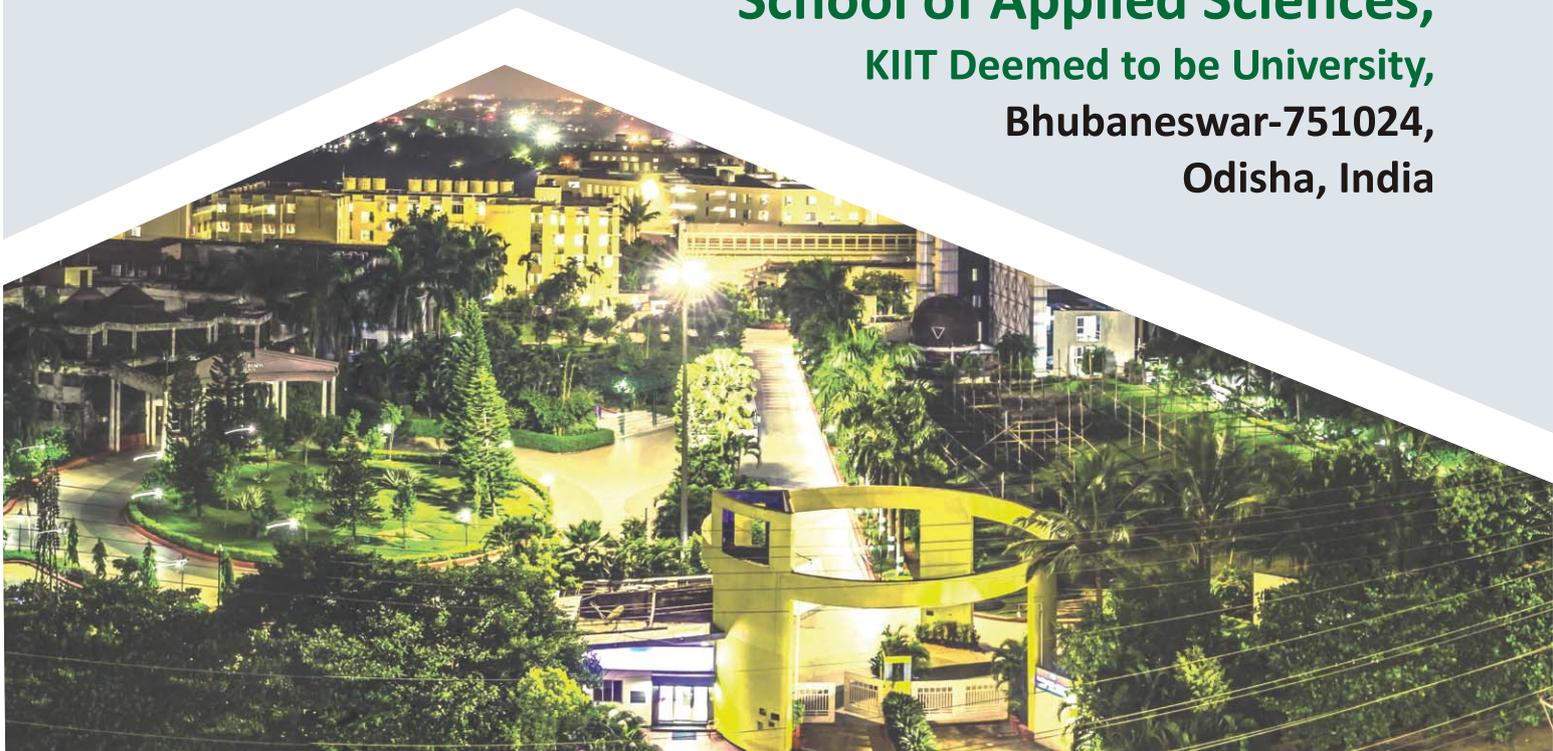


# EFHD-2020 E-Abstract Book

12<sup>th</sup> - 14<sup>th</sup> September, 2020

Department of Biology  
School of Applied Sciences,  
KIIT Deemed to be University,  
Bhubaneswar-751024,  
Odisha, India



## **Advisory Committee**

### ***Chief Patron***

**Prof. (Dr.) Achyuta Samanta**

Hon'ble Founder, KIIT & KISS

### ***Patron***

**Prof. (Dr.) Subrat Kumar Acharya**

Hon'ble Pro-Chancellor, KIIT Deemed University

**Prof. Hrushikesh Mohanty**

Hon'ble Vice-Chancellor, KIIT Deemed to be University

**Prof. Sasmita Samanta**

Hon'ble Pro-Vice Chancellor, KIIT Deemed to be University.

**Prof. Jnyana Ranjan Mohanty**

Hon'ble Registrar, KIIT Deemed to be University.

## **Organizing Committee**

### ***Convener***

**Dr. Chandana Mohanty**

Biology, KIIT Deemed to be University.

### ***Co-Conveners***

**Dr. CH. Vinod**, Biology, KIIT Deemed to be University

**Dr. Sarbari Acharya**, Biology, KIIT Deemed to be University

**Dr. Nikita Mahapatra**, Biology, KIIT Deemed to be University

### ***Organising Secretaries***

**Dr. A. K Panda**, KIIT Deemed to be University

**Dr. R. Sahu**, KIIT Deemed to be University

**Dr. B. B. Kar** KIIT Deemed to be University

### ***Local Organising Committee***

**Dr. G. Pradhan**, KIIT Deemed to be University

**Dr. J. Sinha**, KIIT Deemed to be University

### ***Scientific Advisory Committee***

**Prof Gopal C. Kundu**, Director, R&D,

KIIT Deemed to be University

**Prof. P. Pattojoshi**, Dean SAS, KIIT Deemed to be University.

**Dr. S. K Sahoo**, Scientist E, ILS, Bhubaneswar

**Prof. M. Suar**, Professor, KIIT Deemed to be University

**Prof. S. Nanda**, Professor, KIIT Deemed to be University

**Prof. B. C. Guru**, Professor, KIIT Deemed to be University

**Dr. K. Parashar**, KIIT Deemed to be University.

**Dr. S. K. S Parashar**, KIIT Deemed to be University

## Invited Speakers



**Prof. Gopal C. Kundu**  
KIIT Deemed to be University,  
Bhubaneswar, Odisha, India

**Topic:**

Understanding the Tumor Heterogeneity and Development of Multi-targeted

12<sup>th</sup> September, 2020 @ 11 am IST



**Dr. Saurabh Priyadarshi**  
University of Illinois at Chicago,  
USA

**Topic:**

Genomic Information: The

12<sup>th</sup> September, 2020 @ 11.45 am IST



**Dr. Avinash Sonawane**  
Professor IIT,  
Indore, Madhya Pradesh, India

**Topic:**

Challenges and Strategies for

12<sup>th</sup> September, 2020 @ 2 pm IST



**Dr. Ranjita Misra**  
SIST- Deemed to be University,  
Chennai, Tamilnadu, India

**Topic:**

Nanotechnological approaches for overcoming drug resistance in

12<sup>th</sup> September, 2020 @ 3 pm IST



**Dr. Mastan B. Somepalli**  
University of Pennsylvania,  
USA

**Topic:**

Nutrient acquisition strategies of enteric pathogen Cryptosporidium

13<sup>th</sup> September, 2020 @ 10 am IST



**Dr. Vandana Mallareddy**  
Lewis Katz School of Medicine  
Temple University USA

**Topic:**

Exosomes: Cell-free alternative to cell-based therapies and diagnosis

13<sup>th</sup> September, 2020 @ 11 am IST



**Dr. Cuckoo Mahapatra**  
North Orissa University, Odisha,  
India

**Topic:**

Regenerative medicine: A revolutionary approach to modern

13<sup>th</sup> September, 2020 @ 2 pm IST



**Dr. Abhalaxmi Singh**  
University of Illinois, Chicago,  
USA

**Topic:**

Emerging trends in Nano-therapeutics: An insight into

14<sup>th</sup> September, 2020 @ 10 am IST



**Dr. Fahima Dilnawaz**  
Institute of Life Sciences, Bhubaneswar,  
Odisha, India

**Topic:**

Mesoporous silica nanoparticles for drug delivery of cancer.

14<sup>th</sup> September, 2020 @ 11 am IST



**Dr. Priya Ranjan Debata**  
North Orissa University, Odisha,  
India

**Topic:**

Targeting cell cycle for cancer therapy

14<sup>th</sup> September, 2020 @ 2 pm IST



## *Message*

It brings me immense pleasure to know that the Department of Biology, School of Applied Sciences, KIIT Deemed to be University, Bhubaneswar is organizing an International Virtual Conference on 'Emerging Frontiers for Healthcare and Delivery' (EFHD-2020) from 12th to 14th September 2020.

Technology development has been transforming and adding value to healthcare services. Technological innovations introduced in the field during the last decade have brought many advantages and conveniences to patients, enhancing service quality and efficiency. The objective of the webinar is to address the current research and evolution of innovative strategies and its possible implications for different health issues and implementation of the same towards comprehensive health care.

I hope that this conference would generate innovative ideas among the participants, contributing to better health care services. It also will facilitate interactions among researchers to exchange the ideas of recent advances in the field.

I congratulate the organizers for arranging such an extraordinary event at this point in time. I wish the conference a grand success.

**(Dr. A. Samanta)**  
Founder, KIIT & KISS



## *Message*

I'm happy that the Department of Biology, School of Applied Sciences, KIIT Deemed to be University, Bhubaneswar is organizing an international virtual conference on "Emerging Frontiers for Healthcare and Delivery (EFHD), on 12-14 September 2020. Recent advancements in science and technology have provided new opportunities to address health problems and deliver healthcare services as a just-in-demand service. In that aspect, the theme of the conference is befitting and is highlighted with the deliberations of brilliant researchers in the field from our country and abroad. I'm sure the participants will find it exciting in pursuit of their knowledge in this field.

I extend my heartfelt appreciation to the School of Applied Science and particularly the Department of Biology for organizing this conference during this pandemic situation, which in stills our resolve to excel in research and knowledge creation.

I convey my warm greetings to the organizing committee and wish the grand success of the conference-on-web.

A handwritten signature in black ink, appearing to read 'H. Mohanty', written in a cursive style.

**Prof. Hrushikesh Mohanty**  
Vice-Chancellor,  
KIIT-Deemed to be University



## *Message*

It is a matter of immense pleasure to know that an international virtual conference on “Emerging Frontiers for Healthcare and Delivery (EFHD)” from 12th - 14th September 2020 is being organized by the Department of Biology, School of Applied Sciences, KIIT Deemed to be University, Bhubaneswar.

The theme of the conference Emerging frontiers for healthcare is an upcoming sector which needs to be prioritized for enhancing the life expectancy of individuals. Innovations in this field can be an added feature in the already existing arsenal of tools for health improvement.

This conference will serve as a platform for nurturing young researchers with a scientific bent of mind to do wonders in this sector. This conference will surely boost up the participants to come forward with new ideas and share it with experts in this field.

I extend my greetings and congratulate the organizers and the participants and hope the event achieves great success.

**Prof. Sasmita Samanta**  
Pro-Vice Chancellor,  
KIIT-Deemed to be University



## *Message*

It gives me immense pleasure to note that the Department of Biology, School of Applied Sciences, KIIT Deemed to Be University, Bhubaneswar, is going to organize two days International Virtual Conference on the title “Emerging frontiers for healthcare and delivery” from 12th-14th September 2020. I am happy to note that an E Abstract Book will be released during the conference.

Taking active participation in this conference and contributing immensely will not only enhance their technical abilities but will also build their overall persona while instilling a sense of passion and confidence. The conference provides a platform to exchange knowledge about the latest scientific and industry results and to discuss the latest trends and development. I hope this conference will provide a fantastic opportunity to network with peers from academia and industry and aids in the development of humanity at large.

KIIT Deemed to be University has always played a vital role in promoting and organizing various value adding activities of curricular and co-curricular programs, even today when the whole world is suffering from the COVID-19 pandemic, we at KIIT Deemed to be University envisions to enrich education.

I extend my best wishes to all participants for a grand success of this conference.

Wishing the team, all success.

**Prof. Jnyana Ranjan Mohanty**  
Registrar,  
KIIT-Deemed to be University



## *Message*

It is a pleasure to know that the Biology wing of the School is organizing an International conference “Emerging Frontiers for Healthcare and Delivery” during 12 - 14 September 2020.

This meet of scientists, academicians, Industry personnel, young researchers and students from allied disciplines is very crucial to solve many different challenges of Health and allied sectors. Complex challenges often require different perspectives, cutting across disciplines and expertise. It is also very important to frame a suitable platform for the next generation to be systematically inducted into the scientific workforce. In this context, the deliberations during the three day event should lead to smart outcomes for a wide range of stakeholders.

I take this opportunity to congratulate the organizing team of this important event and wish the conference a grand success.

A handwritten signature in black ink, appearing to read 'Puspallata Pattojoshi'.

**Dr. Puspallata Pattojoshi**

Dean SAS,  
KIIT-Deemed to be University



## Message

I am delighted to say that EFHD2020 is being organised by the Department of Biology, School of Applied Science, Biology, KIIT Deemed to be University, Bhubaneswar, India, with all its glory from 12th-14th September 2020.

Academic conglomerations of the sort imbibe and explore the scholastic and cultural diversities among the entire fraternity thereby contributing to advancement of research in the health sector for betterment of mankind. Organizing such events during the ongoing pandemic strengthens and upholds our intent of developing an environment of exchange of ideas and concurrently deciphering knowledge. I am enthralled by the wide participation.

I hope this conference would trigger innovative ideas among the participants paving way for better facilities in healthcare sectors and by the end of this conference some unanswered questions in this arena shall be clarified after interaction with the person's expertise in this field.

I extend my warm greetings to all participants and wish the EFHD2020 a grand success.

