Heighten Science PUBLICATIONS Corporation

ISSN
2576-3768

Research Article

Combinatorial Therapeutic Approaches to DNA/RNA and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine Nanocapsules with Surface Conjugated DNA/RNA to Targeted Nano Drugs for Enhanced Anti-Cancer Efficacy and Targeted Cancer Therapy Using Nano Drugs Delivery Systems

Alireza Heidari* and Christopher Brown

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

***Address for Correspondence:** Alireza Heidari, Faculty of Chemistry, California South University, 14731 Comet St. Irvine, CA 92604, USA, Email: Scholar.Researcher.Scientist@gmail.com; Alireza.Heidari@calsu.us

Submitted: 06 October 2017
Approved: 14 October 2017
Published: 17 October 2017

Copyright: © 2017 Heidari A, et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

In the current study, combinatorial therapeutic approaches to DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems were investigated.

Introduction

The birth of stereoselectivity probably dates back to 1890, when Emil Fischer recognized that the reaction of L-Arabinose ($C_5H_{10}O_5$) with Hydrogen Cyanide (HCN) provided bout 66% of one of the two possible diastereomers, namely, L-Mannonoitrile [1-20]. In this way, asymmetric induction was discovered, and thus one of the corner stone of diastereoselective synthesis laid down. The stereochemistry of elimination reactions of secondary and tertiary alcohols are meaningful with respect to both regioselectivity and/or stereoselectivity (anti vs. syn) only when it is obtained under the conditions where primary products are produced with minimum secondary isomerization [21-40].

We believe that we have found just the right system which can shed more light on the mechanism for the dehydration and/or substitution reactions over heterogeneous catalyst Cadmium Oxide (CdO), homogenous Triphenylphosphine

How to cite this article: Heidari A, Brown C. Combinatorial Therapeutic Approaches to DNA/RNA and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine Nanocapsules with Surface Conjugated DNA/RNA to Targeted Nano Drugs for Enhanced Anti-Cancer Efficacy and Targeted Cancer Therapy Using Nano Drugs Delivery Systems. Ann Adv Chem. 2017; 1: 061-069. https://doi.org/10.29328/journal.aac.1001008

(Phosphorustriphenyl) in DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules (Figure 1) with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems [41-91]. Additionally, we have investigated the effect of temperature, pressure, Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2) on the structure, reactivity and selectivity of Cadmium Oxide (CdO). Quantum Chemical Calculations (QCC) are utilized to simulate the structure, spectra and transition state of Cadmium Oxide (CdO) with adsorbed homogenous Triphenylphosphine (Phosphorustriphenyl) on DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems.

Materials, Research Method and Experimental Techniques

Cadmium Oxide (CdO) is efficient catalysts for esterification reaction. Its success is based on the possibility to prepare it with strong Brønsted acidity and good resistance to high reaction temperatures. Moreover, Cadmium Oxide (CdO) has applications in different area of chemical industry such as cosmetics, artificial perfumes, flavours, pharmaceuticals, plasticizers, solvents, leather, painting and as the dehydrating agents.

A series of catalysts with varying Phosphoric acid (H_3PO_4) contents were prepared by impregnating calculated amounts of H_3PO_4 dissolved in Deionized water (DI water, DIW or de-ionized water) on Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2) supports. All the catalysts were characterized by Energy Dispersive X-Ray Analysis (EDXA), Energy Dispersive X-Ray Microanalysis (EDXMA),

