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Editorial Open Access

A Chemotherapeutic and Biospectroscopic Investigation of the Interaction of Double–Standard DNA/RNA–Binding Molecules with Cadmium Oxide (CdO) and Rhodium (III) Oxide (Rh_2O_3) Nanoparticles as Anti–Cancer Drugs for Cancer Cells' Treatment

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Editorial

Chemotherapists have been fascinated for a long time with phenomenon of anti–cancer drugs. This editorial generally associated with anti-cancer compounds, now extends equally well to medicinal and pharmaceutical chemistry [1–19]. Despite this continuing very frequent use in the scientific literature, anti–cancer drugs like many other and useful and popular chemical concepts is non–reductive and lacks an unambiguous basis. It has no precise quantitative definition and is not directly measureable experimentally. In other words, anti–cancer compounds are a virtual quantity, rather than a physical observable. Hence, the chemistry of anti–cancer drugs has been attractive to chemotherapists. In addition, the interest to the chemistry of nanoparticles is due to the fact that nanoparticles are important synthetic materials in the preparation of anti–cancer compounds.

On the other hand, anti–cancer drugs can confer unusual and sometimes valuable, chemical, biological, biochemical, medical, clinical, agrochemical and pharmaceutical properties upon a molecular system and these effects have been exploited by the life science industries for the development of many chemical, biological, biochemical, medical, clinical, agrochemical and pharmaceutical compounds. Specially, in recent years, the use of nanoparticles has attracted much attention in chemotherapy due to economic and environmental considerations. DNA/RNA–nanoparticles molecules vocalize a large section of all anti–cancer drugs, emphasizing their superior medicinal and pharmaceutical magnitude. Meanwhile, the centralized investigation of anti–cancer drugs with respect to their binding specifications paved the way towards a systematic complexity of more strong drugs with the conclusive target of achieving high progression–selectivity. In this regard, the development of new efficient synthetic methods leading to anti–cancer compounds continuous to receive special attention in anti–cancer drugs synthesis because of their chemical, biological, biochemical, medical, clinical, agrochemical and pharmaceutical properties and activities.

This editorial has been presented a novel approach to some nanoparticles such as Cadmium Oxide (CdO) and Rhodium (III) Oxide (Rh_2O_3), which interacting with DNA/RNA surface. In view of the fact that also most anti–tumor drugs are DNA/RNA binder, potential medicinal or pharmaceutical or diagnostic applications will be discussed. The development of simple, efficient and environmentally begin chemical processes or methodologies for widely used anti–cancer drugs from readily available reagents is one the major challenges for chemotherapists in anti–cancer compounds synthesis. It should be noted that there has been enormous interest to develop highly efficient transformations for the preparation of anti–cancer drugs, as well as medicinal, agrochemical and pharmaceutical materials, with potential application in the medicinal, pharmaceutical and agrochemical industries from the commercially available compounds. There is also a need for chemotherapists to find new, efficient and strategically important processes, which are environmentally, begin and lead to the grater structural variation in a short period of time with high yields and simple work up procedure. For these reasons, over the last few years tremendous advances have been made to chemical process to achieve the ultimate goal of hazard–free, waste–free and energy–efficient anti–cancer drugs synthesize. However, the developments of improved anti–cancer compounds are an area of great current interest owing to their almost ubiquitous nature in both academic and industrial laboratories. The design of anti–cancer drugs, able to organize them in a predicted manner to form tubular structures, is also an area of great active interest.

Furthermore, we have recently discovered that Cadmium Oxide (CdO) and Rhodium (III) Oxide (Rh_2O_3) nanoparticles bind tightly to double–standard DNA/RNA molecules, irrespective of their number of base–pairs. For this aim and scope, we have synthesized Cadmium Oxide (CdO) and Rhodium (III) Oxide (Rh_2O_3) nanoparticles as mentioned before. The binding constants between DNA/RNA and the Cadmium Oxide (CdO) and Rhodium (III) Oxide (Rh_2O_3) nanoparticles were in the same range. That means the length of the spacer have not a great influence on the binding site. In this editorial, we have also changed the spacer to the nucleic acids derivatives, which bind probably in the major groove of DNA/RNA. The new anti–cancer drugs were characterized with Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy (ATR–FTIR), FT–Raman, UV-Vis, HR Mass, ^{1}HNMR, ^{13}CNMR and ^{31}PNMR spectroscopies. Also, after the synthesis of Cadmium Oxide (CdO) and Rhodium (III) Oxide (Rh_2O_3) nanoparticles, we have found that in these types of nanoparticles, the binding constant between DNA was greater than RNA.

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