**Dr. Chandana Mohanty**

Convener

KIIT-Deemed to be University

## **CONTENTS**

<b>Author Name and Publication Details</b>	<b>Page No.</b>
Understanding the Tumor Heterogeneity and Development of Multi-targeted Therapeutics in Breast Cancer Prof. Gopal C. Kundu	1
Identification of cis acting elements essential for 3D Igh locus organization and antibody repertoire formation critical for healthcare Saurabh Priyadarshi	3
Challenges and Strategies for improving tuberculosis therapy Dr. Avinash Sonawane	5
Nanotechnology based Approaches for Overcoming Multidrug Resistance in Cancer Therapy Ranjita Misra	7
Emerging trends in Nanotherapeutics to improve healthcare system Abhalaxmi Singh	8
Nutrient acquisition strategies of enteric pathogen Cryptosporidium Mastanbabu Somepalli	10
Exosomes: Cell free alternative to cell-based therapies and diagnosis of diseases Vandana Mallareddy	11
siRNA functionalized dual drug loaded mesoporous silica nanoparticles for lung cancer therapy Fahima Dilnawaz and Sanjeeb K. Sahoo	13

Targeting Cell Cycle for Cancer Treatment Priya Ranjan Debata	14
Regenerative Medicine - A Revolutionary Approach to Modern Healthcare Cuckoo Mahapatra	15
SAT-336 Time Restricted Feeding Delays Breast Cancer Initiation and Growth in a Mouse Model of Postmenopausal Obesity Manasi Das.	17
A Review on Caspase Enzyme and Its Biological Activities. Gayatri Sahoo, Dibyaranjan Samal, Meesala Krishna Murthy	18
A QSAR Model to Discover Phytochemical Urease Inhibitors Kumar Sambhav Chopdar, Pranab Kishor Mohapatra, Ganesh Chandra Dash, Binata Nayak, Mukesh Kumar Raval	20
Burkholderia gladioli Strain NGJ1 Deploys A Prophage Tail Like Protein to Feed on Fungi Durga Madha Swain, Gopaljee Jha	21
Repurposing Drugs to Aim the Diabetes Epidemic Md. Harun Al Rashid	22
Studies on Antibacterial Activity And Physicochemical Properties Of LDH/Ag Reinforced Chitosan-G-Poly Acrylonitrile Nanocomposite Shaikh Nazrul , Lingaraj Behera , Sarat Kumar Swain	23
Quinacrine-Gold Hybrid Nanoparticle and NIR Exposure Increases the Sensitivity Of Oral Cancer Stem Cells Via Upregulating DR-5 Through The Reduction Of Mitochondrial Membrane Potentiality Somya Ranjan Dasha, Subhajit Chatterjeea, Biswajit Dasa, Saptarshi Sinhaa, Chanakya Nath Kundua	25

Records of <i>Botia lohachata</i> Chaudhuri, 1912 As Indigenous Ornamental Fish In Paschim Medinipur, West Bengal, India.  Arun Jana, Godhuli Sit	27
Health Issues of Out-Migrants: A Study of Migrated Workforce from Banpur Block of Odisha, India  Sanjaya Kumar Sahoo, Sukanta Chandra Swain*	28
Big Data and Machine Learning Based Secure Healthcare Framework  Abhishek Mehta, Trupti Rathod, Khushi Solanki	29
<i>Annona Muricata</i> Leaf Extract-Induced Apoptosis In Human Breast Cancer Cells Through The Inhibition of Canonical Wnt Signaling Cascade Via Activation of P53  Swagatika Paridaa, Sujata Mahapatrab, Dillip Kumar Bishia	30
Biodiversity Conservation through Environmental Education  Kiran Kumar Jena	31
Preliminary Phytochemical Screening of Different Solvent Mediated <i>Cucumis L.</i> And <i>Momordica L.</i> Extracts of Family Cucurbitaceae  Rupinderpal Kaur, Yumnam Devashree, Vijay Singh	32
Targeting tumor micro environment for cancer therapy  Sarbari Acharya	33
Melatonin Restores the Age-Affected Chronomics Of Anti-Inflammatory Marker Socs1.  Ch. Vinod	34

Comparative study of the anti-bacterial activity of naturally occurring alkaloids and flavonoids  Sweta Mohanty, Sneha Shriparna Satpathy, Chandana Mohanty	35
Anticancer Activity of Plant Extract, Mouse Model And Skin Carcinogenesis  Anjali Bhargava, Reena Upadhyaya	37
Impact of Covid-19 Lockdown On Ground Water Of Bhubaneswar Smart City, Odisha, India: An Overview  Bharat Chandra Kalapahad, Saradendu Acharya, Prativa Kar	38
Systematic Evaluation Of Selected Herbs Of Different Families For Antidiabetic And Anticancerous Properties Of Barkatullah University Campus Area, Bhopal (M.P.)  Reena Upadhyay, Anjali Bhargava	40
Delivery of Dual Drug Loaded Lipid Based Nanoparticles Across The Blood–Brain Barrier Impart Enhanced Neuroprotection In A Rotenone Induced Mouse Model of Parkinson’s Disease  Paromita Kundu, Manasi Das, Kalpalata Tripathy, Sanjeeb K Sahoo	42
Enhanced Anti-Metastatic and Antitumorigenic Efficacy of Berbamine Loaded Lipid Nanoparticles In Vivo  Priyambada Parhi1, Sujit Suklabaidya, Sanjeeb Kumar Sahoo	43
Role of macrophage secretory factors and ROS in the formation of tunneling nanotubes and its role in cancer therapy  Pragyaparamita Sahu, SoumyaRanjan Jena, Luna Samanta	44
Effect of Vehicular Emission on Human Health In Jagatpur Industrial Zone, Cuttack District, Odisha  Dr. Swati Panda	45

Insects Vector of Plants Viral Diseases. Manish Kumar Yadav	46
Attenuation Of UVB-Induced Oxidative Damages In 3T3 Fibroblast Cells By Ethanollic Extract Of Red Alga <i>Gracilaria Verrucosa</i> Jyotsnarani Pradhan, Manisha Hota	48
Antidote Effect of <i>Withania Somnifera</i> Against Endosulfan Induced Toxicity In Ovarian Follicular Cells Of Mice Basant Kumar	49
Bionanotechnology- A New Approach for Detection and Treatment of Cancer Prabin Kumar Sahoo and Deoraj Sharma	50
Caffeine- A secondary metabolite drug Rituparna Nayak, Nikhil Pradhan, Deoraj Sharma	51
Covid 19 Vaccine Development and Novel Therapeutics Upasana Mahato, Mohammed Anas, Deoraj Sharm	52
Electronically Tuned Oxido Vanadium (IV) Porphyrins for the Selective Epoxidation of Alkenes and its applications Vivek Kumar Mishra, Chanchal Haldar	53
Gender Differences in Health and Wellbeing among Older Adults in South India; A Community Based Study Varalakshmi Manchana	55

<p>Identification and Validation of COVID-19 Therapeutic Drug Targets for Their Role Towards Drug Design</p> <p>Jyoti Rani</p>	56
<p>Basil – A Powerful Immune Modulating Herb</p> <p>Shruti Pragyan Tripathy, Kajol Behera, Deoraj Sharma</p>	58
<p>Design and Development of Several Polymeric Metal-Organic Frameworks, Spectral Characterization, and Their Antimicrobial Activity.</p> <p>Shamim Ahmad Khan</p>	59
<p>Nanoformulated Quinacrine Regulates NECTIN-4 Domain Specific Functions in Cervical Cancer Stem Cells</p> <p>Chatterjee S. , Kundu C. N.</p>	60
<p>Influence of Stress on Lysosomal Function in <i>Hydra Vulgaris</i>: Molecular Insights into Aging and Disease</p> <p>Kowshik Kukkemane</p>	62
<p>Liposomal Based Nano Drug Delivery System in Cancer Therapeutic</p> <p>Aradhana Shanti Soreng, Punyabrata Dash, Deoraj Sharma , Purnyasmi Mishra,</p>	64
<p>Mental Health Services for Children and Adolescents in India: Problems and Solutions</p> <p>Kiiriii Aniljoy</p>	65

Enhanced Photocatalytic Nanostructured Fe-Cobalt Bimetallic Oxide/Activated Carbon Composites for the Removal of Cationic Dyes from Aqueous Solutions and its prospective  K.R.Shylaja, N.P.Radhika, T.R.Divakara, B.K.Jayanna	66
Synthesis of Two [2+2] Ionic Metallomacrocycles: Design of Flexible Organometallic Ligand, Self-Assembly And Characterization of Hexagonal Macrocycles and health science applicability  Arnab Chakraborty, Khushwant Singh, Neeladri Das	68
Regenerative Medicine: A revolutionary approach to modern healthcare  Kalyani Behera	69
Role of Plant Quarantine in Prevention of Plant Diseases  Sushree Sangita Barik	70
Vaccine Perplex and Exigent Challenges  Sangeeta Kumari	72
Comparison of assembly tools using bacterial genome sequence data: Insights in to next generation sequencing data analysis  Sahu Satya Narayan , Mishara Biswajit , Sahu Rojalin	73

<p>Evaluation of the anti-cancer mechanism of berberine in human cervical cancer cells using mammalian cell culture and multiple spectroscopic approaches.</p> <p><u>Darpan Raghav</u>, Shabeeba M. Ashraf, Krishnan Rathinasamy</p>	74
<p>An insight into Colour Perception in Males</p> <p>Samar Kumar and Vedant Gattani</p>	76
<p>A computational approach to tackle the pandemic.</p> <p>Manvi, Siddhi Kumari &amp; Prateek Paul</p>	77
<p>Role of melatonin in regulation of immune responses of spleen and head kidney cells in fresh water teleost, <i>Channa punctatus</i></p> <p>Manish Kumar Tripathi</p>	78
<p>Quality of Life of People Living with Cancer under Institutionalized Palliative Care and Community Based Palliative Care in Kerala</p> <p>Kiirri Aniljoy &amp; Jona V</p>	79
<p>Studies on antibacterial activity and physicochemical properties of LDH/Ag reinforced chitosan-g-poly acrylonitrile nanocomposite</p> <p>Shaikh Nazrul , Lingaraj Behera , Sarat Kumar Swain</p>	80
<p>Monitoring pesticides in agroecosystem: The need of the hour</p> <p>Krishna Priyadarshini, Pratikshya Jena, Itishree Behera, Sukanta Kumar Nayak and Sanjay Kumar Raul</p>	82

<p>Phytochemical screening and antibacterial activity of potential mangroves of sartha estuary</p> <p>Sujit Kumar Nayak</p>	84
<p>Socio-Economic Impact of COVID-19 Pandemic on Fisheries Community of Coastal District of West Bengal</p> <p>Asim Kumar Giri and Bishruti Chowdhury</p>	85
<p>Mental Health Disbalance by COVID-19 with Special Reference of Fisheries Community</p> <p>Joydeep Das And Asim Kumar Giri</p>	86
<p>Implementation of Artificial Intelligence in sight to COVID-19 Drug Repurposing</p> <p>Satpathy Sneha shriparna , Mohanty Sweta, Mohanty Chandana</p>	87
<p>Impact of pandemic covid-19 and tuberculosis</p> <p>Bandana Khuntia</p>	89
<p>Recent research and development of drug delivery procedure</p> <p>Mitrabrata Goswami</p>	90
<p>Emerging New Technologies in Health Care: A Need for Gadchiroli District Maharashtra.</p> <p>Dr Sandeep Nivruttirao Niwadange and Dr Hemaraj Madhukar Meshram</p>	91

Studies on volatile constituents and biological properties of the essential oils from fruits of <i>Solanum pubescens</i> Willd Haseebur Rahman , Nazneen Rahman , Mir Haris , Riaz Mahmood	92
Anti-cancer effect of cerium oxide nanoparticle Tapas Ranjan Sahoo	94
Modification of ivermectin- a novel idea for the cure of Covid 19 Rajanikanta Acharya and Deoraj Sharma	95

## **Understanding the Tumor Heterogeneity and Development of Multi-targeted Therapeutics in Breast Cancer**

**Gopal C. Kundu,**

*Director R&D, KIIT Deemed to be University (KIIT DU), Bhubaneswar 751 024, India*

*E-mail: gopalc.kundu@kiit.ac.in; gopalkundu@hotmail.com*

### **Abstract:**

Tumor microenvironment play important role in determining the invasive and metastatic potential of breast and other cancers. Analysis of microenvironment in patients with different solid tumors reveals that the majority of tumors showed infiltration of T cells, macrophages, fibroblasts, dendric cells etc. Intratumoral heterogeneity contributes significantly to the effectiveness of cancer treatment and outcome. Substantial advances in cancer treatments have resulted in significant decrease in mortality. However, existing cancer therapies often result in high toxicity and nonspecific side effects. Therefore, better targeted delivery and increased efficacy of drugs are crucial to overcome these effects. In a recent study, we have implanted breast cancer patient tissues into immune deficient mice and established various generations of patient derived xenograft (PDX) models in breast cancer. The PDX models were characterized and primary cultures derived from PDX models were established and further characterized. These models will be used to screen novel drugs and to develop therapeutically relevant biomarkers using proteomics and genomics based approaches.

Osteopontin, a chemokine like ECM protein plays crucial role in regulating the oncogenic and angiogenic potential of various cancers including breast, prostate, cervix and skin. Several international laboratories including us have demonstrated the role of Osteopontin and its receptors integrins and CD44 in regulating the mechanism and signaling network that ultimately controls tumor progression and metastasis covering all the hallmarks of cancer. During last two decades, we have demonstrated that both tumor and stroma-derived Osteopontin regulate tumor growth and angiogenesis through induction of pro-angiogenic and metastasis associated genes. Recent data has shown that circulating Osteopontin acts as predictive marker in development of hepatocellular carcinoma in a large European population. Moreover, our group have

demonstrated that Osteopontin along with Cyclooxygenase-2 (Cox-2) act as early diagnostic and prognostic marker in luminal A, B positive as well as Her-2 positive and triple negative breast cancers of Indian population. It has been also reported that knocking down of Osteopontin in combination with PD-L1 in macrophages suppresses lung adenocarcinoma cell migration. We have also shown that Osteopontin up-regulates cyclooxygenase-2 expression in tumor-associated macrophages leading to enhanced angiogenesis and melanoma growth via  $\alpha 9\beta 1$  integrin. Our earlier data revealed that Osteopontin promotes HIF-1alpha dependent VEGF expression and breast tumor angiogenesis in response to hypoxia. Our recent data demonstrated that Osteopontin transactivates normal fibroblasts into myofibroblasts and supports breast tumor progression in tumor microenvironment. Furthermore, andrographolide or raloxifene encapsulated Osteopontin-derived RGD-CHNPs significantly suppressed breast tumor growth in pre-clinical mice model. Thus Osteopontin directly or using RGD conjugated nano-drug formulation could be an effective novel theragnostic strategies for the management of breast cancers.

## **Identification of cis acting elements essential for 3D Igh locus organization and antibody repertoire formation critical for healthcare**

Saurabh Priyadarshi

*Dept. of Microbiology and Immunology, University of Illinois College of Medicine,  
Chicago, IL, USA*

### **Abstract:**

A human can probably make more than  $10^{12}$  different antibody molecules even in the absence of antigen – the premature antibody repertoire. Antibodies are proteins which are encoded by genes. The question arise: how can an animal make more antibodies than there are genes in its genome? The answer is: antigen receptor genes are assembled from multiple gene segments during early lymphoid cell development in a process termed V(D)J rearrangement. During early B cell development in the bone marrow (BM), V(D)J and VJ joining occurs on the heavy (IgH) and light (IgL) chain genes, respectively and is mediated by the RAG recombinase in order to generate a diverse repertoire of antibodies. The Igh locus is encompassed within a topologically associated domain (TAD) that is partitioned into three sub-TADs. Large scale Igh locus contraction occurs prior to V(D)J recombination. VH genes are dispersed through 2.5 Mb of the Igh locus, and thus compaction of the Igh locus serves to facilitate spatial proximity between the rearranged DHJH join and distal VH genes. Furthermore, V genes rearrange with very different intrinsic frequencies. However, little is known regarding the mechanisms and DNA motifs that mediate IgH locus contraction. Although a small subset of loops has been discerned for the Igh locus, an unbiased examination of locus looping has been unavailable. We, therefore, comprehensively mapped long-range chromatin interactions using 5C and identified a set of contacts termed Sites I, FrOStIa, FrOStIb, Site II, II.5 and Site III that serve to inter-link the locus in pro-B cells. Three-dimensional DNA FISH studies demonstrated that Sites I, II, and III participate in a three-way interaction and are Pax5 dependent. We have now characterized Site I & FrOStIa and have identified specific motifs including a highly transcribed  $V_H$  promoter, a set of novel enhancers (NEs) and distinct CTCF binding motifs that participate in forming chromatin loops. CRISPR mediated deletion of each of these Site I & FrOStIa related motifs in pro B cell line confirms that these elements engage in long-range looping that determines  $V_H$  germline transcription levels and mediates V(D)J recombination. Furthermore, we generated the KO mice for Site I.3 (highly transcribed  $V_H$  gene promoter) and novel enhancer 1 DNA motifs using CRISPR/Cas9 technology. 3D FISH analysis in

mice shown the role of Site I.3 and novel enhancer 1 DNA motifs in long range chromatin interactions which plays crucial role in 3D Igh locus organization. Deletion of these motifs leads to altered VH gene usage during V(D)J recombination as a result skewed antibody repertoire formation. In conclusion, this study will form the basis for new insights regarding development of a diverse antibody repertoire which has large impact on healthcare.