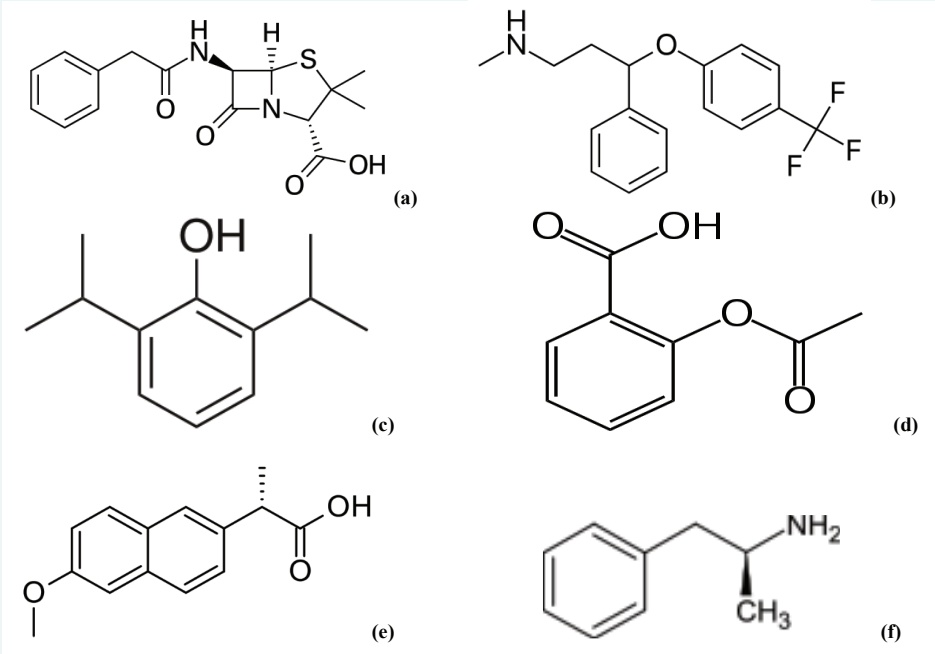

Figure 1: Molecular structure of (a) Benzylpenicillin (Penicillin G), (b) Fluoxetine Hydrochloride (Prozac and Sarafem), (c) Propofol (Diprivan), (d) Acetylsalicylic Acid (ASA) (Aspirin), (e) Naproxen Sodium (Aleve and Naprosyn) and (f) Dextromethamphetamine nanocapsules [1-91].

Scanning Electron Microscope (SEM), Brunauer-Emmett-Teller (BET) analysis, X-Ray Diffraction (XRD), Transmission Electron Microscope (TEM), Differential Thermal Analysis-Thermal Gravim Analysis (DTA-TGA), Energy-Dispersive X-Ray Spectroscopy (EDX), ^{1}HNMR, ^{13}CNMR, ^{31}PNMR, UV-Vis, HR-Mass, Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy (ATR-FTIR) and FT-Raman spectroscopies and Pyridine adsorption-desorption measurements. Then, the reaction of acetic acid with 1-butanol and 1-hexanol were carried out over these catalysts in vapour-phase. The effect of temperature from 200 to 400°C, the initial molar feed ratio, acid: alcohol molar ratio, the amount of loading H_3PO_4 over Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2), injecting rate of feed and the reaction time were also investigated. The optimized conditions for each alcohol were obtained and monitored by Gas Chromatography-Mass Spectrometry (GC-MS).

Optimized conditions of reaction were 0.1g of 45% H_3PO_4/Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2), T=584K, molar ratio (RCO_2H:ROH) of 2:1 and for 1-hexanol and Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2), T=497K, molar ratio of 1:1, and for 1-butanol; time on stream of reaction was 23h. All the product esters showed selectivity close to 100%. From the studies on the esterification of acetic acid over Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2) and H_3PO_4/Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2) with different amounts of Triphenylphosphine (Phosphorustriphenyl) on DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems, the reaction shows higher conversion for 1-hexanol rather than1-butanol. The increase in the nanocapsules chain length of alcohol increases the hydrophobicity of alcohol, then the more hydrophobic alcohol will adsorb better to hydrophobic catalyst. H_3PO_4 increases hydrophobicity of Cadmium Oxide (CdO) and has a main effect on total conversion.

Results and Discussion

Catalytic hydrogenation is the most useful and widely applicable method for the reduction of chemical substances and belongs to the basic process of modern chemical industry. It has found numerous applications in the fuel industry, the synthesis of polymers and plastics, the food industry, the production of alcohols, carbonyl compounds and amines as well as in the manufacturing of fine chemicals, flavors and fragrances, agrochemicals and pharmaceuticals. Majority of industrial catalytic hydrogenations is still carried out using heterogeneous catalysts due to the process advantages such as stability, easy separation and wide range of applicable reaction conditions. The homogenous catalysts, which have been further developed during the past years, have extended the scope of catalytic hydrogenation especially in the field of highly stereoselective transformations. However, new developments continue to appear also in the field of heterogeneous catalysis, particularly in cases where a high chemo-, regio-, or stereoselectivity has to be achieved.

The selectivity aspects of catalytic hydrogenation over heterogeneous catalysts will be discussed and documented with several examples. All three types of selectivity (chemo-, regio- and stereoselectivity) will be addressed with special emphasis on the

applicability of the catalytic procedure. The scope of chemoselective hydrogenation will be demonstrated by selective hydrogenation of unsaturated nitriles. It was found that the C≡N group can be hydrogenated prior to the C=C bond. Hydrogenation of Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules will represent an example of regioselective hydrogenation. In this case, only one of the two C=C bonds present in the molecule should be reduced to obtain desired product. Finally, an example will be given on stereoselective hydrogenation. One example will describe the diastereoselective hydrogenation applied in the DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems.

Conclusion

This study will deal with characteristic and historical aspects of heterogeneous catalysis, major challenges at present and ideas/prospective for the future. It will include the synthesis of major bulk and fine chemicals, of petrochemicals, the researchers in depollution and in biomass uses and its derived chemicals. Particular emphasis will be put on: (i) Activation and selective oxidation of Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules; (ii) Heterogeneous catalysis for fine chemicals; (iii) Asymmetric catalysis; (iv) Environment and biomass catalysis; (v) High throughput researches for combinatorial catalysis and (vi) Projection for catalysis in the last decade.

