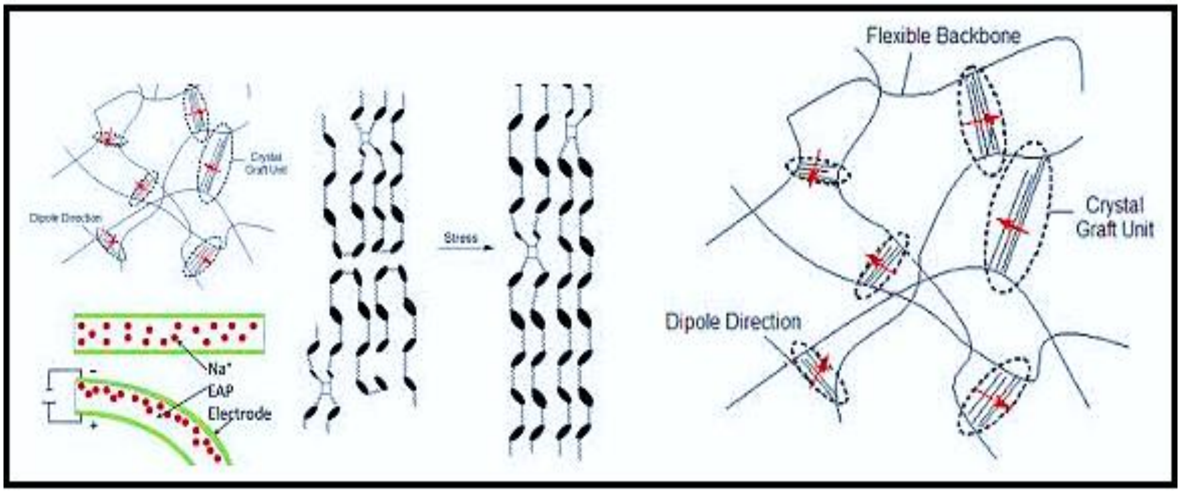

Figure7: *Type of Industrial-Polymer Compounds*

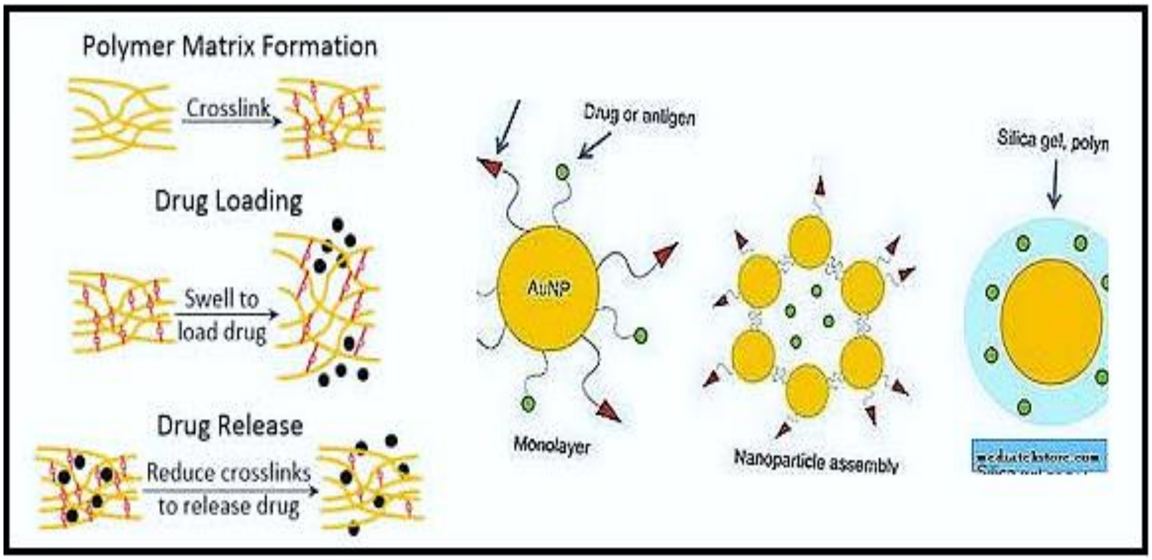

Figure 8: *Type of Medical-Polymer Compounds*

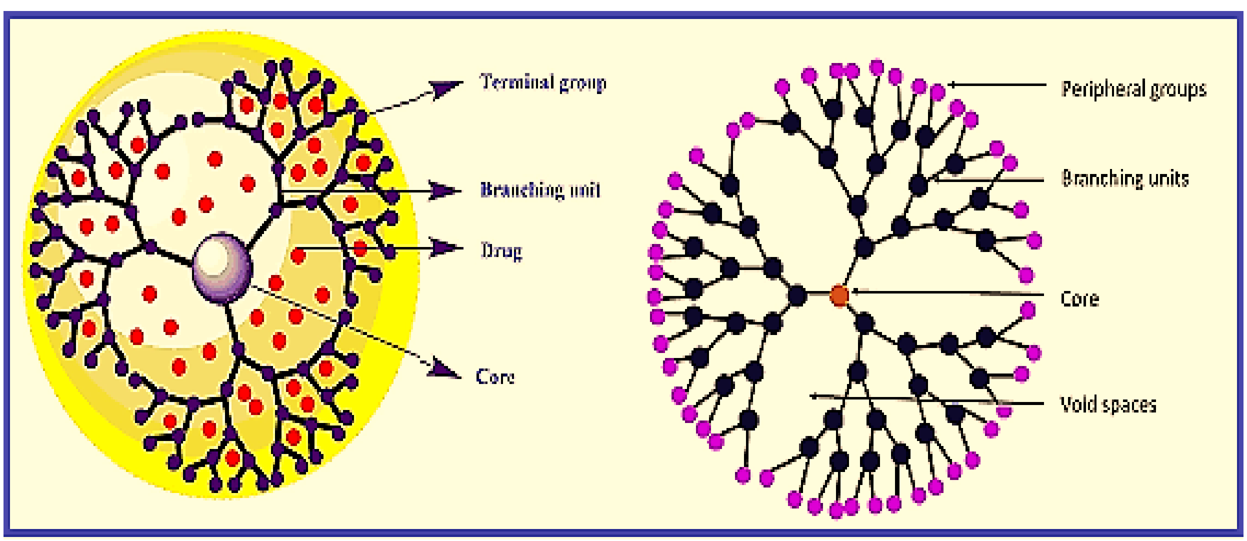

Figure 9: *Dendrimer as a delivery of drug*

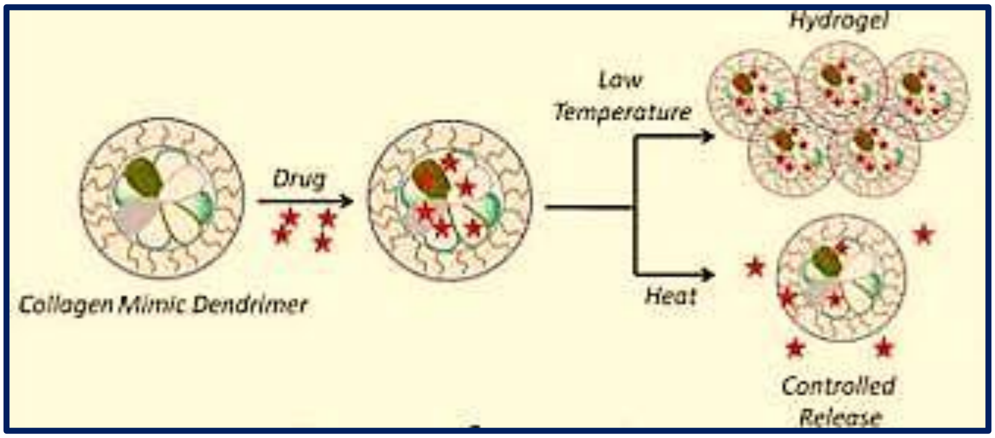

Figure 10: *Dendrimer as a carrier*

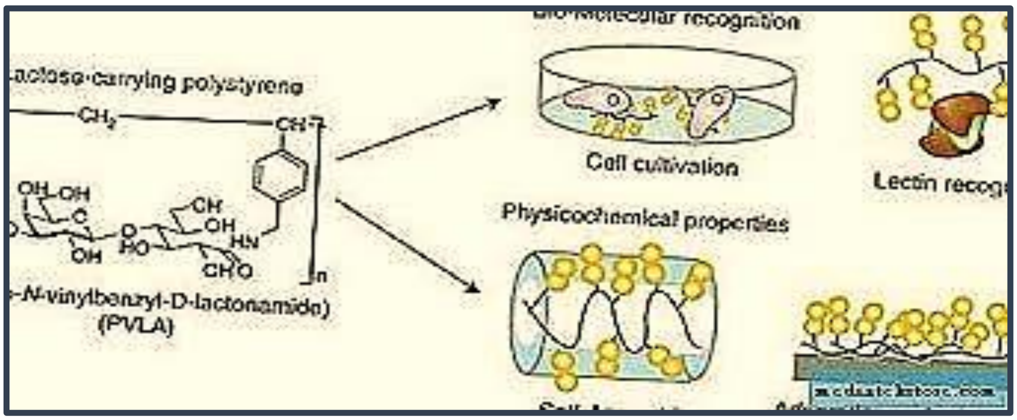

Figure 11: *Dendrimer as a controlling on bio-processes*

Conclusion

Polymers are so popular today that we can find them everywhere, from toys to medicines. Polymers are being studied on a very large scale in academic institutions around the world, in the fields of chemistry, physics and biology. However, the increasing demand for new products led to an increase in the production of polymers from year to year, and this, in turn, led to an exacerbation of environmental pollution. Where nanopolymers are very important, but at the same time they contain some environmental hazards to organisms that live on land, in seas, in oceans and rivers result from the accumulation of products made of polymers, the use of which greatly contributes to our quality of life. Therefore, we have to think about our future and the future of the wonderful nature around us, and do the recycling of polymer production, in order to continue to benefit from the many advantages that polymers provide us.

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