## Challenges and Strategies for improving tuberculosis therapy

**Avinash Sonawane**

*Discipline of Biosciences and Biomedical Engineering,  
Indian Institute of Technology Indore, Madhya Pradesh*

### **Abstract:**

Over the years my research is focused on identification of new *Mycobacterium tuberculosis* (Mtb) virulence and vaccine molecules and their role in modulation of host immunity and drug resistance dynamics. Using glyco-catch method we identified several novel Mtb glycosylated and glycolipo-proteins important for pathogenesis and T-cell activation. We demonstrated that Mtb mannosylated phosphoribosyltransferase inhibits autophagy and reactive oxygen species production to promote mycobacterial survival in zebra fish and macrophages. Another Mtb glycolipoprotein, LprE, suppressed TLR-2, IL-12 and IL-22 dependent phago-lysosome fusion, cathelicidin peptide and autophagy expression to aid Mtb survival in macrophages. Mtb scavenge oxidative radicals to survive in macrophages, however the underlying mechanism(s) were not clear. We first time reported that previously unknown Mtb mannosylated acetyltransferase (Rv3034c) scavenge ROS by inducing peroxisome biosynthesis. We also found that Mtb Rv3034c regulate peroxisome homeostasis, peroxisomal  $\beta$ -fatty acid oxidation pathway and “pexophagy” mechanism to aid bacillary growth in macrophages. A recent notable finding by us showed that Mtb not only reside in macrophages but also in bone marrow mesenchymal stem cells (BM-MSCs) and use them as a safe niche to remain in dormant state. We showed that pathogenic Mtb, but not avirulent mycobacteria, inhibit cathelicidin synthesis by modulating TLR2/MyD88/IRAK4/NF- $\kappa$ B signaling to prolong its survival in BM-MSCs. Mtb also manipulates calcium signaling to support its growth in host cells. A recent path-breaking finding from our group showed that Mtb inhibits TRPV4 calcium ion channel to bipolarize host immunity during infection. *Trpv4*<sup>-/-</sup> mice were more susceptible to Mtb during early stages of infection, while during chronic stage *Trpv4*<sup>-/-</sup> mice were able to contain Mtb infection better than wild-type mice due to reduced lung inflammation by less neutrophil infiltration to TB lung granuloma. Recently our group has developed small conjugate molecules that improve treatment of tuberculosis in vivo-models. Notably, recently our group has successfully developed a novel asparaginase enzyme based therapy for

the treatment of primary and relapsed acute lymphatic leukemia (ALL). This enzyme shows better therapeutic efficacy as compared to commercial asparaginase drugs.

## Nanotechnology based Approaches for Overcoming Multidrug Resistance in Cancer Therapy

Ranjita Misra

*Sathyabama Institute of Science and Technology, Deemed to be University,  
Chennai, Tamilnadu, India*

### **Abstract:**

Chemotherapy with the use of cytotoxic drugs is commonly implemented in the management of many cancer types. However, development of drug resistance is a major obstacle to the success of cancer chemotherapy. It is known that several cell membrane transporter proteins are responsible for the resistance to many commonly used chemotherapeutic drugs by affecting disposition of these drugs in the tumor cells. Overexpression of P-glycoprotein is one of the prominent mechanisms that contribute to the multidrug resistance phenotype. Development of drug resistance with the treatment of DOX leads to an unsuccessful outcome in many patients. Different strategies are available to overcome MDR in cancer cells like use of MDR modulators, RNA interference (RNAi) therapy are the most current technologies. In order to face the challenge in cancer drug resistance the use of novel combination therapy has been highlighted recently. Nowadays, nanotechnology-based combination drug delivery systems has emerged as efficient drug delivery strategy to target the drugs to tumor tissues thereby overcoming many biological, biophysical and biomedical barriers that the body exists against successful delivery of anticancer drugs. These co-delivery systems provides a sustained, controlled and targeted delivery of individual chemotherapeutic drugs in a combinational approach suggesting enhanced therapeutic anticancer effects with reduced drug related side effects. There is rising support that many combinatorial nanoparticles consisting of both MDR modulators (either chemosensitizers or siRNA) and chemotherapeutic agents have been used successfully to resensitize the tumor cells thereby augmenting the therapeutic efficiency of cancer therapy both *in vitro* and *in vivo*.

## **Emerging trends in Nanotherapeutics to improve healthcare system**

Abhalaxmi Singh

*Department of Pharmacology, University of Illinois, Chicago, USA*

*Email: abhalaxmi@gmail.com*

### **Abstract:**

Advances in nanotechnology have helped to translate multifunctional nanoparticles into biomedical applications by overcoming the shortcomings related to traditional disease diagnosis and therapy. Nanoparticle drug delivery systems have been used in the clinic since the early 1990's. Traditionally, nanomedicines were aimed to improve the delivery of therapeutic molecules at the target site and to have a better biodistribution thereby improving the balance between their efficacy and toxicity. Over these past decades, newer strategies have been evolved with mainly four directions to boost nanomedicine performance and exploitation, i.e. smart patient stratification, smart drug selection, smart combination therapies and smart immunomodulation.

Combination of chemotherapeutic medications has long been adopted as the standard first-line treatment against cancer to improve the clinical outcome. It has several advantages like 1) use of drugs at lower doses, 2) reduction of cytotoxic effect, 3) induction of synergistic effect of drugs resulting in better therapeutic response and improved survival. However, effective administration of multiple drugs with different pharmacokinetics in specific dose ratio is a challenge. Nano-formulations help to overcome these limitations by encapsulating multiple drugs with different properties in desired ratio. Further, combinatorial therapies involving both siRNA and miRNA have the potential benefits of dual inhibition of a target gene product as well as modulation of oncogenes within the same pathway. In addition, chemotherapeutic drugs can also be combined with the advantage of thermal therapy by encapsulating metal oxides that can be externally modulated by alternating current.

Immunotherapies including immune checkpoint inhibitors, and chimeric antigen receptor (CAR) T cell therapies have radically changed the cancer therapy landscape. Nano-immunotherapy can be used in different ways to modulate the adaptive/ innate immune system. Nano therapies can trigger tumor cell death and release of tumor antigens that can act as adjuvants to initiate immune response against cancer

cells. Further, it also helps to target the peripheral immune system located in lymph nodes and in the spleen.

Other than different therapies, recently another focus of nanomedicine research has been towards development of bioinspired or biomimetic formulations. This helps to recapitulate one or more functional modules of their native counterparts, intending to deliver cargoes in a manner that mimics how the signals are transduced in natural systems. Biomimetic nanoparticles can be designed to mimic many of the natural mechanisms of the immune system engaged in an inflammatory response to achieve inflammation targeting. Nanomedicine research has built interdisciplinary teams including engineers, chemists, biologists, physicists, and clinicians to clinically translate nanotechnology to improve the lives of patients and revolutionize the health care worldwide.

**Keywords:** Nanomedicine, Immunotherapy, combinatorial therapy, biomimetic nanoparticle

## Nutrient acquisition strategies of enteric pathogen *Cryptosporidium*

Mastanbabu Somepalli

University of Pennsylvania, USA

Email: babusmastan@gmail.com

### Abstract:

The apicomplexan parasite *Cryptosporidium* is a major cause of diarrheal morbidity and mortality worldwide. Despite this enormous global burden, effective treatment options are lacking and the frontline drug nitazoxanide has limited efficacy in the most susceptible individuals. Thus, there is an urgent need for developing safe and efficacious treatments. Nutrient acquisition is a fundamental aspect of host-pathogen interactions and is a potential target for anticryptosporidial agents. Nucleotide pathways are attractive targets for antimicrobial development, and several laboratories are designing inhibitors of these enzymes as potential treatment for *Cryptosporidium* infections. Here we take advantage of newly available molecular genetics for *Cryptosporidium parvum* to investigate nucleotide biosynthesis by directed gene ablation. Surprisingly, we found that the parasite tolerates the loss of classical targets including dihydrofolate reductase-thymidylate synthase (DHFR-TS) and inosine monophosphate dehydrogenase (IMPDH). We show that thymidine kinase provides a route to thymidine monophosphate in the absence of DHFR-TS. In contrast, only a single pathway has been identified for *C. parvum* purine nucleotide salvage. Nonetheless, multiple enzymes in the purine pathway, as well as the adenosine transporter, can be ablated. The resulting mutants are viable under normal conditions but are hypersensitive to inhibition of purine nucleotide synthesis in their host cell. *Cryptosporidium* might use as-yet undiscovered purine transporters and salvage enzymes; however, genetic and pharmacological experiments led us to conclude that *Cryptosporidium* imports purine nucleotides from the host cell. The potential for ATP uptake from the host has significant impact on our understanding of parasite energy metabolism given that *Cryptosporidium* lacks oxidative phosphorylation and glycolytic enzymes are not constitutively expressed throughout the parasite life cycle

## **Exosomes: Cell free alternative to cell-based therapies and diagnosis of diseases**

Vandana Mallareddy

*Lewis Katz School of Medicine Temple University, USA*

*Email: vandana.mallareddy@temple.edu*

### **Abstract:**

Cardiovascular diseases (CVDs) are the major cause of death globally. Several risk factors have been identified which strongly associate with the development of CVDs. The highest risk of CVDs is with co-morbidities such as diabetes, hypertension, hyperlipidemia, depression etc. In order to understand the biological implications underlying these mechanisms, several studies are focused towards genetics and proteomics approach. Recently, the shift has been thrust towards extracellular vesicles (EVs) mainly exosomes as another critical factor responsible for CVDs. There are three main subtypes of EVs i.e., microvesicles, exosomes, and apoptotic bodies, which are differentiated based on their biogenesis, release pathways, size, content, and function. With no specific protein markers identified to distinguish between the different types of EVs, different protein profiles due to their different routes of formation are their basic markers. Exosomes are nanoscale membrane-bound EVs formed by an endosomal route and are typically 30–150 nm in diameter. Specifically, these are formed by inward budding of the limiting membrane of early endosomes secreted by most eukaryotic cells in the body that facilitates intercellular communication. They carry several signaling biomolecules, including non-coding/coding RNAs, proteins, enzymes, cell surface receptors, growth factors, cytokines and lipids that can modulate target cell biology and function. Due to these capabilities, exosomes have emerged as novel wireless communicator in paracrine and autocrine manner with different or same cell types in heart tissue. Studies have shown that exosomes contribute to both normal physiology (for example, cardiac development, reticulocyte maturation and myocardial angiogenesis), as well as to pathophysiological processes leading to development of CVDs such as Myocardial infarction, cardiomyopathy, coronary artery disease etc. Exosomes (either circulating or released from heart tissue) have been actively involved in cardiac remodeling in response to stressors. Besides, exosomes released from stem cells have protective effects in heart diseases and shown to have regenerative potential in the heart. Critically, exosomes have an inherent low risk compared to live stem cell transplants and harness a natural regenerative capability from these stem cells. These exosomes cannot replicate and transform

into other harmful cell types. In addition, they are less likely to trigger an immunogenic response. The unique composition of exosomes depending on their origin cells provide the potential in the clinical realm, for use in diagnosis, prognosis and therapeutics. In recent years, the exosomal miRNAs and lncRNAs have attracted much attention as novel disease biomarkers and useful diagnostic tools with high specificity not just in CVDs but also extensively in Cancer. Different biochemical and biophysical methods are used for the isolation of exosomes based on their size, shape, charge and surface markers. However, the clinical translation of exosomes has been limited by the isolation and purification methods, as well as their restricted yields and functional heterogeneity. Thus, engineering exosomes through surface modification has emerged in order to augment the natural properties of exosomes and to recapitulate their function in semi-synthetic and synthetic form. With continuing research and evolving technology, exosomes could be the future for personalized medicine

**Keywords:** Cardiovascular diseases, exosomes, stem cells, regenerative, biomarker

**siRNA functionalized dual drug loaded mesoporous silica nanoparticles for lung  
cancer therapy**

**Fahima Dilnawaz\* & Sanjeeb K. Sahoo\***

*\*Laboratory of Nanomedicine, Institute of Life Sciences, Nalco Square, Chandrasekharpur,  
Bhubaneswar-751023, Odisha, India*

*Email : fahimadilnawaz@gmail.com*

**Abstract**

Globally lung cancer remained as the leading causes of death. Active targeting has been considered as an attractive choice towards improved therapeutic efficiency. Nanoparticle-mediated gene therapy has been involved for therapeutic improvement in cancer. Recently mesoporous silica nanoparticles (MSNs) has drawn significant attention for potential biomedical applications, due to its attractive multifaced features such as huge surface area, tunable pore size, high drug loading capacity and biocompatibility. In the present study MSNs were synthesized and well characterized. Combined anticancer drug loaded MSNs were functionalized with surviving-siRNA and its therapeutic efficacy was evaluated in A549 cells. Our results revealed combinational approach is quite effective to achieve synergistic effect. This approach will shed new light on future design and applications for lung cancer therapy.

## **Targeting Cell Cycle for Cancer Treatment**

Priya Ranjan Debata

*P. G. Department of Zoology, North Orissa University, Takatpur, Baripada,  
Mayurbhanj, Odisha, 757003*

*E-mail: prdebata@gmail.com*

### **Abstract:**

Cell proliferation is necessary for growth, development, and regeneration of eukaryotic organisms; however, the abnormal cell proliferation causes cancer. Deregulation of cell cycle has been well documented as involved in the process of carcinogenesis. The genetic, epigenetic and metabolic alterations play important role in deregulating the cell cycle events as a result of which development of cancer. Cell cycle is a series of well-organized and tightly regulated events in the cell at molecular level in which a cell prepares for its division. It can be broadly defined as the molecular events starting from the birth of a cell until its division. During this period the cellular components are doubled, and then accurately segregated into daughter cells. The cell cycle is divided into G1 phase where the signaling events initiates the process, in S phase the DNA replication occurs, in G2 phase the cell organizes and condenses the genetic material, and in M phase the cell divides into two daughter cells. Sometimes the cells exit cell cycle and remain as a quiescent, metabolically active stage called G0 phase or resting phase, and the cells are called as postmitotic cells. The Restriction point (R) is located at G1 is important determiner and commits the cell cycle process to go on. Several drugs have been developed which interfere with the machinery of cell cycle and holds opportunity for treatment of cancer in future. Once of the such drugs palbociclib a CDK4/CDK6-selective inhibitor recently got provisional approval of breast cancer treatment by the FDA. Other CDK4/CDK6- selective inhibitors demonstrated very encouraging results both in clinical and preclinical set up. Besides a growing list of compounds both synthetic and natural origins are available those selectively inhibit the function of different enzymes and proteins involved in cell cycle. Studies on targeting cell cycle for treatment of cancer is an active area of cancer research

## **Regenerative Medicine - A Revolutionary Approach to Modern Healthcare**

Cuckoo Mahapatra

*P. G. Department of Zoology, North Orissa University, Baripada-757003*

### **Abstract:**

Care and management of injured tissues, organs and chronic diseases are major challenges in modern healthcare system owing to rising costs and patient comorbidities. Regenerative medicine and tissue engineering provide a ray of hope in devising alternative strategies that can replace current treatment methods such as surgery and surgical transplantation. Surgery and organ transplantations additionally require immune-suppressants and post-surgical care which may take long periods of recuperation and typically do not return the patient to pre-disease condition. Regenerative medicine is an emerging interdisciplinary field of research and clinical application that promises to ensure the complete restoration of original health to the patient by repair, replacement and regeneration of cells, tissues and organs. It uses various approaches which are broadly divided into two i.e., manipulation of stem cells and engineering of extracellular templates or scaffolds. Since, regenerative medicine is an evolving field most approaches are in pre-clinical and clinical trial stages and very few therapies are in market. Furthermore, these strategies ignore the importance of endogenous regenerative ability of the individual which is expected to enhance the therapeutic outcome. Regenerative ability has been well documented in amphibians, few lizards and many invertebrates but is limited in human beings and other mammals. Phylogenetic relationships have revealed that the inability to regenerate has evolved from a regenerative pre-condition and regenerative failure results from disruption of endogenous regeneration process. So, a mechanistic understanding of regeneration is necessary as it would allow targeted intervention to improve the therapeutic response and explore ways to stimulate regeneration where it does not normally occur. Hence, regeneration studies on model organisms like amphibians and lizards will not only help in devising guiding principles for effective regeneration in human beings but also supplement the existing strategies in regenerative medicine.

