

Study of Synthesis, Pharmacokinetics, Pharmacodynamics, Dosing, Stability, Safety and Efficacy of Olympiadane Nanomolecules as Agent for Cancer Enzymotherapy, Immunotherapy, Chemotherapy, Radiotherapy, Hormone Therapy and Targeted Therapy Under Synchrotron Radiation

Alireza Heidari*

Faculty of Chemistry, California South University, 14731 Comet St. Irvine, CA 92604, USA

*Corresponding author: Heidari A, Faculty of Chemistry, California South University, 14731 Comet St. Irvine, CA 92604, USA, Tel: 1-775-410-4974; E-mail: Scholar.Researcher.Scientist@gmail.com

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Editorial

Olympiadane nanomolecules are a mechanically-interlocked molecule composed of five interlocking macrocycles that resembles the olympic rings. The nanomolecule is a linear pentacatenane or a catenane [1,2]. It was synthesized and named by Fraser Stoddart and co-workers in 1994 [1,2]. The molecule was designed without any practical use in mind, although other catenanes may have possible application to the construction of a molecular **computer** in Nano scale (Figures 1 and 2) [1,2]. Furthermore, Olympiadane nanomolecules are an important class of ring fused heterocyclic Nano compounds exhibit a wide spectrum of biological, medical, medicinal, pharmaceutical, chemical and clinical activities as agent for cancer enzymotherapy, immunotherapy, chemotherapy, radiotherapy, hormone therapy and targeted therapy under synchrotron radiation [3–34]. Therefore, development of new and efficient synthetic method for the preparation of these Nano compounds is of importance in both synthetic organic chemistry and also medicinal and pharmaceutical chemistry. The classical synthesis, pharmacokinetics, pharmacodynamics, dosing, stability, safety and efficacy of Olympiadane nanomolecules mainly involve the use of acylchloride and 2-pyridylalkylamine, followed by subsequent functionalization to anchor various electrophilic reagents. Other approaches include the use of imine derivatives, 2-cyanopyridine, and recently, benzotriazoles. During the course of our studies towards the development of new routes to the synthesis, pharmacokinetics, pharmacodynamics, dosing, stability, safety and efficacy of fused Nitrogen heterocyclic Nano compounds, we wish to introduce a valid and an efficient procedure for the synthesis, pharmacokinetics, pharmacodynamics, dosing, stability, safety and efficacy of Olympiadane nanomolecules via one-pot condensation of pyridyl ketone with aldehyde and NH_4OAc in the presence of Lithium Chloride as an inexpensive neutral Lewis acid using microwave irradiation.

Alireza Heidari first examined one-pot reaction of benzaldehyde and amine and Trimethylsilyl Cyanide (TMSCN) in the absence of Lithium Trifluoromethanesulfonate (LiOTf). The reaction was very sluggish so that the corresponding α -amino nitrile was obtained in the low conversion (45%) even after 72 h. On the other hand, in the presence of a catalytic amount of Lithium Trifluoromethanesulfonate (LiOTf) (10–15 mol%) various types of aromatic and aliphatic aldehydes can effectively be converted into α -amino nitriles following the one-pot procedure under neutral conditions. However, we found that the Strecker amino acid synthesis with aliphatic amines under above conditions was failed. Interestingly, in presence of $\text{MS } 4 \text{ \AA}$ as drying agent this reaction was very fast and the corresponding α -

amino nitrile was obtained in high yield. It is important to mention that aliphatic aldehydes were also converted to their corresponding α -amino nitriles in excellent yields without any formation of aldolic product. Interestingly, we found that the catalyst can also be recovered and reused for at least five times for the Strecker amino acid synthesis without significant loss of catalytic activity.

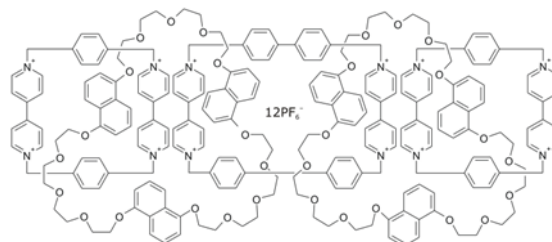


Figure 1: Molecular structure of Olympiadane nanomolecules as agent for cancer enzymotherapy, immunotherapy, chemotherapy, radiotherapy, hormone therapy and targeted therapy [1,2].

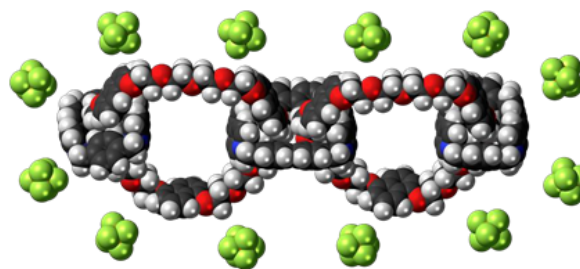


Figure 2: Molecular schematics of Olympiadane nanomolecules as agent for cancer enzymotherapy, immunotherapy, chemotherapy, radiotherapy, hormone therapy and targeted therapy [1,2].

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