Case studies have been chosen to exemplify the different fields of interest. The case of Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules selective oxidation to the corresponding olefins or oxygenates will be presented such as the up-grading C_1 to C_5 nanocapsules, which is of paramount importance for fundamental and industrial interests, namely: how such inert nanocapsules rather cheap raw nanomaterials can be activated and up-graded. The case of Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules oxidation on basic catalysts based on Cadmium Oxide (CdO), Iron(III) Oxide (Fe_2O_3), Iridium(IV) Oxide (IrO_2), Rhodium(III) Oxide (Rh_2O_3), Ruthenium(IV) Oxide (RuO_2) and Titanium Dioxide (TiO_2) were presented. A high combinatorial therapeutic approach for catalyst preparation was given. Environment catalysis for Selective Catalytic Reduction (SCR) Reaction was described. Finally, combinatorial therapeutic approaches to DNA/RNA of human cancer cells and Benzylpenicillin (Penicillin G), Fluoxetine Hydrochloride (Prozac and Sarafem), Propofol (Diprivan), Acetylsalicylic Acid (ASA) (Aspirin), Naproxen Sodium (Aleve and Naprosyn) and Dextromethamphetamine nanocapsules with surface conjugated DNA/RNA of human cancer cells to targeted Nano drugs for enhanced anti-cancer efficacy and targeted cancer therapy using Nano drugs delivery systems were investigated.

References

1. Heidari A. Brown C. Study of Composition and Morphology of Cadmium Oxide (CdO) Nanoparticles for Eliminating Cancer Cells. J Nanomedicine Research. 2015: 2; 20.

2. Heidari A, Brown C. Study of Surface Morphological, Phytochemical and Structural Characteristics of Rhodium (III) Oxide (Rh_2O_3) Nanoparticles. Int J Pharmacol, Phytochem Ethnomedicine. 2015; 1; 15-19. **Ref.:** https://goo.gl/RZmczj

3. Heidari A. An Experimental Biospectroscopic Study on Seminal Plasma in Determination of Semen Quality for Evaluation of Male Infertility. Int J Adv Technol. 2016: 7; 2. **Ref.:** https://goo.gl/ZWaf1a

4. Heidari A. Extraction and Preconcentration of N-Tolyl-Sulfonyl-Phosphoramid-Saeure-Dichlorid as an Anti-Cancer Drug from Plants: A Pharmacognosy Study. J Pharmacogn Nat Prod. 2016: 2.

5. Heidari A. A Thermodynamic Study on Hydration and Dehydration of DNA and RNA-Amphiphile Complexes. J Bioeng Biomed Sci S. 2016.

6. Heidari A. Computational Studies on Molecular Structures and Carbonyl and Ketene Groups' Effects of Singlet and Triplet Energies of Azidoketene O=C=CH-NNN and Isocyanatoketene O=C=CH-N=C=O. J Appl Computat Math. 2016: 5.

7. Heidari A. Study of Irradiations to Enhance the Induces the Dissociation of Hydrogen Bonds between Peptide Chains and Transition from Helix Structure to Random Coil Structure Using ATR-FTIR, Raman and ^{1}HNMR Spectroscopies. J Biomol Res Ther. 2016: 5.

8. Heidari A. Future Prospects of Point Fluorescence Spectroscopy, Fluorescence Imaging and Fluorescence Endoscopy in Photodynamic Therapy (PDT) for Cancer Cells. J Bioanal Biomed. 2016: 8. **Ref.:** https://goo.gl/6DEyyx

9. Heidari A. A Bio-Spectroscopic Study of DNA Density and Color Role as Determining Factor for Absorbed Irradiation in Cancer Cells. Adv Cancer Prev. 2016: 1.

10. Heidari A. Manufacturing Process of Solar Cells Using Cadmium Oxide (CdO) and Rhodium (III) Oxide (Rh_2O_3) Nanoparticles. J Biotechnol Biomater. 2016: 6.

11. Heidari A. A Novel Experimental and Computational Approach to Photobiosimulation of Telomeric DNA/RNA: A Biospectroscopic and Photobiological Study. J Res Development. 2016: 4.

12. Heidari A. Biochemical and Pharmacodynamical Study of Microporous Molecularly Imprinted Polymer Selective for Vancomycin, Teicoplanin, Oritavancin, Telavancin and Dalbavancin Binding. Biochem Physiol. 2016; 5: 2. **Ref.:** https://goo.gl/wtXVcH

13. Heidari A. Anti-Cancer Effect of UV Irradiation at Presence of Cadmium Oxide (CdO) Nanoparticles on DNA of Cancer Cells: A Photodynamic Therapy Study. Arch Cancer Res. 2016: 4; 1. **Ref.:** https://goo.gl/JNX8s5

14. Heidari A. Biospectroscopic Study on Multi-Component Reactions (MCRs) in Two A-Type and B-Type Conformations of Nucleic Acids to Determine Ligand Binding Modes, Binding Constant and Stability of Nucleic Acids in Cadmium Oxide (CdO) Nanoparticles-Nucleic Acids Complexes as Anti-Cancer Drugs. Arch Cancer Res. 2016: 4; 2. **Ref.:** https://goo.gl/F6tovb

15. Heidari A. Simulation of Temperature Distribution of DNA/RNA of Human Cancer Cells Using Time-Dependent Bio-Heat Equation and Nd: YAG Lasers. Arch Cancer Res. 2016: 4; 2. **Ref.:** https://goo.gl/a72pU4

16. Heidari A. Quantitative Structure-Activity Relationship (QSAR) Approximation for Cadmium Oxide (CdO) and Rhodium (III) Oxide (Rh_2O_3) Nanoparticles as Anti-Cancer Drugs for the Catalytic Formation of Proviral DNA from Viral RNA Using Multiple Linear and Non-Linear Correlation Approach. Ann Clin Lab Res. 2016: 4: 1.