## SAT-336 Time Restricted Feeding Delays Breast Cancer Initiation and Growth in a Mouse Model of Postmenopausal Obesity

**Manasi Das**, PhD, **Deepak Kumar**, PhD, Consuelo Saucedo, BS, Emilie Gross, PhD, Hyun-Tae Park, MD, Mehak Kaur, Karina Kuo, Purva Parwal,

*Dorothy Sears, PhD, Lesley Ellies, PhD*

*University of California San Diego, San Diego, CA, United States*

### **Abstract:**

The prevalence of obesity and the metabolic syndrome (MetS) has increased dramatically in developed countries over the last three decades. Numerous studies indicate that adiposity and the MetS are independent risk factors for multiple diseases including cancer, particularly postmenopausal breast cancer. Therefore improving the metabolic health of obese postmenopausal women may mitigate their risk for breast cancer. Accumulating evidence suggests that time-restricted feeding (TRF), a form of intermittent fasting in which food intake is limited to a defined period during the normal active phase, can have a positive influence on metabolic health. Importantly, interventional studies in obese mice and small clinical studies in humans have demonstrated that TRF can improve metabolic health even though obesity is maintained. Time restriction rather than calorie restriction is thus a promising method to control the negative sequelae of obesity, due to the hunger and irritability that reduces compliance with long-term calorie restriction. The objective of this study was to investigate whether TRF attenuates breast cancer in a mouse model of postmenopausal obesity and whether this effect is mediated by reducing the hyperinsulinemia associated with obesity. **Methods:** Ovariectomized mice were used as postmenopausal mice model. The ovariectomized mice were initially made obese by feeding 60% high fat diet (HFD) for 10 weeks and then grouped into a continued *ad libitum* group (24 h access to food) or a TRF group (8 h access to food during active phase). For an orthotopic tumor model, mice were injected with E0771 breast cancer cells into four mammary fat pads per mouse three weeks following the start of TRF. As a tumor initiation model, transgenic PyMT mice were used to assess tumor onset and growth following the same TRF or AL access to the HFD. The insulin dependency of tumor growth

was studied by increasing insulinemia using an implanted insulin pump, or by reducing insulin secretion using diazoxide. Insulin effects on tumor cell proliferation and migration was further validated *in vitro*.

**Results and Conclusion:** TRF had a dramatic effect, reducing tumor growth in obese mice fed a high fat diet (HFD) to levels seen in lean mice. Tumor growth and initiation was also delayed in the transgenic PyMT model of mammary tumorigenesis. Our results further suggest that the antitumor effect of TRF is at least partially mediated by reducing hyperinsulinemia, suggesting that this intervention may be effective in breast cancer prevention and therapy.

## **A Review on Caspase Enzyme and Its Biological Activities**

Gayatri Sahoo<sup>1</sup>, Dibyaranjan Samal<sup>2</sup>, Meesala Krishna Murthy<sup>3\*</sup>

<sup>1</sup>Department of Zoology, PSSJ Degree College, Banarpal, Angul 759128, Odisha, India.

<sup>2</sup>Department of Biotechnology, Academy of Management and Information Technology (AMIT), Khurda 752057, Odisha, India.

<sup>3\*</sup>Department of Zoology, Mizoram University, Aizawl 796004, Mizoram, India.

### **Abstract:**

In protein world, different types of proteins regulate our biological activities and some creates revolutionary works. Caspase is one of them. Caspases are those proteolytic enzymes, belong to a family of Cysteine protease, which play a major role in the apoptosis/apoptotic cell death pathway/programmed cell death. This type of cell death triggers cleaving specific proteins in the cytoplasm and nucleus. Caspases also regulate programmed cell death such as pyroptosis and necroptosis. Cancer deficiency causes tumor development and different types of caspases regulate different activities and irregularity of these caspases develop many diseases in animals. Caspases involved inflammatory signals are also implicated in disease. caspases exist as inactive zymogens in cells and undergoes cascade catalytic activation at the onset of apoptosis. The activated caspases are subject to inhibition by the inhibitor-of apoptosis (IAP) family of proteins. All caspases are obligate homodimers in their active forms. The two monomers of the active molecules are required to provide mutual interaction that stabilizes the catalytic site in a productive conformation. Caspases can mediate the inflammatory response and apoptotic cell death to maintain organismal homeostasis. Caspases are involved in suppression of oncogenic transformation. Upstream of caspase activity regulates Tumorigenesis mechanism. Caspase gene polymorphism may be involved in numerous tumor types. These oncogenic changes promote apoptosis/programmed cell death. HCoV-OC43, Human corona virus, is a member of the species Beta-coronavirus 1, which induced neuronal programmed cell Death.

HCoV-OC43 infection in human neurons activates unfolded-protein response and caspase-3 induces cell death and the viral protein spike (S) glycoprotein is involved in the process. My article is the basing upon caspases and their regulatory activity on apoptosis.

**Keywords:** Enzymes, Caspase, Homodimers, Proteolysis, Apoptotic

## A QSAR Model to Discover Phytochemical Urease Inhibitors

Kumar Sambhav Chopdar<sup>1</sup>, Pranab Kishor Mohapatra<sup>2</sup>, Ganesh Chandra Dash<sup>3</sup>, Binata Nayak<sup>4</sup>,  
Mukesh Kumar Raval<sup>5, #, \*</sup>

<sup>1</sup>Department of Zoology, Rajendra College, Balangir, Odisha 767002, India

<sup>2</sup>Department of Chemistry, CV Raman College of Engineering, Bhubaneswar,  
Odisha 752054, India

<sup>3</sup>Department of Chemistry, APS College, Roth, Balangir, Odisha 767061, India

<sup>4</sup>School of Life Sciences, Sambalpur University, Sambalpur, Odisha 768019, India

<sup>5</sup>Department of Chemistry, Gangadhar Meher University, Sambalpur, Odisha 768004, India

<sup>#, \*</sup> Present Address: Stone Building, Opposite Mission School, Balangir, Odisha 767001, India

### Abstract:

Urease inhibitors are known to play an important role in the field of medicine as well as agriculture. Attempt is made to develop novel urease inhibitor(s) with a major concern to treat *Helicobacter pylori* infection. Due to their hydrolytic instability and toxicity profile, amongst a number of urease inhibitors, a large number of molecules fail *in vivo* and in clinical trials. The search for potential inhibitors may require screening of large and diverse databases of small molecules and to design novel molecules. We have developed a Monte- Carlo method based QSAR model to predict urease inhibiting potency of molecules using SMILES and GRAPH descriptors on an existing diverse database of urease inhibitors. The model satisfies all the statistical parameters required for acceptance as a good model. The model is applied to identify urease inhibitors among the wide range of compounds in the phytochemical database, NPACT, as a test case. We combine the ligand-based and structure- based drug discovery methods to improve the accuracy of the prediction. The method predicts pIC50 and estimates docking score of compounds in the database. The method may be applied to any other database or compounds designed *in silico* to discover novel drugs targeting urease.

**Keywords:** QSAR, Monte-Carlo method, Urease inhibitors, Phytochemicals.

## ***Burkholderia gladioli* Strain NGJ1 Deploys a Prophage Tail like Protein to Feed on Fungi**

Durga Madhab Swain, Gopaljee Jha

Plant Microbe Interactions Laboratory, National Institute of Plant Genome Research, Aruna  
Asaf Ali Marg, New Delhi, 110067, India.

### **Abstract:**

Some bacteria can feed on fungi, a phenomenon known as mycophagy. Here we show that a prophage tail-like protein (Bg\_9562) is essential for mycophagy in *Burkholderia gladioli* strain NGJ1. The purified protein causes hyphal disintegration and inhibits growth of several fungal species. Disruption of the Bg\_9562 gene abolishes mycophagy. Bg\_9562 is a potential effector secreted by a type III secretion system (T3SS) and is translocated into fungal mycelia during confrontation. Heterologous expression of Bg\_9562 in another bacterial species, *Ralstonia solanacearum*, confers mycophagous ability in a T3SS-dependent manner. We propose that the ability to feed on fungi conferred by Bg\_9562 may help the bacteria to survive in certain ecological niches. Furthermore, considering its broad-spectrum antifungal activity, the protein may be potentially useful in biotechnological applications to control fungal diseases.

## **Repurposing Drugs to Aim the Diabetes Epidemic**

Md. Harun Al Rashid

Samsi Rural Hospital, Ratua-1, Malda 732139, West Bengal, India.

E-mail: mdharunalrashid15@gmail.com

### **Abstract:**

A drug repurposing strategy could be a potential approach to overcoming the economic costs for diabetes mellitus (DM) treatment incurred by most countries. DM has emerged as a global epidemic, and an increase in the outbreak has led developing countries like Mexico, India, and China to recommend a prevention method as an alternative proposed by their respective healthcare sectors. Despite major investment by pharmaceutical companies in conventional drug discovery pipelines, development of new drugs has failed to keep up with the increasing incidence of many diseases, including DM. Drug repurposing, where existing drugs are applied to a new indication, is gaining momentum as a successful approach to overcome the bottlenecks commonly encountered with conventional approaches. Repurposing takes advantage of available information on the molecular pharmacology of clinical agents to drastically shorten drug development timelines. This review discusses recent advances in the discovery of new antidiabetic agents using repurposing strategies.

## **Studies on Antibacterial Activity and Physicochemical Properties Of LDH/Ag Reinforced Chitosan-G-Poly Acrylonitrile Nanocomposite**

Shaikh Nazrul <sup>a</sup>, Lingaraj Behera <sup>b</sup>, Sarat Kumar Swain <sup>c,\*</sup>

<sup>a</sup> P. G. Department of Chemistry, North Orissa University, Baripada 757003, Odisha, India,  
nazrulshaikh2@gmail.com

<sup>b</sup> P. G. Department of Chemistry, North Orissa University, Baripada 757003, Odisha, India,  
lrbehera@yahoo.com

<sup>c,\*</sup> Department of Chemistry, Veer Surendra Sai University of Technology, Burla, Sambalpu-768018,  
Odisha, India, skswain\_chem@vssut.ac.in \*Corresponding author

### **Abstract:**

The design of advanced materials with antimicrobial properties has emerged in response to the need for preventing and controlling the growth of pathogenic microorganisms without the use of antibiotics. The present work deals with the application of a relatively new class of hybrid filler, Mg-Al LDH/Ag was incorporated as a reinforcing filler with antibacterial properties to chitosan-g-poly(acrylonitrile) for synthesizing CS-g- PAN/Mg-Al LDH/Ag nanocomposites. A series of CS-g-PAN/Mg-Al LDH/Ag nanocomposites have synthesized by in situ polymerization method. The nanocomposites are systematically characterized by Fourier Transform Infrared Spectroscopy (FTIR), X- ray Diffraction (XRD), Thermogravimetric analysis (TGA), Field Emission Scanning Electron Microscopy (FESEM), High-Resolution Transmission Electron Microscopy (HRTEM), Energy Dispersive Spectroscopy (EDS), UV-Vis spectrophotometer and Oxygen Permeability Test. The tensile strength and antibacterial activity are studied. Antibacterial properties of such nanocomposites were determined by using an agar diffusion test against both Gram positive bacteria (*Staphylococcus aureus*) and Gram negative bacteria (*Escherichia coli*). The interaction between hybrid filler and polymer matrix is studied by FTIR. TGA reveals CS-g-PAN/Mg-Al LDH/Ag nanocomposites have more thermal stability over virgin PAN and CS-g-PAN copolymers. The morphology of the CS-g- PAN/Mg-Al LDH/Ag nanocomposites is explored by using XRD, FESEM and HRTEM. The as-synthesized

nanocomposite has appreciable thermal stability in combination with reduction in oxygen permeability and better antibacterial activities by which the material with potential use in diverse applications such as packaging or paper coatings.

**Keywords:** LDH, AgNPs, Nanocomposites, Antibacterial activity.

## **Quinacrine-Gold Hybrid Nanoparticle and NIR Exposure Increases the Sensitivity Of Oral Cancer Stem Cells Via Upregulating DR-5 Through The Reduction Of Mitochondrial Membrane Potentiality**

Somya Ranjan Dash<sup>a</sup>, Subhajit Chatterjee<sup>a</sup>, Biswajit Das<sup>a</sup>, Saptarshi Sinha<sup>a</sup>,

Chanakya Nath Kundu<sup>a\*</sup>

<sup>a</sup>Cancer Biology Division, School of Biotechnology, Kalinga Institute of Industrial Technology (a deemed to be University), Campus-11, Patia, Bhubaneswar, Odisha, 751024, India.

Corresponding Author:

\*School of Biotechnology, Kalinga Institute of Industrial Technology (a deemed to be University), Campus-11, Patia, Bhubaneswar, Odisha, 751024, India;  
E-mail: cnkundu@gmail.com; cnkundu@kiitbiotech.ac.in

### **Abstract:**

Oral squamous cell carcinoma (OSCC) is one of the major predominant cancer worldwide. Treatment of oral cancer is possible by medication, surgery, and radiation which relieve the patient for a shorter period. The existence of cancer stem-like cells (CSCs) in the bulk of tumor mass promotes its survivability while protecting itself from the cytotoxic effects of the drugs and develops multidrug resistance property while promoting the greater chance of cancer reoccurrence. The conventional chemotherapeutic agents cannot kill the CSCs because they escape the toxic effects of the drug due to its high DNA repair and high drug efflux capacities. So, it is required to formulate a multimodal agent that can increase the DNA damage in one hand and inhibit the DNA repair activity on the other hand that can kill CSC in a specific manner. As usual selective targeting of cancer and cancer stem cells always remains a challenging task. Literature suggested that gold (Au) and Quinacrine (QC) both have DNA damaging potential in cancer cells and Au has excellent photothermal activity. QC activates DNA repair inhibitory (DRI) protein APC and possesses DNA binding ability which causes DNA adduct. Accordingly, we framed our objective to develop a PLGA-coated hybrid nanoparticle (QAuNP) by combining Quinacrine (QC) with gold (Au) and use it as a photosensitizer molecule which induces hyperthermia in the oral cancer stem cells upon near-infrared light (NIR) stimulation. The combined effect of QC, Au, and hyperthermia can effectively promote the induction of apoptosis in invitro developed SCC-9 CSCs model via the upregulation of DR-5 (Death receptor 5) in a TRAIL

independent manner. In addition, these multimodal hybrid nanoparticles decrease the mitochondrial membrane potential (MMP) and elevate the level of ROS (Reactive oxygen species) in SCC-9 CSCs. Thus, chemotherapeutic and photoablation/hyperthermia collectively contribute to enhance anticancer efficacy in SCC-9 CSCs.

