Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Open Journal of Radiology and Medical Imaging

Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis

Alireza Heidari1,2,3,4,*, Ricardo Gobato5,6 and Abhijit Mitra7

1Faculty of Chemistry, California 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
5Green Land Landscaping and Gardening, Seedling Growth Laboratory, Bela Vista do Paraíso, 86130-000, Parana, Brazil
6Secretary of Education and Sports of the State of Parana, Laboratory of Biophysics and Molecular Modeling Genesis, Parana, 86130-000, Brazil
7Department of Marine Science, University of Calcutta, 35 B. C Road, Kolkata, 700019, West Bengal, India

*Corresponding Author: Alireza Heidari, Faculty of Chemistry, California South University, 14731 Comet St. Irvine, CA 92604, USA, email id: Scholar.Researcher.Scientist@gmail.com; Alireza.Heidari@calsu.us; Central@aisi-usa.org

Received Date: Nov 30, 2021 / Accepted Date: Dec 15, 2021 / Published Date: Dec 20, 2021

Abstract
Using samples of small cell lung tumors, a research team led by biologist Dr. Raymond discovered two new ways to induce tumor cell death. By activating ferroptosis, one of two subtypes of tumor cells can be targeted: first, iron-dependent cell death due to oxidative stress, and second, oxidative stress. Therefore, cell death can also be induced in a different way. Both types of cell death must be caused by drugs at the same time to eliminate the majority of the tumor mass.

Keywords: Cancer; Cells; Tissues; Tumors; Prevention; Prognosis; Diagnosis; Imaging; Screening, Treatment; Management


Copyright: This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. Copyright © 2021; Alireza Heidari

www.raftpubs.com
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Introduction

Despite many advances in treatment, the diagnosis of small cell lung cancer in particular means a poor prognosis. In Germany, a maximum of 8,000 new cases of small cell lung cancer (SCLC) are diagnosed each year. At the time of diagnosis, the cancer had found many holes to escape from the immune system. Cellular mechanisms, such as cell death regulated by apoptosis, are usually inactive at this stage. In this way, tumor cells can divide and spread almost without disturbance. High cell division is characteristic of small cell lung cancer, which initially promises a good response to chemotherapy. Unfortunately, in many cases the success of chemotherapy is short-lived because the tumor cells resist treatment quickly; In addition, the tumor is made up of not just one but several cell types (so-called subgroups), each with unique strategies for escaping lethal therapy. Scientists are trying to find out which cell death pathways are still available. The activity of the gene was compared between cells taken from the patient inside and outside the tumor. Significant signaling pathways for traditional cell death mechanisms were already shut down in the tumor before treatment in the early stages. In contrast, genes important for activating iron-dependent cell death by oxidative damage (ferroptosis) were strongly activated in cancer cells. Simply put, they found that small lung cancer cells could be divided into two subgroups: neurons and endocrine cells, and non-neuronal cells. In the neuronal and endocrine subtypes, there are more active genes that would otherwise normally be found in hormone-producing neurons. Cells belonging to another subgroup do not have this property and therefore belong to the group of non-neural cells. Several experiments have shown that non-neuronal cells can be killed using the butyrin duloxetine, which causes ferroptosis [1-567].

Results and Discussion

In cells belonging to the subgroup of nerves, it was found that they protect themselves against oxidative stress by producing antioxidants, resulting in cell death. However, by adding the antioxidant inhibitor Auranofin, the researchers were able to kill these cells as well. Biologists have made important observations about the possible application of these findings in the treatment of small cell lung cancer; When targeting only one of two pathways, activating ferroptosis or preventing the production of antioxidants in a tumor consisting of cells in both subgroups, the cancer cells were able to escape lethal therapy. They did this by regulating their gene expression to reach a subgroup that could resist targeted individual therapy.

Conclusions

It is currently in clinical trials for cancer treatment. Auranofin, which inhibits the production of protective antioxidants in cancer cells, has been used to treat rheumatoid arthritis for decades. Future clinical trials using this combination therapy will determine the extent to which this targeted treatment option improves the prognosis of small cell lung cancer patients.