17. Heidari A. Biomedical Study of Cancer Cells DNA Therapy Using Laser Irradiations at Presence of Intelligent Nanoparticles. J Biomedical Sci. 2016: 5; 2. **Ref.:** https://goo.gl/Emb96J

18. Heidari A. Measurement the Amount of Vitamin D2 (Ergocalciferol), Vitamin D3 (Cholecalciferol) and Absorbable Calcium (Ca^{2+}), Iron (II) (Fe^{2+}), Magnesium (Mg^{2+}), Phosphate (PO^{4-}) and Zinc (Zn^{2+}) in Apricot Using High-Performance Liquid Chromatography (HPLC) and Spectroscopic Techniques. J Biom Biostat. 2016: 7; 2. **Ref.:** https://goo.gl/pU5F6Y

19. Heidari A. Spectroscopy and Quantum Mechanics of the Helium Dimer (He^{2+}), Neon Dimer (Ne^{2+}), Argon Dimer (Ar^{2+}), Krypton Dimer (Kr^{2+}), Xenon Dimer (Xe^{2+}), Radon Dimer(Rn^{2+}) and Ununoctium Dimer (Uuo^{2+}) Molecular Cations. Chem Sci J. 2016: 7.

20. Heidari A. Human Toxicity Photodynamic Therapy Studies on DNA/RNA Complexes as a Promising New Sensitizer for the Treatment of Malignant Tumors Using Bio-Spectroscopic Techniques. J Drug Metab Toxicol. 2016; 7: 129. **Ref.:** https://goo.gl/KozuXZ

21. Heidari A. Novel and Stable Modifications of Intelligent Cadmium Oxide (CdO) Nanoparticles as Anti-Cancer Drug in Formation of Nucleic Acids Complexes for Human Cancer Cells Treatment. Biochem Pharmacol (Los Angel). 2016; 5: 207.

22. Heidari A. A Combined Computational and QM/MM Molecular Dynamics Study on Boron Nitride Nanotubes (BNNTs), Amorphous Boron Nitride Nanotubes (a-BNNTs) and Hexagonal Boron Nitride Nanotubes (h-BNNTs) as Hydrogen Storage. Struct Chem Crystallogr Commun. 2016; 2: 1.

23. Heidari A. Pharmaceutical and Analytical Chemistry Study of Cadmium Oxide (CdO) Nanoparticles Synthesis Methods and Properties as Anti-Cancer Drug and its Effect on Human Cancer Cells. Pharm Anal Chem Open Access. 2016; 2: 113.

24. Heidari A. 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. Chemo Open Access. 2016; 5: 129.

25. Heidari A. Pharmacokinetics and Experimental Therapeutic Study of DNA and Other Biomolecules Using Lasers: Advantages and Applications. J Pharmacokinet Exp Ther. 2016; 1.

26. Heidari A. Determination of Ratio and Stability Constant of DNA/RNA in Human Cancer Cells and Cadmium Oxide (CdO) Nanoparticles Complexes Using Analytical Electrochemical and Spectroscopic Techniques. Insights Anal Electrochem. 2016; 2: 1.

27. Heidari A. Discriminate between Antibacterial and Non-Antibacterial Drugs Artificial Neutral Networks of a Multilayer Perceptron (MLP) Type Using a Set of Topological Descriptors. J Heavy Met Toxicity Dis. 2016; 1: 2.

28. Heidari A. Combined Theoretical and Computational Study of the Belousov-Zhabotinsky Chaotic Reaction and Curtius Rearrangement for Synthesis of Mechlorethamine, Cisplatin, Streptozotocin, Cyclophosphamide, Melphalan, Busulphan and BCNU as Anti-Cancer Drugs. Insights Med Phys. 2016; 1: 2. **Ref.:** https://goo.gl/ZvxJFS

29. Heidari A. A Translational Biomedical Approach to Structural Arrangement of Amino Acids' Complexes: A Combined Theoretical and Computational Study. Transl Biomed. 2016; 7: 2. **Ref.:** https://goo.gl/eDVfaP

30. Heidari A. Ab Initio and Density Functional Theory (DFT) Studies of Dynamic NMR Shielding Tensors and Vibrational Frequencies of DNA/RNA and Cadmium Oxide (CdO) Nanoparticles Complexes in Human Cancer Cells. J Nanomedine Biotherapeutic Discov. 2016; 6: 144.

31. Heidari A. Molecular Dynamics and Monte-Carlo Simulations for Replacement Sugars in Insulin Resistance, Obesity, LDL Cholesterol, Triglycerides, Metabolic Syndrome, Type 2 Diabetes and Cardiovascular Disease: A Glycobiological Study. J Glycobiol. 2016; 5: 111.