**Keywords:** Oral cancer, QAuNP hybrid nanoparticle, Photothermal therapy, DR-5.

**Records of *Botia lohachata* Chaudhuri, 1912 As Indigenous Ornamental Fish in Paschim Medinipur, West Bengal, India.**

Arun Jana\*, Godhuli Sit

PG Dept. of Zoology, Raja N.L. Khan Women's College (Autonomous), Midnapur, Paschim

Medinipur, West Bengal 721102, India

arunjana@gmail.com, kgpgodhuli563@gmail.com

**Abstract:**

The main objective of the present study is the survey of small indigenous freshwater ornamental fish diversity of Paschim Medinipur districts of West Bengal, India and emphasis has been given to their ornamental value and local abundance. The economical condition of the villagers does not permit to perform a sophisticate life in the study area. As because they have to largely depend upon the cultivation and capturing of small fish, prawn, crab and molluscs from different freshwater resources for their daily diet. But they do not know that there are so many freshwater indigenous small and moderate size fish which has immense ornamental value. During the study period we recorded *Botia lohachata* chaudhuri, 1912 first time to the Paschim Medinipur district as well as West Bengal. *Botia lohachata* chaudhuri, 1912 only distributed at Midnapore block of Paschim Medinipur district. The specimens have been identified morphometrically & meristimatic system followed by Talwar-Jhingran, 1991. It's belongs to family Botiidae under order cypriniformes. *Botia lohachata* chaudhuri, 1912 is a good ornamental fish due to its body colour which appears as Silvery grey, with a series of Y-shaped marking, fins hyaline to delicate grey, partly with dark blotches and bars have been attracted aquarist. It is found in very low amount into study area. So, need its conservation. If we can culture and breed this indigenous ornamental fish from the natural water bodies, then on the one hand it will be possible to conservation of this fish and on the other hand it will bring economic prosperity to the local people.

**Keywords:** Conservation, Ornamental, Paschim Medinipur, Record.

## **Health Issues of Out-Migrants: A Study of Migrated Workforce from Banpur Block of Odisha, India**

Sanjaya Kumar Sahoo, Sukanta Chandra Swain\*

*KIIT Deemed to be University, Bhubaneswar,*

*Email: sanjaya86census@gmail.com Email:*

*sukanta\_swain@yahoo.com*

### **Abstract:**

Mismatch of regional supply and demand of workforce warrants migration. Workforce gets migrated from abundantly available regions to scarcely endowed regions. Migration reduces the pressure of unemployment in the regions of abundance and facilitates capital formation. At the same time, migrated workforce comes across multiple adversities at their migrated places leading to complication in many fronts like adaptability to climate, culture, practice, language, food, etc. All these issues have direct bearings with the health of the migrants. As hypothesized prior to this research, on the basis of observation of a few cases, migration put toll on the health of the migration owing to failure in adaptability. However, hypothesis based on judgment needs to be tested and hence the foundation of this research is laid. This Paper is based on qualitative research wherein Case study method is adopted and seven cases (i.e., migrants) have been highlighted through in-depth interviews with those migrants, their family members and health-care consultants of those migrants for ascertaining whether migration has gifted them some diseases. In the process, this study also unfolds the availability, affordability and accessibility of the health care facilities in the migrated places by the migrant work force.

**Keywords:** Migration, migrated place, Health issues, Health care facilities, Availability, Affordability, Accessibility.

## **Big Data and Machine Learning Based Secure Healthcare Framework**

Abhishek Mehta<sup>a</sup>, Trupti Rathod<sup>b</sup>, Khushi Solanki<sup>c</sup>

<sup>a</sup>Parul Institute of Computer Application, Parul University, Vadodara, Gujarat, India,  
abhishek.mehta3094@gmail.com

<sup>b</sup>Vidyabharti Trust College of Master in Computer Application, Bardoli, Gujarat, India,  
trupti123.rathod@gmail.com

<sup>c</sup>Parul Institute of Computer Application, Parul University, Vadodara, Gujarat, India,  
khushisolucky1278@gmail.com

### **Abstract:**

The paper presents a brief introduction to big data and its role in healthcare applications. It is observed that the use of big data architecture and techniques are continuously assisting in managing the expeditious data growth in healthcare industry. Here, initially an empirical study is performed to analyze the role of big data in healthcare industry. It has been observed that significant work has been done using big data in healthcare sector. Nowadays, it is intricate to envision the way the machine learning and big data can influence the healthcare industries. It has been observed that most of the authors who implemented the use of machine learning and big data analytics in disease diagnosis have not given significant weightage to the privacy and security of the data. Here, a novel design of smart and secure healthcare information system using machine learning and advanced security mechanism has been proposed to handle big data of medical industry. The innovation lies in the incorporation of optimal storage and data security layer used to maintain security and privacy. Different techniques like masking encryption, activity monitoring, granular access control, dynamic data encryption and end point validation have been incorporated. The proposed hybrid four-layer healthcare model seems to be more effective disease diagnostic big data system

**Keywords:** Healthcare, Big data analytics, Disease diagnosis, Predictive analysis, Security and

## ***Annona Muricata* Leaf Extract-Induced Apoptosis In Human Breast Cancer Cells Through The Inhibition Of Canonical Wnt Signaling Cascade Via Activation of P53**

Swagatika Parida<sup>a</sup>, Sujata Mahapatra<sup>b</sup>, Dillip Kumar Bishi<sup>a\*</sup>

<sup>a,b</sup>Dept. of Biotechnology, Rama Devi Women's University, Vidya Vihar, Bhubaneswar, Odisha

<sup>a\*</sup>Dept. of Biotechnology, Rama Devi Women's University, Vidya Vihar, Bhubaneswar, Odisha, India;

E-mail: dillipkumar.bishi@gmail.com

### **Abstract:**

Wnt signaling pathway is a major intracellular cascade of events that promotes differentiation and maintains the stemness of the cells. In cancer, it has been observed that the upregulation of the Wnt signaling is crucial for the survival of the cancer cells and also reprogram them to acquire epithelial to mesenchymal transition (EMT), which is a hallmark for the development of cancer stem cells (CSCs). Cancer stem cells reside in the bulk of tumor cells and most of the existing chemotherapeutics drugs are inaccessible to target CSCs, which is a major cause of cancer relapse. Targeting the major signaling pathway before the cancer cells determine its fate to become CSCs would be a promising approach for the treatment of cancer. Moreover, due to non-specific targeting by synthetic drugs available in the market, kill not only the cancer cells but also have adverse side effects on neighboring healthy cells. An extensive literature investigation suggested that the leaf extract of *Annona muricata* has a promising anti-cancer potential. Considering all the previously reported results, we hypothesize that whether the same could inhibit the Wnt signaling pathway or not. We have attempted to assess the IC<sub>50</sub> concentration of lyophilized leaf extract of *Annona muricata*, using two different human breast cancer cell lines (MCF-7 and MDA-MB 231) by performing MTT assay.  $\gamma$ -H2AX and Caspase-3 immunofluorescence assay was performed to check the chromosomal integrity, DNA damaging and apoptosis-inducing potentiality of the *Annona muricata* leaf extract. Western blot was performed to confirm the downregulation of Wnt signaling pathway associated proteins and the upregulation of p53, thus arrest the cell cycle and induce apoptosis in cancer cells. Collectively, all these results demonstrate that leaf extract of *Annona muricata* could be a potent natural drug formulation with significant anti-cancer activity.

**Keywords:** Breast cancer, *Annona muricata*, Wnt signaling, Apoptosis.

## **Biodiversity Conservation through Environmental Education**

Kiran Kumar Jena

*Berhampur University, Berhampur 760007*

*Email: kirankumarjena22@gmail.com*

### **Abstract:**

Biodiversity is the indicator of healthy ecosystem. The continued growth of human populations and of per capita consumption have resulted in unsustainable exploitation of Earth's biological diversity, exacerbated by climate change, ocean acidification, and other anthropogenic environmental impacts. There have been a number of challenges that we as a society face today that include the decline in wildlife numbers and species, and habitat destruction. Loss of habitat, illegal poaching of wildlife and lack of awareness of conservation have contributed to the loss of biodiversity. Studies show that thousands of species are endangered, whereas more than 300 species have already disappeared. It is therefore necessary to come up with ideas and implement projects for the conservation of biodiversity in protected natural areas to reduce the pressure over rare species. This is impossible without education, information, without raising awareness regarding the importance of protected natural areas. Contemporary environmental education will have to be sensitive to the ill-defined nature of key emerging concepts such as biodiversity and sustainability. Environmental education around the world has first and foremost gained importance because of its potential to contribute to the resolution of environmental issues and not because of its potential to contribute to democratic and emancipatory human development. The costs of loss or degradation of biodiversity are hard to establish but studies show that worldwide they are substantial and growing. Education can help people of various ages and social standing to find out about values, motivation, skills and responsibility regarding maintaining the quality of the environment and human health.

**Keywords:** Biodiversity conservation, Nature, Knowledge, Environmental education.

## Preliminary Phytochemical Screening of Different Solvent Mediated *Cucumis* L. And *Momordica* L. Extracts of Family Cucurbitaceae

Rupinderpal Kaur<sup>1\*</sup>, Yumnam Devashree<sup>1</sup>, Vijay Singh<sup>2</sup>

<sup>1</sup> Department of Bioengineering and Biosciences, Lovely Professional University, Phagwara, Punjab  
144411, India

<sup>2</sup> Department of Botany, Mata Gujri College, Fatehgarh Sahib, Punjab 140406, India

### Abstract:

Medicinal and aromatic plants are potential source of raw materials used for manufacture of drugs and perfumery products more than a quarter of all the medicines used in the world today contain natural compounds derived from plants that often serve lead molecules whose activities can be enhanced by manipulation through combinations with chemicals and by synthetic chemistry that can be exploited in the field of new drugs research and development. The primary benefits of using plants derived medicines are that they are relatively safer than synthetic alternatives offering profound therapeutic benefits and more affordable treatment. Phyto constituents are the natural bioactive compounds found in plants. This phyto constituents work with nutrients and fibers to form an integrated part of defense system against various diseases and stress conditions. Phyto-chemicals are basically divided into two groups, ie. primary and secondary constituents; according to their functions in plant metabolism. Primary constituents comprise common sugars, amino acid, proteins and chlorophyll while secondary constituents consist of alkaloids, terpenoid, steroids and flavonoids, so on. Medicinal plants have bioactive compounds which are used to curing of various diseases. In this present investigation involves 6 different medicinal plants of genus *Cucumis* L. and *Momordica* L. were studied in six different solvents Viz. Acetone, methanol, hexane, chloroform, aqueous and acetone were used to obtain extracts from produced plant leaves. The extracts were subjected to qualitative phytochemical screening using standard procedure. Phytochemical screening reveals the presences of Alkaloids, Saponins, Tannins, Steroids, Glycosides and Flavonoids.

**Keywords:** Phytochemical analysis, Medicinal plants, Leaves, Primary and Secondary constituents.

## **Targeting tumor micro environment for cancer therapy**

Sarbari Acharya

*School of Applied Sciences*

*KIIT Deemed to be University (KIIT DU), Bhubaneswar 751 024, India*

### **Abstract:**

New approaches and targets to treat lung cancer has become paramount. Tumor microenvironment (TME) of lung cancers is heterogeneous and a challenge for therapy. During the last decades, it has become clear that in many tumors a pro-inflammatory TME promotes cancer development, progression and metastasis. Tumor associated macrophages (TAMs), an important component of the TME, are the main source of inflammatory signals in the stroma of the tumor microenvironment. Once monocytes are recruited at the tumor site, conditioned by the tumor microenvironment they lose their cytotoxic capability and undergo reprogramming (M2 reprogramming) into TAMs. Such re-programmed macrophages gain pro-tumoral functions such as supporting the tumor growth, promoting angiogenesis, tumor invasion and metastases and suppressing T-cells that are responsible for the anti-tumoral responses. They stimulate cell proliferation by producing pro-inflammatory cytokines (IL6) and growth factors (such as EGF and TGF) thus enhancing metastatic potential and resistance to treatments. The inflammatory environment created by TAMs promotes epithelial-to-mesenchymal transition (EMT) which subsequently leads to the generation of cancer stem cells (CSCs). Thus, TAMs, could be an important target for elimination of CSCs. Currently, different approaches have been proposed to modulate TAMs and one such approach is to target signaling pathways that causes M2 differentiation of macrophages. The role of STAT3 in mediating M2 differentiation of TAMs have emerged as an important target for future cancer therapy.

**Keywords:** Tumor microenvironment, M1-M2 reprogramming, cancer stem cells, STAT 3

## Melatonin Restores the Age-Affected Chronomics Of Anti-Inflammatory Marker *Socs1*.

Ch. Vinod

*Department of Biology, School of Applied Sciences,*

*KIIT Deemed to be University, Bhubaneswar.*

*Email: [ch.vinodfbs@kiit.ac.in](mailto:ch.vinodfbs@kiit.ac.in)*

### **Abstract:**

The circadian clock regulates numerous life processes in an organism with respect to environmental cues. In mammal's suprachiasmatic nucleus (the master clock located in the brain) synchronizes with several other peripheral oscillators resulting in overt rhythms. The major synchronization activity depends upon secretion of the neurohormone melatonin. These rhythms can get modulated due to internal or the external factors. One such internal process that leads to dysfunctional circadian activity is aging. Almost all creatures undergo aging process which is a steady change in their physiological and behavioral aspects due to numerous factors. In mammals it is generally accompanied by increased oxidative stress and inflammatory markers. In one of our studies we had observed that *Socs1* (Suppressors of cytokine signaling 1) a gene encoding anti-inflammatory marker SOCS1 exhibited daily rhythms in all the peripheral clocks studies (liver, kidney, heart and intestine) in adult male Wistar rats of age 3 months (m). In the age groups 12 m and 24 m a gradual change in the levels and daily rhythms of *Socs1* was observed in all the peripheral clocks. The peripheral clocks kidney and intestine displayed abolished rhythms in 24 m old group rats. Further it was demonstrated by many researchers that the melatonin levels decline with aging. Hence, we had administered melatonin in all the age groups and recorded the chronomics of *Socs1*. Interestingly we had observed that melatonin administration resulted in a partial restoration of *Socs1* rhythms in liver and intestine in 12 m group. However, in 24 m group the melatonin administration resulted in a differential restoration of *Socs1* rhythms and levels in all the peripheral clocks. This demonstrates the therapeutic potential of melatonin in restoring circadian activity. It further provides an insight to treat several age-associated disorders.