Acknowledgment

This study was supported by the Cancer Research Institute (CRI) Project of Scientific Instrument and Equipment Development, the National Natural Science Foundation of the United Sates, the International Joint BioSpectroscopy Core Research Laboratory Program supported by the California South University (CSU), and the Key project supported by the American International Standards Institute (AISI), Irvine, California, USA.
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


References

Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


18. Heidari A. 2016. 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. 7: 292.

19. Heidari A. 2016. 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. 7: 112.


27. Heidari A. 2016. 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. 1: 2.


31. Heidari A. 2016. Molecular Dynamics and Monte-Carlo Simulations for Replacement Sugars in Insulin Resistance, Obesity, LDL Cholesterol, Triglycerides, Metabolic Syndrome, Type 2 Diabetes and Cardiovascular
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Disease: A Glycobiological Study. J Glycobiol. 5: 111.
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


52. Heidari A. 2016. 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. 5: 143.
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


69. Heidari A. 2017. Polymorphism in Nano-Sized Graphene Ligand-Induced Transformation of Au38-xAgx/xCux(SPh-tBu)24 to Au36-xAgx/xCux(SPh-tBu)24 (x = 1-12) Nanomolecules for Synthesis of Au144-xAgx/xCux[(SR)60, (SC)460, (SC)660, (SC)1260, (PET)60, (p-MBA)60, (F)60, (Cl)60, (Br)60, (I)60, (At)60, (Uus)60 and (SC6H13)60] Nano Clusters as Anti-Cancer Nano Drugs. J Nanomater Mol Nanotechnol. 6: 3.
75. Heidari A. 2017. 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
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


82. Heidari A. 2017. 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. 4: 16.


www.raftpubs.com
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


111. Heidari A. 2017. Vibrational Decihertz (dHz), Centihertz (cHz), Millihertz (mHz), Microhertz (μHz), Nanohertz (nHz), Picohertz (pHz), Femtohertz (fHz), Attohertz (aHz), Zeptohertz (zHz) and Yoctohertz (yHz) Imaging and Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation. International Journal of Biomedicine. 7: 335-340.
116. Heidari A. 2017. Vibrational Decahertz (daHz), Hectohertz (hHz), Kilohertz (kHz), Megahertz (MHz), Gigahertz (GHz), Terahertz (THz), Petahertz (PHz), Exahertz (EHz), Zettahertz (ZHｚ) and Yottahertz (YHz) Imaging and Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation. Madridge J Anal Sci Instrum. 2: 41-46.
119. Heidari A. 2018. Infrared Photo Dissociation Spectroscopy and Infrared Correlation Table Spectroscopy Comparative Study on Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation with the Passage of Time. Austin Pharmacol Pharm. 3: 1011.

www.raftpubs.com
146. Heidari A. 2018. Correlation Spectroscopy (COSY), Exclusive Correlation Spectroscopy (ECOSY), Total Correlation Spectroscopy (TOCY), Incredible Natural-Abundance Double-Quantum Transfer Experiment
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


165. Heidari A. 2018. Cadaverine (1,5-Pentanediamine or Pentamethylenediamine), Diethyl Azodicarboxylate (DEAD or DEADCAT) and Putrescine (Tetramethylenediamine) Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Synchrotron and Synchrocyclotron Radiations. Hiv and Sexual Health Open Access Open Journal. 1: 4-11.


170. Heidari A. 2018. Uranocene (U(C8H8)2) and Bis (Cyclooctatetraene)Iron (Fe(C8H8)2 or Fe (COT)2)-Enhanced Precatalyst Preparation Stabilization and Initiation (EPPSI) Nano Molecules", Chemistry Reports. 1: 1-16.


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis

DOI: https://doi.org/10.36811/ojrmi.2021.110039
OJRMI: December-2021: Page No: 782-824


181. Heidari A, Gobato R. 2018. A Novel Approach to Reduce Toxicities and to Improve Bioavailabilities of DNA/RNA of Human Cancer Cells-Containing Cocaine (Coke), Lysergide (Lysergic Acid Diethyl Amide or LSD), Δ⁹-Tetrahydrocannabinol (THC) [(−)-trans-Δ⁹-Tetrahydrocannabinol], Theobromine (Xantheose), Caffeine, Aspartame (APM) (NutraSweet) and Zidovudine (ZDV) [Azidothymidine (AZT)] as Anti-Cancer Nano Drugs by Coassembly of Dual Anti-Cancer Nano Drugs to Inhibit DNA/RNA of Human Cancer Cells Drug Resistance. Parana Journal of Science and Education. 4: 1-17.