32. Heidari A. Synthesis and Study of 5-[(Phenylsulfonyl)Amino]-1,3,4-Thiadiazole-2-Sulfonamide as Potential Anti-Pertussis Drug Using Chromatography and Spectroscopy Techniques. Transl Med (Sunnyvale). 2016; 6: 138.

33. Heidari A. Nitrogen, Oxygen, Phosphorus and Sulphur Heterocyclic Anti-Cancer Nano Drugs Separation in the Supercritical Fluid of Ozone (O_3) Using Soave-Redlich-Kwong (SRK) and Pang-Robinson (PR) Equations. Electronic J Biol. 2016; 12: 4. **Ref.:** https://goo.gl/snnfNz

34. Heidari A. An Analytical and Computational Infrared Spectroscopic Review of Vibrational Modes in Nucleic Acids. Austin J Anal Pharm Chem. 2016; 3: 1058.

35. Heidari A, Brown C. Phase, Composition and Morphology Study and Analysis of Os-Pd/HfC Nanocomposites. Nano Res Appl. 2016; 2: 1.

36. Heidari A. Brown C. Vibrational Spectroscopic Study of Intensities and Shifts of Symmetric Vibration Modes of Ozone Diluted by Cumene. International Journal of Advanced Chemistry. 2016; 4: 5-9. **Ref.:** https://goo.gl/F2Q7jy

37. Heidari A. Study of the Role of Anti-Cancer Molecules with Different Sizes for Decreasing Corresponding Bulk Tumor Multiple Organs or Tissues. Arch Can Res. 2016: 4; 2.

38. Heidari A. Genomics and Proteomics Studies of Zolpidem, Necopidem, Alpidem, Saripidem, Miroprofen, Zolimidine, Olprinone and Abafungin as Anti-Tumor, Peptide Antibiotics, Antiviral and Central Nervous System (CNS) Drugs. J Data Mining Genomics & Proteomics. 2016; 7: 125. **Ref.:** https://goo.gl/bzT3FV

39. Heidari A. Pharmacogenomics and Pharmacoproteomics Studies of Phosphodiesterase-5 (PDE5) Inhibitors and Paclitaxel Albumin-Stabilized Nanoparticles as Sandwiched Anti-Cancer Nano Drugs between Two DNA/RNA Molecules of Human Cancer Cells. J Pharmacogenomics Pharmacoproteomics. 2016; 7: 153.

40. Heidari A. Biotranslational Medical and Biospectroscopic Studies of Cadmium Oxide (CdO) Nanoparticles-DNA/RNA Straight and Cycle Chain Complexes as Potent Anti-Viral, Anti-Tumor and Anti-Microbial Drugs: A Clinical Approach. Transl Biomed. 2016; 7: 2. **Ref.:** https://goo.gl/oxMqzZ

41. Heidari A. A Comparative Study on Simultaneous Determination and Separation of Adsorbed Cadmium Oxide (CdO) Nanoparticles on DNA/RNA of Human Cancer Cells Using Biospectroscopic Techniques and Dielectrophoresis (DEP) Method. Arch Can Res. 2016; 4: 2. **Ref.:** https://goo.gl/D6c6SA

42. Heidari. Cheminformatics and System Chemistry of Cisplatin, Carboplatin, Nedaplatin, Oxaliplatin, Heptaplatin and Lobaplatin as Anti-Cancer Nano Drugs: A Combined Computational and Experimental Study. J Inform Data Min. 2016; 1: 3. **Ref.:** https://goo.gl/r1pVeQ

43. Heidari A. Linear and Non-Linear Quantitative Structure-Anti-Cancer-Activity Relationship (QSACAR) Study of Hydrous Ruthenium (IV) Oxide (RuO_2) Nanoparticles as Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs) and Anti-Cancer Nano Drugs. J Integr Oncol. 2016; 5: 110.

44. Heidari A. Synthesis, Characterization and Biospectroscopic Studies of Cadmium Oxide (CdO) Nanoparticles-Nucleic Acids Complexes Absence of Soluble Polymer as a Protective Agent Using Nucleic Acids Condensation and Solution Reduction Method. J Nanosci Curr Res. 2016; 1: 101.

45. Heidari A. Coplanarity and Collinearity of 4'-Dinonyl-2,2'-Bithiazole in One Domain of Bleomycin and Pingyangmycin to be Responsible for Binding of Cadmium Oxide (CdO) Nanoparticles to DNA/RNA Bidentate Ligands as Anti-Tumor Nano Drug. Int J Drug Dev & Res. 2016; 8: 007-008. **Ref.:** https://goo.gl/2k13k7

46. Heidari A. A Pharmacovigilance Study on Linear and Non-Linear Quantitative Structure (Chromatographic) Retention Relationships (QSRR) Models for the Prediction of Retention Time of Anti-Cancer Nano Drugs under Synchrotron Radiations. J Pharmacovigil 2016; 4: 161. **Ref.:** https://goo.gl/E7RKi3

47. Heidari A. Nanotechnology in Preparation of Semipermeable Polymers. J Adv Chem Eng 2016; 6: 157.

48. Heidari A. A Gastrointestinal Study on Linear and Non-Linear Quantitative Structure (Chromatographic) Retention Relationships (QSRR) Models for Analysis 5-Aminosalicylates Nano Particles as Digestive System Nano Drugs under Synchrotron Radiations. J Gastrointest Dig Syst. 2016; 6: 119.

