Molecular Enzymology and Drug Targets

Extended Abstract
Vol. 5, Iss. 1
2019

Euro Biopharma 2018 : Recent applications of nanotechnology in advanced drug delivery systems - Hussein Osman Ammar - Future University in Egypt

Hussein Osman Ammar

Future University in Egypt, Egypt

Malignant growth is one of the main sources of death around the world, possessing the runner up in creating nations, and demonstrating a developing frequency after some time . Current malignancy treatment procedures are situated in medical procedure, radiotherapy and chemotherapy, being the chemotherapy the one that shows the more noteworthy productivity for disease treatment, chiefly in further developed stages. Regardless of this extraordinary reaction, anticancer specialists are administrated at higher sums so as to give a last appropriate fixation to the objective tissues or organs, and this methodology is rehashed in each pattern of chemotherapy . Acquaintance of new specialists with disease treatment has extraordinarily improved patient endurance yet there are a few natural hindrances that offend medicate conveyance to target cells and tissues, in particular troublesome blood half-life and physiologic conduct with high askew impacts and successful freedom from the human living being . Additionally, in malignancy, there is a little subset of disease cells-disease undifferentiated organisms (CSC)- that, similar to typical undeveloped cells, can self-recharge, offer ascent to heterogeneous populaces of girl cells, and multiply broadly . Standard chemotherapy is coordinated against quickly separating cells, the majority of non-undifferentiated organisms of a tumor, and in this manner CSC frequently show up moderately unmanageable to those operators . The improvement of symptoms in ordinary tissues and multidrug opposition (MDR) instruments by malignant growth cells prompts a decrease in tranquilize fixation at target area, a poor aggregation in the tumor with resulting decrease of viability that may partner to tolerant backslide. To beat these issues and still improve the proficiency of chemotherapeutic specialists there is an interest for not so much poisonous but rather more objective explicit treatments towards disease cells, for example novel medications, sedate conveyance frameworks (DDSs) and furthermore quality conveyance frameworks .

Nanoparticles have been developed as effective target specific strategies for cancer treatment, acting as nanocarriers and also as active agents. Over the last decades, different types of nanoparticles have been developed based on various components, including carbon, silica oxides, metal oxides, nanocrystals, lipids, polymers, dendrimers, and quantum dots, together with increasing variety of newly developed materials. Metallic nanostructures are more flexible particles compared to other nanomaterials owed to the possibility of controlling the size, shape, structure, composition, assembly, encapsulation and tunable optical properties. Between the metallic nanostructures possible applied, AuNPs appears of great interest in the medical field, 3showing great efficiency towards cancer therapy . The continuous interest in AuNPs is based in their tunable optical properties that can be controlled and modulated for the treatment and diagnosis of diseases. The synthesis of nanoparticles follows some aspects relying in a high homogeneity of the materials in physical properties that greatly influence the size, shape and surface characteristics. The main process for nanoparticles development requires chemical administration of capping agents that adsorb in the surface of nanoparticles. AuNPs can be synthesized with different sizes through the reduction of gold with different agents such molecules bearing a thiol group, an aliphatic chain and a charged end group, and that can avoid particle aggregation. AuNPs deliver systems can be formulated based in their capacity to bearing different functional groups, once it can be involved in covalent and non-covalent bindings by a thiol-linker. In fact, robust AuNPs appear by the stabilization with thiolates once the bond between Au and the thiol (S) is very strong. This process enhances the affinity of the AuNPs surface for several types of ligands such as polyethylene glycol (PEG) molecules, nucleic acids (DNA and RNA), peptides, antibodies, and also small drug molecules. AuNPs have been review in radiotherapy experiments in order to overcome the problems associated to the healthy tissue damage imposed by radiotherapy. A long term study using AuNPs and irradiation in mices bearing implanted tumors in order to eliminate the possibility of tumor regression, results in a reduction of the tumor size until not be detected and 86% long term cure, i.e. for more than a year, which was much higher than the 20% survival for the implementation of just radiotherapy. Gene therapy is though as a hopeful strategy in cancer therapy being considered as a powerful treatment like chemotherapy and radiotherapy, however the implementation of such systems is based in viral vectors that raise cytotoxic and immune response problems When conjugated to AuNPs, siRNAs have been shown to exhibit increased stability, cellular uptake and efficacy in physiological conditions, retaining the ability to act through the RNAi pathway The first demonstration that DNA-AuNP conjugates could be easily internalized into cells, without the need for transfection agents, and induced gene silencing by an antisense mechanism was reported by Rosi and co-workers in 2006. AuNPs as gene-delivery vectors emerged initially with cationic ligands that appears a good gene delivery system once protects the DNA molecule from degradation by DNAse I.

In any case, current therapeutics (medications and particles) show genuine cell poisonousness that isn't just aimed at the malignant growth cells however rather advance askew cell confusion and cell demise, normally revealed promotion unwanted symptoms and fundamental harmfulness. Nanomedicine has been advancing a few helpful ideas that upset the manner in which we have been managing disease treatment, for example nanoparticles as medication conveyance operators, limiting reactions and harmfulness of the medications. Besides, these nanoparticle stages take into consideration specific focusing of malignant growth cells or tumor vessels either by fusing novel or standard anticancer medications as well as the conveyance of remedial hereditary modulators

Biography:

Hussein Osman Ammar is a senior research fellow in the Department of Pharmacology, Future University, Egypt. He got his PhD and he is currently working as a senior research fellow. He has many years of experience in experimental laboratory research and have published in journal papers and presented at international conferences.

drhusseinammar@hotmail.com

This work is partly presented at 6th European Biopharma Congress September 18-19, 2018 Amsterdam, Netherlands