186. Heidari A. 2018. Fucitol, Pterodactyliadiene, DEAD or DEADCAT (DiEthyl AzoDiCarboxylaTe), Skatole, the NanoPutians, Thebacon, Pikachurin, Tie Fighter, Spermidine and Mirasorvone Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations. Glob Imaging Insights. 3: 1-8.


188. Heidari A, Gobato R. 2018. First-Time Simulation of Deoxyuridine Monophosphate (dUMP) (Deoxyuridyl Acid or Deoxyuridylicate) and Vomitoxin (Deoxyynivalenol (DON)) ((3α,7α)-3,7,15-Trihydroxy-12,13-Epoxytrichothec-9-En-8-One)-Enhanced Precatalyst Preparation Stabilization and Initiation (EPPSI) Nano Molecules Incorporation into the Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Cancer Cells, Tissues and Tumors Treatment under Synchrotron and Synchrocyclotron Radiations. Parana Journal of Science and Education. 4: 46-67.

189. Heidari A. 2018. Buckminsterfullerene (Fullerene), Bullvalene, Dickite and Josipos Ligands Nano Molecules Incorporation into the
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis

DOI: https://doi.org/10.36811/ojrmi.2021.110039

Nano Polymeric Matrix (NPM) by Immersion of the Nano Polymeric Modified Electrode (NPME) as Molecular Enzymes and Drug Targets for Human Hematology and Thromboembolic Diseases Prevention, Diagnosis and Treatment under Synchrotron and Synchrocyclotron Radiations. Glob Imaging Insights. 3: 1-7.


209. Heidari A. 2018. Analogous Nano Compounds of the Form M(C6H5)2 Exist for M = (Nd, Tb, Pd, Pa, Np, Th, and Yb). Enhanced Precatalyst Preparation Stabilization and
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis

DOI: https://doi.org/10.36811/ojrmi.2021.110039
OJRMI: December-2021: Page No: 782-824

223. Heidari A. 2019. Three-Dimensional (3D) Imaging Spectroscopy of Carcinoma, Sarcoma, Leukemia, Lymphoma, Multiple Myeloma, Melanoma, Brain and Spinal Cord Tumors, Germ Cell Tumors, Neuroendocrine Tumors...
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


238. Heidari A. 2019. The Importance of the Power in CMOS Inverter Circuit of Synchrotron and Synchrocyclotron Radiations Using 50 (nm) and 100 (nm) Technologies and Reducing the Voltage of Power Supply. Radiother Oncol Int. 1: 1002-1015.


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Page: 804

www.raftpubs.com

Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis

DOI: https://doi.org/10.36811/ojrmi.2021.110039

OJRMI: December-2021: Page No: 782-824


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


www.raftpubs.com
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


414. Heidari A. 2020. Study of Stimulated Raman Biospectroscopy in Lopinavir as a
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Current Research in Cytology and Histology. 1: 29-35.
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


461. Heidari A, Gobato R. 2020. Integrated Analysis of the Conformation of a DNA/RNA-Linked Spin Label by Combining NMR Ensembles and Molecular Dynamics Simulations Provides More Realistic Models of
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Page: 818

www.raftpubs.com


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


483 Heidari A, Hotz M, MacDonald N, et al. 2021. Rhodium (III) Oxide or Rhodium Sesquioxide (Rh2O3) and Rhodium (IV) Oxide (RhO2) Effect on the Stop Growth of Cancer Cells, Tissues and Tumors under Synchrotron and Synchrocyclotron Radiations. Int J Hematol Oncol. 4: 106-149.


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


www.raftpubs.com

488. Heidari A, Hotz M, MacDonald N, et al. 2021. Active Targeting of Rhenium (IV) Oxide (ReO₂), Rhenium Trioxide (ReO₃) and Rhenium (VII) Oxide (Re₂O₇) Nanoparticles as Cancer Therapeutics Swell-up to Kill Cancer Cells under Synchrotron and Synchrocyclotron Radiations. International Journal of Advanced Chemistry. 9: 103-121.
Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis


Investigation of the Impact of Low-Dose Computed Tomography (LDCT) Screening for Primary Lung Cancer (PLC) on the Risk of Developing Brain Metastasis (BM) after Primary Lung Cancer (PLC) Diagnosis