49. Heidari A. DNA/RNA Fragmentation and Cytolysis in Human Cancer Cells Treated with Diphthamide Nano Particles Derivatives. Biomedical Data Mining 2016; 5: 102.

50. Heidari A. A Successful Strategy for the Prediction of Solubility in the Construction of Quantitative Structure-Activity Relationship (QSAR) and Quantitative Structure-Property Relationship (QSPR) under Synchrotron Radiations Using Genetic Function Approximation (GFA) Algorithm. J Mol Biol Biotechnol 2016; 1: 1. **Ref.:** https://goo.gl/STV4NQ

51. Heidari A. Computational Study on Molecular Structures of C_{20}, C_{60}, C_{240}, C_{540}, C_{960}, C_{2160} and C_{3840} Fullerene Nano Molecules under Synchrotron Radiations Using Fuzzy Logic. J Material Sci Eng. 2016; 5: 282.

52. Heidari A. Graph Theoretical Analysis of Zigzag Polyhexamethylene Biguanide, Polyhexamethylene Adipamide, Polyhexamethylene Biguanide Gauze and Polyhexamethylene Biguanide Hydrochloride (PHMB) Boron Nitride Nanotubes (BNNTs), Amorphous Boron Nitride Nanotubes (a-BNNTs) and Hexagonal Boron Nitride Nanotubes (h-BNNTs). J Appl Computat Math 2016; 5: 143.

53. Heidari A. The Impact of High Resolution Imaging on Diagnosis, Int J Clin Med Imaging 2016; 3.

54. Heidari A. A Comparative Study of Conformational Behavior of Isotretinoin (13-Cis Retinoic Acid) and Tretinoin (All-Trans Retinoic Acid (ATRA)) Nano Particles as Anti-Cancer Nano Drugs under Synchrotron Radiations Using Hartree-Fock (HF) and Density Functional Theory (DFT) Methods. Insights in Biomed. 2016; 1: 2. **Ref.:** https://goo.gl/MqrtdL

55. Heidari A. Advances in Logic, Operations and Computational Mathematics. J Appl Computat Math 2016; 5: 5.

56. Heidari A. Mathematical Equations in Predicting Physical Behavior. J Appl Computat Math 2016; 5: 5.

57. Heidari A. Chemotherapy a Last Resort for Cancer Treatment. Chemo Open Access. 2016; 5: 4.

58. Heidari A. Separation and Pre-Concentration of Metal Cations-DNA/RNA Chelates Using Molecular Beam Mass Spectrometry with Tunable Vacuum Ultraviolet (VUV) Synchrotron Radiation and Various Analytical Methods. Mass Spectrom Purif Tech. 2016; 2: 101.

59. Heidari A. Yoctosecond Quantitative Structure-Activity Relationship (QSAR) and Quantitative Structure-Property Relationship (QSPR) under Synchrotron Radiations Studies for Prediction of Solubility of Anti-Cancer Nano Drugs in Aqueous Solutions Using Genetic Function Approximation (GFA) Algorithm. Insight Pharm Res. 2016; 1: 1. **Ref.:** https://goo.gl/y4DXYN

60. Heidari A. Cancer Risk Prediction and Assessment in Human Cells under Synchrotron Radiations Using Quantitative Structure Activity Relationship (QSAR) and Quantitative Structure Properties Relationship (QSPR) Studies. Int J Clin Med Imaging. 2016; 3: 516. **Ref.:** https://goo.gl/gFd8JH

61. Heidari A. A Novel Approach to Biology. Electronic J Biol. 2016; 12: I-II. **Ref.:** https://goo.gl/xpjtTt

62. Heidari A. Innovative Biomedical Equipment's for Diagnosis and Treatment. J Bioengineer & Biomedical Sci. 2016; 6: 2.

63. Heidari A. Integrating Precision Cancer Medicine into Healthcare, Medicare Reimbursement Changes and the Practice of Oncology: Trends in Oncology Medicine and Practices. J Oncol Med & Pract. 2016; 1: 2.

64. Heidari A. Promoting Convergence in Biomedical and Biomaterials Sciences and Silk Proteins for Biomedical and Biomaterials Applications: An Introduction to Materials in Medicine and Bioengineering Perspectives. J Bioengineer & Biomedical Sci. 2016; 6: 3.

65. Heidari A. X-Ray Fluorescence and X-Ray Diffraction Analysis on Discrete Element Modeling of Nano Powder Metallurgy Processes in Optimal Container Design. J Powder Metall Min. 2017; 6: 1.