**Keywords:** Circadian rhythms, Melatonin, *Socs1*, Aging.

## Comparative study of the anti-bacterial activity of naturally occurring alkaloids and flavonoids

Sweta Mohanty, Sneha Shriparna Satpathy, Chandana Mohanty\*

*School of Applied Science, Biology Department KIIT, Deemed  
to be University, Bhubaneswar 751024, Odisha, India*

### Abstract:

Contaminations with microorganisms resistant to multiple antibiotics pose a serious threat to mankind. The increased indiscriminate use of the commercially available antimicrobial drugs leads to development of antibiotic resistance in pathogenic bacteria thereby notably limiting their potency and significantly causing failure of treating infections. This fabricates a grave need to develop novel drugs and hence screening of natural products in search for new antimicrobial agents becomes imperative in addition to developing effective agents with high efficacy and low toxicity to combat this problem. Antimicrobials of plant origin have a strong antibacterial activity and are efficient in the treatment of infectious diseases simultaneously mitigating many of the side effects that are often associated with synthetic antimicrobials. The antibacterial activity and the possible molecular mechanisms of naturally occurring alkaloid, *Berberamine* and flavonoids *Genistein* and *Naringenin* was investigated in this study against the opportunistic bacterial enteropathogens *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterococcus faecalis* and *Staphylococcus aureus* respectively, through various studies conducted by analyzing the growth, morphology and protein of the treated bacterial cells. The antibacterial susceptibility test result indicated minimum inhibition concentration (MIC) of *Berberamine*, *Genistein*, and *Naringenin* against the respective bacteria and the time-kill curves showed the correlation of concentration-time. After the exposure of bacteria to the extracts individually, the fragmentary cell membrane and cell's unequal division was observed by the scanning electron microscopy (SEM) indicating the bacterial cell damage. Sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) study demonstrated that these extracts could damage bacterial cells by destroying cellular proteins. Meanwhile, Fluorescence microscope study revealed that these extracts could also affect the synthesis of DNA. The results strongly suggest that *Berberamine*, *Genistein*, *Naringenin* could significantly damage the structure of bacterial cell membrane and inhibit synthesis of protein and DNA, which causes the bacteria to die eventually. Antibacterial activities of various alkaloids and

flavonoids have been reported previously, but mechanism(s) of their action on bacterial cells remain(s) largely unknown. Here, we investigated the effects of *Berberamine*, *Genistein*, and *Naringenin* and explored the relevant molecular mechanisms.

**Keywords:** Alkaloids, Antimicrobial activity, Flavonoids, Antibacterial activity.

## **Anticancer Activity of Plant Extract, Mouse Model And Skin Carcinogenesis**

Anjali Bhargava<sup>a</sup>, Reena Upadhyaya<sup>b</sup>

<sup>a</sup>Rabindranath Tagore University, Bhopal, India, bhargavaanjali92@gmail.com

<sup>b</sup>Reena Upadhyaya, Barkatullah [University, Bhopal, India, r1971u@gmail.com](#)

### **Abstract:**

Plants have been used by man as a cost-effective remedy to cure various diseases since ancient times. Plant kingdom has been continuously screened by researchers around the world for the formulation of herbal drugs to treat life-threatening diseases including cancer. Plant bioactive metabolites are of much importance in novel drug discovery to combat cancer and saving human lives. This Review focuses on the studies done earlier for evaluating anticancer activity of plants using different in vitro and in vivo methods. The causes of skin carcinogenesis and mouse models used in preclinical studies for cancer drug development are the other highlights of this study. Plenty of researches have been conducted in last some years throughout the world which reveal that plants do possess a wide variety of compounds having anticancer properties. Therefore, this review is an attempt to draw attention towards some important researches carried out in last some years which may be helpful in further researches for effective anticancer drug development in future.

**Keywords:** Skin cancer, Mouse models, Cell lines, Anticancer.

## **Impact of Covid-19 Lockdown on Ground Water of Bhubaneswar Smart City, Odisha, India: An Overview**

Bharat Chandra Kalapahad<sup>1</sup>, Saradendu Acharya<sup>2</sup>, Prativa Kar<sup>3</sup>

<sup>1</sup>Department of Chemistry, GIET University, Gunupur 765022, Odisha, India

Email: kalapahadbharat@gmail.com

<sup>2</sup>Department of Chemistry, Jupiter Degree College, Bhubaneswar 752054, Odisha, India

Email: saradendu@yahoo.com

<sup>3</sup>Department of Chemistry, GIET University, Gunupur 765022, Odisha, India

Email: prativakar@gmail.com

### **Abstract:**

Climate change is having serious impacts on the world's water system through more flooding and droughts and exacerbate a range of risks. But during the novel corona virus disease (COVID-19) lockdown, instructions by World Health Organization (WHO) and Governmental bodies, the movement of act is halted. Improvement in the prevailing conditions of atmosphere, hydrosphere and biosphere in which air and water pollution levels have shrunk as "Corona virus is Earth's vaccine". Nature is reviving and healing. Our observation implies that ground water is definitely under active interactions with surface water. The ground water of Bhubaneswar is replenishing and away from suspended particulate matter (SPM) caused by sedimentation, siltation and sewage disposal. No pollution from industries, reduced domestic and anthropogenic activity. Time series analysis of satellite image collection showed that the suspended particular matter concentration is decreased. Our study during unlock 1.0 of covid-19 is to develop water quality index (WQI) using seven Physico-chemical water quality parameters including Biochemical Oxygen Demand (BOD), Most Probable Number (MPN), Total Dissolved Solids (TDS), Dissolved Oxygen (DO), Turbidity, Total Suspended Solids (TSS) and pH. Water qualities during lockdown period is compared to the pre-lockdown period. The mean values of the physic-chemical parameters of the ground water were within the permissible limits specified by

WHO and BIS. The present study describes the changes in chemical and biological water quality parameters between lockdown and pre-lockdown periods. The objective of the study is to analyze the status, evaluate the effect of lockdown and the rate of replenishing ground water quality of Bhubaneswar.

**Keywords:** Corona, WHO, Ground water, SPM, TSS, Lockdown parameters.

## Systematic Evaluation of Selected Herbs of Different Families for Antidiabetic and Anticancerous Properties of Barkatullah University Campus Area, Bhopal (M.P.)

\*Reena Upadhyay, Anjali Bhargava

Barkatullah University, Bhopal

Email ID: [r1971u@gmail.com](mailto:r1971u@gmail.com)

### Abstract:

Present research work deals on documentation of Native medicinal flora of Barkatullah University Campus area, Bhopal. The University is located North western part of state of Madhya Pradesh.

India is covered 7.8% of recorded species in all over world, 60,000 plant species exist out of which 300 plant species are facing risk of endangered day by day.

Bhopal is capital of M.P. its known as city of lakes and famous India is glorious past of Traditional knowledge of medicinal plants. According to the World Health Organization, upto 90% of population in developing countries use plants and its products as Traditional medicine for primary healthcare.

Highest Dominant families of field survey of Campus area are *Fabaciae myrataceae* Apocynaceae families in the B.U. campus area.

1. *Ficus religiosa* (Family Moraceae) has been reported to be used in the traditional system of Ayurveda for treatment of diabetes.
2. *Eugenia jambolana* (Jamun) family Myrateceae. The mostly used plants parts are seeds, leaves, fruit, bark. The plant is rich in compounds containing anthocynin, glucosides, ellagic acids. Seeds contain alkaloids, jambosine, glucosides, which slows down the conversion of starch into sugar in body of diabetic patients.
3. *Ocimum sanctum* – *Ocimum sanctum* L. (Holy basil – Tulsi) belongs to family Laminaceae – Every parts of plants is used as therapeutic purpose. The major bioactive phytochemicals are present in the leaves, stems of holy basil, include falvonoids, saponins, tannins, triterpenoids.
4. *Catharanthus roseus* L. or *Vinca rosea* leaves stem are a sources of alkaloid that contains antitumour and anticancerous properties.

The leaves are sources of alkaloids used to control diabetes, childhood cancer. In vinca rosea plant contain more than 100 alkaloids found of which vincristine and Vinblastine are most alkaloid present. The present study concluded that there is huge collection of plants with Antidiabetic potential, only few of them have scientifically or Ethanomedicinal studied. *Ficus religiosa*, *Eugenia*, *Jambolana*, *Momordica chaintia*, *Ocimum sanctum* plants used for treatment of diabetic treatment in Ayurveda, Homoeopathic medicine system. This review will be helpful in treatment of diabetes, cancers and others diseases.

This research work will be helpful for researcher to developing new strategies in cancer treatment in regenerative medicine.

**Keywords:** Ayurvedic system, Deforestation, Ethanomedicine, Antidiabetic properties.

**Delivery of Dual Drug Loaded Lipid Based Nanoparticles Across The Blood–Brain Barrier  
Impart Enhanced Neuroprotection In A Rotenone Induced  
Mouse Model of Parkinson’s Disease**

Paromita Kundu,<sup>†</sup> Manasi Das,<sup>†</sup> Kalpalata Tripathy,<sup>‡</sup>, Sanjeeb K Sahoo<sup>†</sup>

<sup>†</sup>Institute of Life Sciences, Nalco Square, Bhubaneswar 751023, India

<sup>‡</sup>Department of Pathology, Shri Ramachandra Bhanj Medical College, Cuttack 753007, India

**Abstract:**

Parkinson’s disease (PD) is the most widespread form of dementia where there is an age-related degeneration of dopaminergic neurons in the substantia nigra region of the brain. Accumulation of  $\alpha$ -synuclein ( $\alpha$ S) protein aggregate, mitochondrial dysfunction, oxidative stress, and neuronal cell death are the pathological hallmarks of PD. In this context, amalgamation of curcumin and piperine having profound cognitive properties, and antioxidant activity seems beneficial. However, the blood–brain barrier (BBB) is the major impediment for delivery of neurotherapeutics to the brain. The study involves formulation of curcumin and piperine coloaded glyceryl monooleate (GMO) nanoparticles coated with various surfactants with a view to enhance the bioavailability of curcumin and penetration of both drugs to the brain tissue crossing the BBB and to enhance the anti-parkinsonism effect of both drugs in a single platform. In vitro results demonstrated augmented inhibition of  $\alpha$ S protein into oligomers and fibrils, reduced rotenone induced toxicity, oxidative stress, and apoptosis, and activation of autophagic pathway by dual drug loaded NPs compared to native counterpart. Further, in vivo studies revealed that our formulated dual drug loaded NPs were able to cross BBB, rescued the rotenone induced motor coordination impairment, and restrained dopaminergic neuronal degeneration in a PD mouse model.

**Keywords:** Parkinson’s disease, Blood–brain barrier, Lipid-based nanoparticles

## Enhanced Anti-Metastatic and Antitumorogenic Efficacy of Berbamine Loaded Lipid Nanoparticles *In Vivo*

Priyambada Parhi<sup>1</sup>, Sujit Suklabaidya<sup>2</sup>, Sanjeeb Kumar Sahoo<sup>1</sup>

<sup>1</sup>Institute of Life Sciences, Nalco Square, Chandrasekharapur, Bhubaneswar, India.

<sup>2</sup>Manipal University, Karnataka, India.

Email ID of corresponding author: sanjeesahoo2005@gmail.com

### Abstract:

Research on metastasis is gaining momentum for effective cancer management. Berbamine (BBM) has the potency to act as a therapeutic in multiple cancers and cancer metastasis. However, the major limitation of the compound includes poor bioavailability at the tumor site due to short plasma half-life. Here, our major objective involved development of lipid-based nanoparticles (NPs) loaded with BBM with an aim to circumvent the above problem. Moreover its, therapeutic potentiality was evaluated through various *in vitro* cellular studies and *in vivo* melanoma primary and experimental lung metastatic tumor model in C57BL/6 mice. Results of different cellular experiments demonstrated enhanced therapeutic efficacy of BBM-NPs in inhibiting metastasis, cell proliferation and growth as compared to native BBM in highly metastatic cancer cell lines. Further, *in vivo* results demonstrated suppression of primary B16F10 melanoma tumor growth in C57BL/6 mice model treated with BBM-NPs than that of native BBM. Importantly, a moderately cytotoxic dose of BBM-NPs was able to significantly suppress the incidence of B16F10 cells lung metastasis *in vivo*. Results indicated development of an effective approach for aggressive metastatic cancer.

## **Role of macrophage secretory factors and ROS in the formation of tunneling nanotubes and its role in cancer therapy**

Pragya paramita Sahu, Soumya Ranjan Jena, Luna Samanta

Redox Biology Laboratory, Department of Zoology, School of Life Sciences, Ravenshaw University,  
Cuttack 753003, India

### **Abstract:**

Cancer initiation, progression, metastasis and the development of chemoresistance are linked to tunneling nanotubes (TnTs). TnTs are intercellular communication structures involved in transport of cellular contents. TnTs are recognized in tumor-stromal cross-talk and tumor development. Macrophage conditioned medium (M $\phi$ CM) induces TnTs in MCF7 cells. Differentiation of macrophages into tumor-associated macrophages (TAMs) partake actively in tumor growth, invasion, metastasis and resistance to chemotherapy. Further, it is known that reactive oxygen species (ROS) are involved in TnTs formation. In the present study, to corroborate the above mentioned reports we also observed an enhanced generation of ROS and augmented 4-HNE adducts in the cellular proteins confirming oxidative stress in the macrophages, and the MCF-7 cells grown in M $\phi$ CM. We also noticed enhancement in the expression of antioxidant enzymes (SOD, Catalase, GPx and GR) in MCF-7 cells grown in M $\phi$ CM. The ability to escape anoikis enables cancer cells to metastasize. We also reported here that treatment of MCF-7 cells with M $\phi$ CM not only augmented ROS generation and antioxidant enzyme expression but also enhanced TnTs formation, help to transfer cell organelles and also enhanced cell migration. Therefore, it is hypothesized that increased ROS production by macrophages and proteomic markers like inflammatory cytokines, growth factors, keratins, desmoplankin, vitronectin, S100A9, S100A11 and APOA1 are involved in endorsing cancer progression. M $\phi$ CM augmented the formation of TnTs and was accompanied with an increased expression of metastasis markers (N-Cadherin, and Vimentin) with suppression of E-cadherin implying presence of cross-talk activities in these tumor cells leading to propagation and metastasis. Treatment with Metformin decreased the number of TnTs formed dose dependently. The results surmise that TnTs formation may be augmented by stromal secretory factors mediated through ROS and helping the tumor cells to proliferate and metastasize. Therefore, TnTs may be targeted for potential cancer therapy or may be used as a potential drug delivery module to inhibit metastasis and cancer progression

## **Effect of Vehicular Emission on Human Health in Jagatpur Industrial Zone, Cuttack District, Odisha**

Dr.Swati Panda

Reader in Zoology Salipur Autonomous College, Odisha

### **Abstract:**

In developing countries air quality crisis in cities is attributed to Vehicular emission which contributes to 40% to 80% of total air pollution. Fine and ultrafine particles released from vehicular emission can penetrate deep into the respiratory system. Vehicular pollution in urban areas is quite significant due to high vehicles density, older vehicles, inadequate inspection and maintenance facilities, adulteration of fuel, improper traffic management system, road conditions, high population etc. The motor vehicle engine emits many types of pollutants Nitrogen Oxide(NO<sub>2</sub>), Sulphur Dioxide (SO<sub>2</sub>), Monoxide(CO), Carbon Dioxide(CO<sub>2</sub>), Suspended Particulate Matter(SPM), Volatile Organic Compounds(VOCS).

A case study has been monitored during 2008 -2010 at Jagatpur Industrial Zone. Jagatpur Industrial Zone is just 5 K.M away from Cuttack city nearby NH 5. Emissions from motor vehicles were the sources of pollution. Data were collected from RTO, Cuttack District. It was revealed that total no of vehicles was registered respectively 24529,34866,45264 in the year 2008,2009,2010 respectively. Due to inhalation of dust and vehicular emission people had been suffering from cold, cough, asthma, bronchitis. The record from ESI, Dispensary, Jagatpur the people were suffering from respiratory diseases i.e.94 in 2008 and 769 in 2009 respectively. Respiratory diseases were in increasing trend. Respiratory problems was reported due to dust generation from various industries and automobiles.

The government has shown some initiative by introducing unleaded petrol and catalytic converters fitted cars, introduction of mass rapid transport system to improve environmental quality of the area.

## **Insects Vector of Plants Viral Diseases.**

Manish Kumar Yadav

Dr. Rajendra Prasad Central Agricultural University Pusa

Email: arpansfour@gmail.com

### **Abstract:**

Vectors are organisms that introduce a pathogen such as a bacterium or virus into a plant to cause an infection. Insects, mites, and nematode vectors focus the movement of plant pathogens among immobile plants. Many insects or other arthropods may contain plant pathogens but cannot transmit them to plants and thus are not vectors. Some of our most important plant diseases require mobile vectors. Almost all sucking insects are recognized or suspected as vectors of various plant viral diseases.

