

Normal Tissue Complication Probability (NTCP) Prediction for Modeling Radiotherapy Induced Normal Tissue Complications: An Overview beyond Phenomenological Models

Alireza Heidari^{1,2,3,4*}

¹California South University, 14731 Comet St. Irvine, CA 92604, USA

²BioSpectroscopy Core Research Laboratory, California South University, 14731 Comet St. Irvine, CA 92604, USA

³Cancer Research Institute (CRI), California South University, 14731 Comet St. Irvine, CA 92604, USA

⁴American International Standards Institute, Irvine, CA 3800, USA

***Correspondence:** Faculty of Chemistry. Alireza Heidari, California South University, 14731 Comet St. Irvine, CA 92604, USA

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Abstract

Numerical models of (normal/generally and ordinary/sound) tissue trouble possibility (NTCP) ready to unequivocally (depict a potential future occasion) radiation-caused morbidities (RIM) assume a critical part in the ID of a brightened (with an individual touch) best arrangement, and address the way to capitalizing on the advantages of (connected with PCs and science) progresses in radiation treatment (RT).

Keywords

Hadrontherapy, Radiotherapy, Cancer, Treatment, Cure, Tumors, Oncology, Particle Therapy

Opinion

Numerical models of (normal/generally and ordinary/sound) tissue trouble possibility (NTCP) ready to unequivocally (depict a potential future occasion) radiation-caused morbidities (RIM) assume a critical part in the ID of a brightened (with an individual touch) best arrangement, and address the way to capitalizing on the advantages of (connected with PCs and science) progresses in radiation treatment (RT). Most current RT approaches to doing things present/cause, be that as it may, new difficulties in speculating (a number) the gamble of RIM. The point of this report is to deductively audit NTCP models in the (strong fundamental construction on which greater things can be worked) of cutting-edge radiation treatment approaches to getting things done. Issues obviously associated with or connected with hypofractionated stereotactic body RT and particle beam treatment are fundamentally audited. Reirradiation pictures/circumstances for new or rehashing malignances and NTCP are additionally outlined. A new phenomenological way to deal with (portray a potential future occasion) RIM is proposed [1-30].

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References

1. Heidari A, Brown C. Study of Composition and Morphology of Cadmium Oxide (CdO) [Nanoparticles](#) for Eliminating [Cancer](#) Cells. *J Nanomed Res.* 2015; 2(5)20:2015.
2. Heidari A, Brown C. Study of Surface Morphological, Phytochemical and Structural Characteristics of Rhodium (III) Oxide (Rh₂O₃) [Nanoparticles](#). *Int J Pharmacol Phytoche Ethnomed.* 2015;1(1):15-19.
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: e007.
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: e103.
5. Heidari A. A Thermodynamic Study on Hydration and Dehydration of [DNA](#) and RNA-Amphiphile Complexes. *J Bioeng Biomed Sci.* 2016;S:006.
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:e142.
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 ¹HNMR Spectroscopies. *J Biomol Res Ther.* 2016;5:e146.
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: e135.
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: e102.
10. Heidari A Manufacturing Process of Solar [Cells](#) Using Cadmium Oxide (CdO) and Rhodium (III) Oxide (Rh₂O₃) [Nanoparticles](#). *J Biotechnol Biomater.*2016;6: e125.
11. Heidari A. A Novel Experimental and Computational Approach to Photobiosimulation of Telomeric DNA/RNA: A Biospectroscopic and Photobiological Study. *J Res Development* 2016;4:144.
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:e146.
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.
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.
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.
16. Heidari A. Quantitative Structure–Activity [Relationship](#) (QSAR) Approximation for Cadmium Oxide (CdO) and Rhodium (III) Oxide (Rh₂O₃) [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.
18. Heidari A. Measurement the Amount of Vitamin D2 (Ergocalciferol), Vitamin D3 (Cholecalciferol) and Absorbable Calcium (Ca²⁺), Iron (II) (Fe²⁺), Magnesium (Mg²⁺), Phosphate (PO⁴⁻) and Zinc (Zn²⁺) in Apricot Using High–Performance Liquid [Chromatography](#) (HPLC) and Spectroscopic Techniques. *J Biom Biostat.* 2016;7:292.
19. Heidari A. Spectroscopy and Quantum Mechanics of the Helium Dimer (He²⁺), Neon Dimer (Ne²⁺), Argon Dimer (Ar²⁺), Krypton Dimer (Kr²⁺), Xenon Dimer (Xe²⁺), Radon Dimer (Rn²⁺) and Ununoctium Dimer (Uuo²⁺) Molecular Cations. *Chem Sci J.* 2016;7: e112.

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: e129.
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.
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 (Rh₂O₃) [Nanoparticles](#) as Anti-Cancer [Drugs](#) for [Cancer](#) Cells' Treatment", *Chemo Open Access.* 2016;5: e129.
25. Heidari A. [Pharmacokinetics](#) and Experimental Therapeutic Study of [DNA](#) and Other [Biomolecules](#) Using Lasers: Advantages and Applications. *J Pharmacokinet Exp Ther.* 2016;1:e005.
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.
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.
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 Nanomedicine Biotherapeutic Discov* 2016;6: e144.

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