66. Heidari A. Biomolecular Spectroscopy and Dynamics of Nano-Sized Molecules and Clusters as Cross-Linking-Induced Anti-Cancer and Immune-Oncology Nano Drugs Delivery in DNA/RNA of Human Cancer Cells Membranes under Synchrotron Radiations: A Payload-Based Perspective. Arch Chem Res. 2017; 1: 2. **Ref.:** https://goo.gl/57Zc6T

67. Heidari A. Deficiencies in Repair of Double-Standard DNA/RNA-Binding Molecules Identified in Many Types of Solid and Liquid Tumors Oncology in Human Body for Advancing Cancer Immunotherapy Using Computer Simulations and Data Analysis. J Appl Bioinforma Comput Biol. 2017; 6: 1.

68. Heidari A. Electronic Coupling among the Five Nanomolecules Shuts Down Quantum Tunneling in the Presence and Absence of an Applied Magnetic Field for Indication of the Dimer or other Provide Different Influences on the Magnetic Behavior of Single Molecular Magnets (SMMs) as Qubits for Quantum Computing. Glob J Res Rev. 4: 2, 2017.

69. Heidari A. Polymorphism in Nano-Sized Graphene Ligand-Induced Transformation of Au_{38}-xAg_x/$xCu_x(SPh\text{-}tBu)_{24}$ to Au_{36}-xAg_x/$xCu_x(SPh\text{-}tBu)_{24}$ (x=1-12) Nanomolecules for Synthesis of Au_{144}-xAg_x/$xCu_x[(SR)_{60}$, $(SC_4)_{60}$, $(SC_6)_{60}$, $(SC_{12})_{60}$, $(PET)_{60}$, $(p\text{-}MBA)_{60}$, $(F)_{60}$, $(Cl)_{60}$, $(Br)_{60}$, $(I)_{60}$, $(At)_{60}$, $(Uus)_{60}$ and $(SC_6H_{13})_{60}]$ Nano Clusters as Anti-Cancer Nano Drugs. J Nanomater Mol Nanotechnol. 2017; 6: 3. **Ref.:** https://goo.gl/9XQEps

70. Heidari A. "Biomedical Resource Oncology and Data Mining to Enable Resource Discovery in Medical, Medicinal, Clinical, Pharmaceutical, Chemical and Translational Research and Their Applications in Cancer Research. Int J Biomed Data Min. 2017; 6: 103.

71. Heidari A. 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 Synchrotorn Radiation. J Dev Drugs. 2017; 6: 154.

72. Heidari A. A Novel Approach to Future Horizon of Top Seven Biomedical Research Topics to Watch in 2017: Alzheimer's, Ebola, Hypersomnia, Human Immunodeficiency Virus (HIV), Tuberculosis (TB), Microbiome/Antibiotic Resistance and Endovascular Stroke. J Bioengineer & Biomedical Sci. 2017; 7: 127.

73. Heidari A. Opinion on Computational Fluid Dynamics (CFD) Technique. Fluid Mech Open Acc. 2017; 4: 157.

74. Heidari A. Concurrent Diagnosis of Oncology Influence Outcomes in Emergency General Surgery for Colorectal Cancer and Multiple Sclerosis (MS) Treatment Using Magnetic Resonance Imaging (MRI) and $Au_{329}(SR)_{84}$, $Au_{329\text{-}x}Ag_x(SR)_{84}$, $Au_{144}(SR)_{60}$, $Au_{68}(SR)_{36}$, $Au_{30}(SR)_{18}$, $Au_{102}(SPh)_{44}$, $Au_{38}(SPh)_{24}$, $Au_{38}(SC_2H_4Ph)_{24}$, $Au_{21}S(SAdm)_{15}$, $Au_{36}(pMBA)_{24}$ and $Au_{25}(pMBA)_{18}$ Nano Clusters", J Surgery Emerg Med. 2017; 1: 1-21. **Ref.:** https://goo.gl/hfg7xe

75. Heidari A. Developmental Cell Biology in Adult Stem Cells Death and Autophagy to Trigger a Preventive Allergic Reaction to Common Airborne Allergens under Synchrotron Radiation Using Nanotechnology for Therapeutic Goals in Particular Allergy Shots (Immunotherapy). Cell Biol (Henderson, NV). 2017; 6: 1. **Ref.:** https://goo.gl/6X1jEY

76. Heidari A. Changing Metal Powder Characteristics for Elimination of the Heavy Metals Toxicity and Diseases in Disruption of Extracellular Matrix (ECM) Proteins Adjustment in Cancer Metastases Induced by Osteosarcoma, Chondrosarcoma, Carcinoid, Carcinoma, Ewing's Sarcoma, Fibrosarcoma and Secondary Hematopoietic Solid or Soft Tissue Tumors. J Powder Metall Min. 2017; 6: 170.