Much research on vector transmission seeks to understand the transmission process so as to explain why only certain kinds of insects or mites can serve as vectors and to identify what factors are required for transmission. Because insecticides applied to kill vectors frequently fail to control the vectors, a good understanding of the relationships between vectors and the pathogens that they transmit is important.

Vector transmission processes are usually complex, even for the seemingly simple mechanical transfer of plant viruses to plants on the tips of vectors' stylet-like mouthparts during feeding. In many other cases, the plant parasites transmitted by insect vectors must multiply and circulate throughout the body of the vector to be transmitted. The most fundamental characteristic by which to classify or categorize vector transmission is that of transmission efficiency, or how often a vector transmits a pathogen over time or per transmission opportunity.

Transmission efficiency can increase or decrease over time after a vector first acquires a pathogen, usually by feeding, but some pathogens are transmitted from a mother vector to her offspring via her eggs or embryos. Generally, vector acquisition of pathogens increases with time spent feeding on infected plant sources of the pathogen. Transmission is called nonpersistent if the rate of transmission drops to near zero within a short time (hours). Nonpersistent transmission of viruses also differs from other types of vector–pathogen relationships in that acquisition generally decreases rather than

increases with sustained feeding on infected plants. Semi persistent transmission persists for, at most, a few days after acquisition. Persistent transmission describes situations in which the vector can transmit over many days, in some cases, for weeks or months.

**Keywords:** Virus, Vector, Disease, Insects, Plants, Diseases.

## Attenuation of UVB-Induced Oxidative Damages In 3T3 Fibroblast Cells By Ethanolic Extract Of Red Alga *Gracilaria Verrucosa*

Jyotsnarani Pradhan, Manisha Hota

P.G. Department of Biotechnology, Utkal University, Bhubaneswar, Odisha

jyotsna.biotech@utkaluniversity.ac.in & manisha.hota93@gmail.com

### Abstract:

Solar ultraviolet radiation (UVR) induces molecular, genetic, and epigenetic changes in the skin, which result in skin cancer, photoaging and photosensitivity disorders. Adequate protection of skin against the harmful effects of UV irradiation is essential. Recent studies have focused on marine organisms as a source of potent bioactive molecules used as natural sunscreens. Therefore, in this study, we have isolated some UV absorbing compounds from red alga *Gracilaria verrucosa* by using ethanol and characterized by UV-Visible spectrophotometer, HPLC, FTIR, and MALDI-TOF. Further, we investigated the antioxidative properties of the extract by different *in vitro* radical scavenging assays and protective effects against UV irradiation in epidermal equivalent models by MTT assay and intracellular ROS measurement. UV Visible scan indicates peaks at 328 nm and 265nm, and a single peak was observed in HPLC. FTIR spectra indicate the presence of various amines, hydroxyl, and Carboxylic functional groups. The MALDI-TOF analysis revealed the occurrence of four different types of Mycosporine like amino acids (MAAs). The radical scavenging results showed that ethanolic extract of *G. verrucosa* exhibited significant DPPH radical ( $IC_{50}= 1.4$  mg/ml), nitric oxide radical ( $IC_{50}=172.14$   $\mu$ g/ml) and superoxide radical ( $IC_{50}=100.14$   $\mu$ g/ml) scavenging activity. In cytotoxicity and intracellular ROS measurement assay, the extract showed significant protection against UV B-induced damage in a dose- dependent manner in 3T3 cells. Further, we found a promotion effect of the ethanolic extract on the proliferation of mouse embryonic fibroblast cells. Current *in vitro* data strongly suggest that the MAAs in ethanolic extract of *G. Verrucosa*, as natural and safe UV- absorbing and antioxidant compounds, have a high potential for protection against the diverse harmful effects of solar UV radiation.

**Keywords:** Macroalgae, UV-B, Oxidative stress, Antioxidant, 3T3 cells.

## Antidote Effect of *Withania Somnifera* Against Endosulfan Induced Toxicity

### In Ovarian Follicular Cells of Mice

Basant Kumar

Department of Zoology, Patna University, Patna, Bihar, India

[basantpatna30@gmail.com](mailto:basantpatna30@gmail.com)

#### Abstract:

**Background :** In the present time, the farmers for the better yield of their crops are widely utilising the pesticides. The yield of the crops has increased many folds but recently health related diseases have been reported in the population. Endosulfan is an organochlorine pesticide which is commonly used by the farmers of India, but recent health related problems in the population has raised the issues.

**Objective :** The present research work on animal deciphers the ameliorative effect of *Withania* Endosulfan induced ovarian toxicity in female mice.

**Methods :** Endosulfan at the dose of 3mg/Kg body weight was administered orally to female mice for 5 weeks. Thereafter, crude root extract of at the dose of 1000 mg/Kg body weight was administered for 5 weeks to observe the ameliorative effect of it on ovarian follicular cells.

**Results :** The study reveals that after the administration of Endosulfan, there were significant damage at the cellular level as well as at sub cellular level in follicular ovarian cells of mice. But, after administration of there was significant reversal at the cellular level as well as at sub cellular levels. There significant restoration of cytoplasmic materials, increased parallel stacks of rough endoplasmic reticulum, normalized membranes of mitochondria with its cristae denotes that it not only possesses antioxidant and rejuvenating property but also maintains the cellular integrity of the follicular ovarian cells leading to normal functioning of it.

**Conclusion:** Therefore, the endosulfan induced ovarian cellular toxicity in mice and possesses good antidote property.

**Keywords:** Endosulfan, histopathology, Electron microscopy.

## **Bionanotechnology- A New Approach for Detection and Treatment of Cancer**

Prabin Kumar Sahoo and Deoraj Sharma

Trident Academy of Creative Technology, Bhubaneswar, Odisha

### **Abstract:**

Bionanotechnology mentions the way that nanotechnology is worn to discover gadgets for the study of our own biosystem threat. Cancer has been the growing global threat. Mortality rate and incidences due to cancer are gradually escalating throughout the globe. As a result cancer as a disease listed in Global Burden of Disease (GBD) and estimated by GLOBOCAN 2018, the number of new cancer cases will rise up to 18.1million, and the number of death due to cancer will be 9.6million. Forecast urges that after 10years (2030), 30 million of people will die from cancer every year. To avoid such critical situation, a key for successful cancer treatment is early detection. The prime technique to diagnose cancer cell depends on binding of nanoparticles probes unites with components (proteins, small peptides, antibodies, oligonucleotides aptamers) to cell surface markers on cancer cells and on those entering cells and spotting genetic content. Nanotechnology in cancer treatment may lead to early detection and demolish of tumor cells with minimal damage to the surrounding cells, tissue or organ. There are some emerging nanoparticles used in the treatment of cancer cells by the help of nanotechnology. In Chemotherapy (CRLX101, it is a unique way for the treatment of prostate and brain cancer. It is an example of nanomedicine), Heat Therapy (cancerous cells are targeted and injected gold nanoparticles into the cells, and then sparkle a laser on the nanoparticle. The heat explodes the cancer cells) this therapy is used in the treatment of breast cancer, Radiation Therapy is helpful in the treatment of prostate tumor cells (radioactive gold nanoparticle bind to a molecule that is attracted to tumor cells, this method will increase the concentration of radioactive nanoparticle at the cancer treatment with less damage to the surrounding cells). Some cancerous cells are destroyed by apoptosis. We can use nanopulse which changes the morphology inside the tumor cell and trigger cell death by activating the needed enzyme. More lives could be saved by the help of bionanotechnology in the field of cancer detection and treatment.

## **Caffeine- A secondary metabolite drug**

Rituparna Nayak<sup>1</sup>, Nikhil Pradhan<sup>2</sup>, Deoraj Sharma<sup>3</sup>

Trident Academy of Creative Technology, Bhubaneswar, Odisha

### **Abstract:**

From morning coffee to afternoon tea, caffeine is so thoroughly entrenched in our daily routines and has become the most abused psychoactive drug among the people. Caffeine is naturally found in leaves present in the coffee, cocoa, soft drinks, chocolates and some in non-prescription medication like cough syrup. First of all it is indispensable to know that caffeine affects different people differently. It is basis on the frequency of consumption. It is very potent drug and works in many ways as cocaine, seems to be a virus, resilient, highly contagious and smallest seed of caffeine can grow to define or to destroy you. 1 Tbsp. of pure caffeine is equal to 75 cup of coffee at once. Too much caffeine can decrease the ability of our immune system to fight infection. It blocks the activity of T-cell and B-cell in the body to attack foreign bodies. It blocks adenosine receptors, which makes our brain more alert. It act as a stimulant to our body when it hits our system it stimulates adrenal glands and increases the level of adrenaline in our body. Higher level of stress hormone called cortisol is released. Consequences of overdose leads to migraine, anxiety, insomnia, increase in blood pressure. Caffeine is also harmful when consumed during pregnancy and it affect the growth of fetus and development of baby also. For some people that is boost as they work up late or need energy. When you have caffeine, you're never really asleep and you never really awake. Good quality of caffeine also offers number of health benefits like good for liver, it makes chemical called para-xanthine that slow down the growth of fibrosis, fight cancer, improves performance, reduces stroke, increase stamina during exercise. Anything that is superior for us also has the potential to be injurious and caffeine intake is probably no exception.

## **Covid 19 Vaccine Development and Novel Therapeutics**

Upasana Mahato<sup>1</sup>, Mohammed Anas<sup>2</sup>, Deoraj Sharm<sup>3</sup>

Trident Academy of Creative Technology, Bhubaneswar, Odisha

### **Abstract:**

Coronavirus disease 2019 (COVID-19) causing serious respiratory illness such as pneumonia and lung failure was firstly reported in Wuhan city, the capital of Hubei, China. The etiological agent of COVID- 19 has been confirmed as a novel coronavirus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is most likely transmitted from zoonotic coronaviruses, similar to SARS-CoV previously emerged in 2002. Collaboration will be essential among biotechnology and pharmaceutical companies, many of which are bringing forward a variety of vaccine approaches. Here, we review current status of epidemiology, diagnosis, treatment, vaccine development & therapeutics for the COVID-19. The first vaccine to enter into clinical trials is the mRNA-1273 vaccine (ClinicalTrials.gov: NCT04283461). It is a novel RNA-based vaccine which uses part of the spike protein genetic code embedded in special lipid-based nanoparticles for injection into the body. It has been developed at lightning speed (within 45 days of publication of the first viral genome) by Moderna Therapeutics (Cambridge, MA, USA) who was already working on SARS-CoV and MERS-CoV vaccines which were adapted to SARS-CoV-2. After having shown potential in animal testing, the first phase I clinical trial of this vaccine started on 16 March 2020 in collaboration with the NIH on 45 healthy individuals between the ages of 18–55 years [However, in addition to the novelty of this vaccine, even if the clinical trials are successful, it will be quite some time before it can be available to the population due to pipeline, capacity building, and regulatory issues. Several other mRNA-based vaccines (e.g., by CureVac (Tubingen, Germany), BNT162 by BioNTech (Mainz, Germany) and Pfizer (New York, NY, USA)) are in different stages of development. For instance, the BioNTech mRNA vaccine (Mainz, Germany) encapsulates the nucleic acid in special 80 nm ionizable, glycol-lipid nanoparticles and clinical testing is expected commence shortly. In this era of emerging viral infections, the global community must work together and deploy the very best of its technological resources to address the current pandemic and ensure preparedness for future outbreaks.

## Electronically Tuned Oxido Vanadium (IV) Porphyrins for the Selective Epoxidation of Alkenes and its applications

Vivek Kumar Mishra, Chanchal Halder\*

Department of Chemistry, Indian Institute of Technology (ISM), Dhanbad 826004

(E-mail: vivek.ku.mishra2012@gmail.com, chanchal@iitism.ac.in )

### Abstract:

Electronically tuned four oxido vanadium(IV) complexes of *p*-substituted tetraphenyl porphyrin derivatives *p*-CH<sub>3</sub>-TPP (**I**), *p*-OCH<sub>3</sub>-TPP (**II**), *p*-Cl-TPP (**III**) and *p*-Br-TPP (**IV**) were prepared by adopting modified methods available in literature.<sup>1</sup> Synthesized oxido vanadium(IV) complexes were characterized through a number of techniques like FT-IR, UV-Vis spectroscopy, ESI- MS, <sup>1</sup>H, and <sup>13</sup>C NMR spectroscopy. Single-crystal XRD analysis was used to confirm their molecular structure in solid-state. EPR spectral analysis suggests [v<sup>(IV)</sup>O(*p*-CH<sub>3</sub>-TPP)](**1**) and [v<sup>(IV)</sup>O(*p*-Br-TPP)](**4**) exists as a dimeric form in solution with strong Vanadium-Vanadium interaction. On the other hand [v<sup>(IV)</sup>O(*p*-OCH<sub>3</sub>-TPP)] (**2**) and [v<sup>(IV)</sup>O(*p*-Cl-TPP)] (**3**) present in a monomeric form in solution without a Vanadium-Vanadium interaction. Single-crystal XRD analysis also indicates similar pictures in solid states. Interestingly all oxido vanadium (IV) complexes are excellent candidates for the selective epoxidation of a number of alkenes. Epoxidation proceeds with a very high TOF value and in all cases epoxides generate with 100% selectivity.

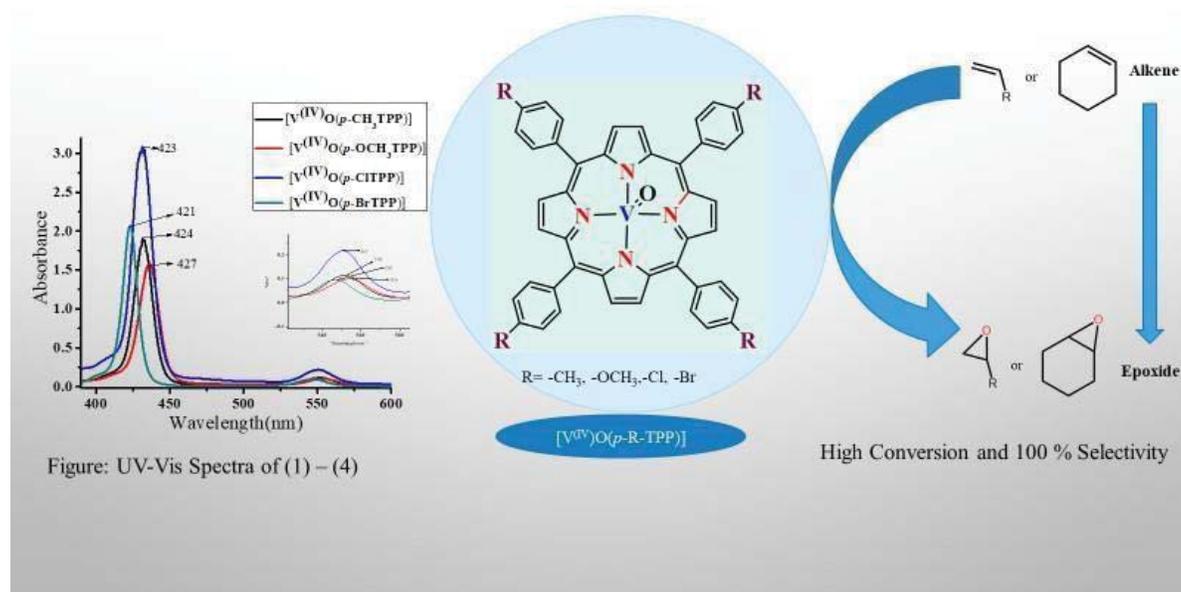


Figure: UV-Vis Spectra of (1) – (4)

**Scheme 1.** Graphical Abstract: Electronically tuned oxido vanadium (IV) porphyrins for the selective epoxidation of alkenes

## **Gender Differences in Health and Wellbeing among Older Adults in South India; A Community Based Study**

Varalakshmi Manchana

School of Medical Sciences, University of Hyderabad, Gachibowli, Hyderabad, India,

drmvlakshmy@gmail.com

### **Abstract:**

Ageing is natural and inevitable consequence of human life. Demographic and social transitions brought tremendous change in the Indian family system. Adjustment to their family, neighborhood and surrounding social world is very challenging as age advances. Left alone in the family is leading cause for the growing social isolation, loneliness and associated health risks among seniors. The study explores the determinants of health, social status with gender dimensions among community based older adults aged 60 years and above (N=260). A descriptive survey design was adopted to collect the data through structured interview schedule. Demographic characteristics included family relationships, living arrangements, self-rated health, happiness, sleep pattern, cognition, morbidity pattern and health care behaviors. The study findings reveal that majority of older adults experience social isolation. Older adults most of the time (18% men, 36% women) felt left out very often, men expressed felt emotional grief due to loneliness than women. Older adults felt socially isolated very often (n=27%) and frequently (n=62%). About 56% of older adults self rated their health and 49% of them stated being somewhat happy and 14% of them were not at all happy. Women rated their health better irrespective of many constraints and poor family and social support, which may due to their gendered attitude to adjust with life compromises. Women were demonstrating higher interest to stay connected, whereas men were not interested to express their constraints. Cognitive performance was associated directly with good sleep and perceived happiness. Conclusion: Loneliness is growing epidemic in older adults, and in those living alone experiences more isolation and its adverse effects on their mental and physical health. The gender plays a strong mediating role in the autonomy, health and social status of men and women life experiences in later life.

