



## **INTERNATIONAL CONFERENCE**

On

# **Emerging Trends in Biomedical Sciences**

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**DST-PURSE AND DBT-WELLCOME  
TRUST FUNDED PROGRAMME**

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## **SOUVENIR CUM ABSTRACT BOOK**

**DEPARTMENT OF BIOCHEMISTRY**

**Faculty Of Life Sciences**

**Aligarh Muslim University, Aligarh, 202002 U.P. India**

**Early Diagnosis of Head and Neck Cancers: Potential Challenges and Solutions**

*Prof. Ahmad Waseem, Department of Molecular and Cell Biology, University of London, UK*

**Translesion DNA Synthesis in Ovarian Cancer Stem Cells**

*Prof. Qi-En Wang, The Ohio State University, USA*

**To Translate or not to Translate? Why Translation of COX-2 mRNA in Human Chondrocytes is Not Early**

*Prof. Tariq M Haqqi, Northeast Ohio Medical University, USA*

**INVITED LECTURES**

43-58

**Regulation of Na-H Exchanger-1 by Carbonic Anhydrase in Experimental Colitis**

*Prof. Islam Khan, Faculty of Medicine, Kuwait University, Kuwait*

**X-Ray Absorption by Heavy Element Compounds and Applications in Radiation Therapy**

*Dr. Sultana Nahar, The Ohio State University, OH, USA*

**A Molecular Stratification of Prostate Cancer: A Way Towards Personalized Treatment Strategies**

*Dr. Bushra Ateeq, Indian Institute of Technology, Kanpur*

**Disorders of Proliferation: Analysis of Novel Pathways and Targets**

*Dr. Rahul Pal, National Institute of Immunology, New Delhi*

**Epigenetic Therapy by Bioactive Phytochemicals against Non-Small Cell Lung Cancer**

*Syed Musthapa Meeran,, CSIR-CDRI, Lucknow*

**Central Role of Mitochondrial Dysfunction in Pathophysiology of Neurodegenerative Conditions: Modulation by Antioxidants and Mitochondrial**

*Prof. Rajat Sandhir, Department of Biochemistry, Panjab University*

**Defining the Structural Design of  $\beta$ -Lactamses and Raison D'être of Antibiotic Resistance: An Infection Combat Zone**

*Prof. Asad U Khan, IBU, AMU, Aligarh*

**Stop-Codon Recognition and Post-Translational [Fe-S] Assembly in the Apicoplast of the Malaria Parasite**

# X-RAY ABSORPTION BY HEAVY ELEMENT COMPOUNDS AND APPLICATIONS IN RADIATION THERAPY

Ashutosh Sultana N. Nahar

*Department of Astronomy, The Ohio State University, Columbus, OH, USA*

We will describe the atomic-molecular-bio physics of X-ray irradiation of high-Z heavy-element nanomaterials as radio sensitizing agents in cancer therapy. High energy x-rays interact mainly with the heavy element in the compound through inner shell electrons for photo-absorptions and photoionization. This fact is implemented in imaging, diagnostics, radiation therapy where high energy x-ray interact with the radio sensitizing agents, such as, cis-platins, bromodeoxyuridine (BUdR), gold nanoparticles etc while remain transparent to lighter biogenic elements. Inner shell interaction leads to ejection of Auger electrons that can kill the surrounding malignant cells in the tumor. The characteristic features of interaction of these compounds resemble mainly to those of the heavy element. Our study on the photo-absorption shows that compounds of high-Z elements, such as Pt, Au, embedded in tumors could provide the most efficient therapy and diagnostics (theranostics) when X-rays are targeted at their characteristic resonant energies where probability of electron ejection is enhanced by a large factor. We determine the resonant energies from the atomic properties of the high-Z element and show that they can initiate cascade of multiple ejections. Harmful damages from broadband radiation from conventional X-ray sources at medical facilities can be reduced considerably by using a monochromatic X-ray source at resonant energy. In this respect we will show that low energy x-rays of about a few hundred keV are more effective in treatment than those MeV range conventional liner accelerators (LINAC).

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