77. Heidari A. Nanomedicine-Based Combination Anti-Cancer Therapy between Nucleic Acids and Anti-Cancer Nano Drugs in Covalent Nano Drugs Delivery Systems for Selective Imaging and Treatment of Human Brain Tumors Using Hyaluronic Acid, Alguronic Acid and Sodium Hyaluronate as Anti-Cancer Nano Drugs and Nucleic Acids Delivery under Synchrotron Radiation. Am J Drug Deliv. 2017; 5: 2. **Ref.:** https://goo.gl/PvNXPE

78. Heidari A. Clinical Trials of Dendritic Cell Therapies for Cancer Exposing Vulnerabilities in Human Cancer Cells Metabolism and Metabolomics: New Discoveries, Unique Features Inform New

Therapeutic Opportunities, Biotech's Bumpy Road to the Market and Elucidating the Biochemical Programs that Support Cancer Initiation and Progression. J Biol Med Science. 2017; 1: 103.

79. Heidari A. \The Design Graphene-Based Nanosheets as a New Nanomaterial in Anti-Cancer Therapy and Delivery of Chemotherapeutics and Biological Nano Drugs for Liposomal Anti-Cancer Nano Drugs and Gene Delivery. Br Biomed Bull. 2017; 5: 305. **Ref.:** https://goo.gl/Gop23g

80. Heidari A. Integrative Approach to Biological Networks for Emerging Roles of Proteomics, Genomics and Transcriptomics in the Discovery and Validation of Human Colorectal Cancer Biomarkers from DNA/RNA Sequencing Data under Synchrotron Radiation. Transcriptomics. 2017; 5: 117.

81. Heidari A. Elimination of the Heavy Metals Toxicity and Diseases in Disruption of Extracellular Matrix (ECM) Proteins and Cell Adhesion Intelligent Nanomolecules Adjustment in Cancer Metastases Using Metalloenzymes and under Synchrotron Radiation. Lett Health Biol Sci. 2017; 2: 1-4.

82. Heidari A. Treatment of Breast Cancer Brain Metastases through a Targeted Nanomolecule Drug Delivery System Based on Dopamine Functionalized Multi-Wall Carbon Nanotubes (MWCNTs) Coated with Nano Graphene Oxide (GO) and Protonated Polyaniline (PANI) in Situ During the Polymerization of Aniline Autogenic Nanoparticles for the Delivery of Anti-Cancer Nano Drugs under Synchrotron Radiation. Br J Res. 2017; 4: 16.

83. Heidari A. Sedative, Analgesic and Ultrasound-Mediated Gastrointestinal Nano Drugs Delivery for Gastrointestinal Endoscopic Procedure, Nano Drug-Induced Gastrointestinal Disorders and Nano Drug Treatment of Gastric Acidity. Res Rep Gastroenterol. 2017; 1: 1.

84. Heidari A. Synthesis, Pharmacokinetics, Pharmacodynamics, Dosing, Stability, Safety and Efficacy of Orphan Nano Drugs to Treat High Cholesterol and Related Conditions and to Prevent Cardiovascular Disease under Synchrotron Radiation. J Pharm Sci Emerg Drugs. 2017; 5: 1.

85. Heidari A. Non-Linear Compact Proton Synchrotrons to Improve Human Cancer Cells and Tissues Treatments and Diagnostics through Particle Therapy Accelerators with Monochromatic Microbeams", J Cell Biol Mol Sci. 2017; 2: 1-5.

86. Heidari A. Design of Targeted Metal Chelation Therapeutics Nanocapsules as Colloidal Carriers and Blood-Brain Barrier (BBB) Translocation to Targeted Deliver Anti-Cancer Nano Drugs into the Human Brain to Treat Alzheimer's Disease under Synchrotron Radiation. J Nanotechnol Material Sci. 2017; 4: 1-5.

87. Gobato R, Heidari A. Calculations Using Quantum Chemistry for Inorganic Molecule Simulation $BeLi_2SeSi$. American Journal of Quantum Chemistry and Molecular Spectroscopy. 2017; 2: 37-46. **Ref.:** https://goo.gl/mNceSB

88. Heidari A. An Investigation of the Role of DNA as Molecular Computers: A Computational Study on the Hamiltonian Path Problem. International Journal of Scientific & Engineering Research. 2014; 5: 1884-1889. **Ref.:** https://goo.gl/33Tn6p

89. Heidari A. Different High-Resolution Simulations of Medical, Medicinal, Clinical, Pharmaceutical and Therapeutics Oncology of Human Lung Cancer Translational Anti-Cancer Nano Drugs Delivery Treatment Process under Synchrotron and X-Ray Radiations. J Med Oncol. 2017: 1.

90. Heidari A. A Modern Ethnomedicinal Technique for Transformation, Prevention and Treatment of Human Malignant Gliomas Tumors into Human Benign Gliomas Tumors under Synchrotron Radiation. Am J Ethnomed. 2017; 4: 10.

91. Heidari A. Active Targeted Nanoparticles for Anti-Cancer Nano Drugs Delivery across the Blood-Brain Barrier for Human Brain Cancer Treatment, Multiple Sclerosis (MS) and Alzheimer's Diseases Using Chemical Modifications of Anti-Cancer Nano Drugs or Drug-Nanoparticles through Zika Virus (ZIKV) Nanocarriers under Synchrotron Radiation. J Med Chem Toxicol. 2017; 2: 1-5.