**Keywords:** Health, Social support, Self-rated Health, Happiness, Older adults.

## **Identification and Validation of COVID-19 Therapeutic Drug Targets for Their Role Towards Drug Design**

Jyoti Rani

Department of Botany Govt. College for Women, Tosham,  
Bhiwani, Haryana 127040  
E-mail-jyoti.sangwan@yahoo.com

### **Abstract:**

COVID-19, as it is called is a viral disease caused by the Virus of the SARS (Severe Respiratory Syndrome) Corona group. The disease first started in Wuhan, the capital of Hubai province of China. By the December 2019 the spread of infection is almost entirely driven by human to human transmission. It spreads through small droplets caused by coughing sneezing or talking in close vicinity. The early signs are asymptomatic, and the disease shows the simple signs of fever, cough, and breathlessness, it extends to pneumonia and multiple organ failure. The lungs are the most effected organs by the COVID 19 as the virus accesses the host cells via enzyme angiotensin converting enzyme 2 (ACE-2) which is abundant in alveolar cells of the lungs and the virus has easy access to the organs where the ACE-2 is found like the gastrointestinal tract epithelium. The COVID-19 belongs is genetically quite diversified group of viruses, thus it is very difficult to understand the exact mode of infection, and its interaction with the human genome. Thus, the molecular modelling and in-silico techniques can be applied to get a better understanding the functional aspects of the protein and its interaction with the cellular genome of human beings.

Characterization of the sequence of the proteins and their interaction behaviour can provide the useful information about the insight in to the antigen sites to help to boost the immunization of human beings. The new drug targets may then be identified by hypothetical protein interaction studies based on molecular modelling techniques. This may lead to establishment of new lead compounds which may act as future generation drugs with diversified therapeutic roles. An in-depth study of the protein sequence will help in better understanding of infection mechanism of the organism at cellular and genomic level. To elucidate the novel drug targets the viral proteins which are non-homologous to host shall be identified and targeted. In this work we are going to use several computational tools to infer the possible functional proteins of COVID-19 involved in

different pathways. The *in-silico* analysis may lead to a vital breakthrough of an insight into the potential target sites at molecular and structural level for the drug design.

**Keywords:** COVID-19, In-silico, Drug designing.

## **Basil – A Powerful Immune Modulating Herb**

Shruti Pragyana Tripathy, Kajol Behera, Deoraj Sharma

Trident Academy of Creative Technology, Bhubaneswar, Odisha

### **Abstract:**

Basil is scientifically known as *Ocimum sanctum*. Basil is native to India and most Southeast Asian countries. Basil is regarded as the best medicinal herb in Ayurveda and thus considered holy in our Hindu culture. *Ocimum sanctum* is also considered as an adaptogenic herb as they have the ability to adapt their functions inside the body according to specific needs of the body which may be physical, chemical or biological. So they are widely marketed as they help the body to resist external stressors. They work at the molecular level inside the cells of body by regulating different glands like hypothalamus, pituitary and adrenal. As a result, it stimulates various enzymes and hormones in our body. It contains eugenol which is an aromatic oily liquid. When this eugenol combines with zinc oxide nanoparticles, it forms zinc oxide eugenol. This compound helps in dental restoration/dental filling and prosthodontics i.e., curing of intraoral defects. It contains ursolic acid which is a natural triterpene compound. Triterpene is itself an anti-oxidant and anti-carcinogenic in nature. Ursolic acid has various beneficial effects like it is anti-inflammatory, anti-oxidant, anti-carcinogenic, anti-apoptotic (prevents cell lysis in large number), anti-obesity, anti-diabetic, neuroprotective, hepatoprotective and also helps in the prevention of various chronic diseases. It contains rosmarinic acid which is anti-oxidant and anti-inflammatory. They are efficient in giving soothing effects to asthma patients and also helpful in the treatment of various allergic disorders. It contains apigenin which is anti-oxidant and anti-inflammatory having anti-bacterial and anti-viral properties. They help in lowering the blood pressure and also used in cancer treatment. It has lutein which neutralizes dangerous free radicals, reduces oxidative stress and lowers inflammation in both eyes and brain. It contains ocimumoside A and B which are anti-stress agents. They help in regulating the neurotransmitters like serotonin and dopamine level in the brain. It is rich in vitamin C and zinc. Presence of vitamin C makes it functions as anti-microbial agent. Presence of zinc in basil stimulates the immune cells as a result of which T-lymphocytes releases cytotoxic chemicals which destroy foreign cell/germ cell and B-lymphocytes produce more antibodies and thus together increase the body's immune response towards infections and toxins. Hence, basil works as natural immunomodulator and provides immunity to our body.

## **Design and Development of Several Polymeric Metal-Organic Frameworks, Spectral Characterization, and Their Antimicrobial Activity.**

Shamim Ahmad Khan\*

Department of Chemistry, Shibli National College, Azamgarh 276001, India

\*Corresponding author: E-mail address:shamim0002@gmail.com

### **Abstract:**

Coordination polymers were obtained by the reaction of metal acetates,  $M(\text{CH}_3\text{COO})_2 \cdot x\text{H}_2\text{O}$  {where  $M = \text{Mn(II)}$ ,  $\text{Co(II)}$ ,  $\text{Ni(II)}$  and  $\text{Cu(II)}$ } with AFP ligand (AFP= 5,5'-(piperazine-1,4-diylbis(methylene))bis(2-aminobenzoic acid)). The AFP ligand was prepared by the one pot, two-step reaction of formaldehyde, 2-aminobenzoic acid, and piperazine. Structural and spectroscopic properties have been studied by elemental, spectral (FT-IR,  $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR, and UV-vis.), and thermogravimetric analysis. UV-vis. spectra and magnetic moment values indicate that  $\text{Mn(II)}$ ,  $\text{Co(II)}$ , and  $\text{Ni(II)}$  polymer-metal complexes are octahedral, while  $\text{Cu(II)}$  and  $\text{Zn(II)}$  polymer-metal complexes are distorted octahedral and tetrahedral, respectively. The analytical data confirmed that the coordination polymers of  $\text{Mn(II)}$ ,  $\text{Co(II)}$ ,  $\text{Ni(II)}$ , and  $\text{Cu(II)}$  are coordinated with two water molecules, which are further supported by infrared spectra and thermogravimetric analysis data. The prepared polymer-metal complexes showed good antibacterial activities against all tested microorganisms; however, the AFP ligand was also found to be effective but relatively less than their polymer-metal complexes. Along with antibacterial activity, all the polymer-metal complexes exhibit significant antifungal activity against most of the tested fungal strains. The results of antimicrobial activity reveals that the AFP- $\text{Cu(II)}$  showed the highest antibacterial and antifungal activity than other polymer-metal complexes.

**Keywords:** Polymer-metal complexes, AFP ligand, Antimicrobial activity

## Nanoformulated Quinacrine Regulates NECTIN-4 Domain Specific Functions in Cervical Cancer Stem Cells

Chatterjee S.<sup>1a</sup>, Kundu C. N.<sup>2a\*</sup>

<sup>1a</sup> Cancer Biology division, School of Biotechnology, Kalinga Institute of Industrial Technology (KIIT), deemed to be University, Campus-11, Patia, Bhubaneswar 751024, Odisha, India.

Email: subho.biotech001@gmail.com

<sup>2a\*</sup> Cancer Biology division, School of Biotechnology, Kalinga Institute of Industrial Technology (KIIT), deemed to be University, Campus-11, Patia, Bhubaneswar 751024, Odisha, India. Email:

cnkundu@gmail.com, cnkundu@kiitbiotech.ac.in

### Abstract:

NECTIN-4 [a poliovirus receptor-related-4 (PVRL-4) encoded gene] has vital roles in cancer proliferation, metastasis and angiogenesis. It possesses three different domains and it is predicted that they have different roles in cancer but the structure-function relationship is still unknown and hence carrying out a detailed study to elucidate the domain-specific functions of NECTIN-4 in cancer is necessary. Using 5-Fluoracil-resistant cervical cancer stem cells (PEMT-5FU-R-MC) and different NECTIN-4 domain-specific constructs, different domains of NECTIN-4 were overexpressed in PEMT-5FU-R-MC cells. Biochemical assays like comet,  $\gamma$ -H2AX immunofluorescence, western blot, in vitro tube formation, gelatin zymography, in ovo CAM assay, etc. were used to delineate the function of each domain of NECTIN-4 in cancer and their regulation by nano-formulated quinacrine (NQC). Endo-domain (lacking extracellular region corresponding to aa 30–347) and ecto-domain (lacking signal peptide and cytoplasmic region corresponding to aa 1–29 and 348–509, respectively) of NECTIN-4 were largely overexpressed in nucleus and cytoplasm, respectively. Endo-domain translocate into nucleus by physically interacting with IMPORTIN- $\alpha$ 2, activates the DNA repair and enhances cell growth, whereas ecto-domain specifically activates angiogenesis by modulating representative angiogenic markers, inducing in vitro tube formation and in ovo blood vessel formation. Full-length NECTIN-4 (aa 1–509) was overexpressed in both nucleus and cytoplasm and modulated both DNA repair and angiogenesis. NQC down-regulated these phenomena by modulating the endo-domain and ecto-domain of NECTIN-4. Thus, current study suggested that endo-domain of NECTIN-4 translocated

into nucleus and increased the DNA repair and ecto-domain of NECTIN-4 enhanced the angiogenesis, whereas NQC inhibits these processes.

**Keywords:** NECTIN-4, Nano-quinacrine, Cervical cancer stem cells, DNA repair and Angiogenes.

## **Influence of Stress on Lysosomal Function in *Hydra Vulgaris*: Molecular Insights into Aging and Disease**

Kowshik Kukkemane

Department of Biochemistry, School of Life Sciences,  
University of Hyderabad, Hyderabad 500046, Email:

kowshik242@gmail.com

### **Abstract:**

Aging and age related pathologies are considered to be one of the most challenging aspects of the increased average life span of human beings. While extensive studies on mechanisms of aging and possible interventions to promote healthy aging have been conducted in various model organisms ranging from nematodes to non-human primates, studies on the cnidarian *Hydra vulgaris* is highly limited. Globally, Hydra has been widely explored in regeneration studies by developmental biologists. However, Hydra being a potentially immortal organism may provide novel insights into the mechanisms by which it would cope with various environmental insults. Mild stresses such as calorie restriction or intermittent fasting has been associated with extension of life span in several model organisms and have been demonstrated to help in healthy aging. In this direction, a detailed study in Hydra system would be of great significance to enhance our understanding of cellular processes linked to healthy aging. Lysosomes being important cellular organelles play crucial role in turnover of intracellular biomolecules and autophagy. Several age associated pathological conditions have shown direct links to lysosomal storage disorders and malfunctioning of lysosomal enzymes. An extensive study involving transcriptomics would reveal specific set of genes and pathways that contribute to survival and longevity under environmental stress conditions in Hydra. As aging and autophagy are tightly interlinked processes in higher vertebrates, studying fate of such interlinks in immortal Hydra under stress would unravel novel mechanisms. Further, FOXO being identified as an important player in longevity, is known to regulate multiple processes including regeneration in Hydra, however, its involvement in stress response remains to be explored. Furthermore, identification of specific alterations in various lysosomal enzymes in terms

of their abundance and activity as a response to environmental stress would be pivotal in gaining insights into mechanisms of aging and disease.

**Keywords:** Aging, Environmental Stress, Hydra, Lysosome.

## **Liposomal Based Nano Drug Delivery System in Cancer Therapeutic**

Aradhana Shanti Soreng, Punyabrata Dash, Deoraj Sharma , Purnyasmi Mishra,

Trident Academy of Creative Technology, Bhubaneswar, Odisha, India

### **Abstract:**

Liposomal based nano-drugs delivery systems show capability to reduce the toxic effects of anti-cancer drugs and increases effectiveness of these drugs treatment in targeted area. The nano scale drugs delivery system ensure that the bound drugs-carrier complex reached and acts accurately on targeted sites. Due to high toxicity and side effect of chemotherapeutic drugs it becomes barrier and effect the limit the dosage to administered. The nano scale drugs are biodegradable and biocompatible if any chance it spilled up materials can be metabolized into non-toxic components. Liposome is a minute spherical vesicle surrounded by lipid bilayer which is used to load pharmaceutical drugs into the tissues. The vesicles can encapsulated water-soluble drugs in their aqueous spaces and lipid soluble drugs within the membrane itself. Liposomal based drugs treatments shows high capacity for encapsulation and shows efficient anticancer activity and preferably reduce toxicity. Liposomal worked as a depot from which the entrapped compounds release slowly. Liposome are amphipathic molecule because it have affinity for both aqueous and polar moieties as they have a hydrophobic tail and hydrophilic head. Liposome increased stability via. encapsulation and provides selective targeting to tumor tissues. It is flexible to couple with site-specific ligands to achieve active targeting. Various advantages of liposomes over standard methods of medicines increase stability and pharmacokinetics effects, extend the duration of residence in blood circulation. Liposomes has self-assembly capability due to which it has the capacity to carry significant drugs payloads and huge range of physiochemical and biophysical properties. Various liposome-nanoparticle shows significantly stabilizing colloidal dispersion otherwise it can be unstable nanoparticle in in-vivo and in-vitro system. All these requirements have led us to the development of nanoscale liposome systems for drug release.

**Keywords:** Chemotherapeutic, Encapsulation, Pharmacokinetics, Drug delivery.

## **Mental Health Services for Children and Adolescents in India: Problems and Solutions**

Kiirii Aniljoy

Department of Social Work, Jamia Millia Islamia, New Delhi 110025,

Email [kiirii.aniljoy@gmail.com](mailto:kiirii.aniljoy@gmail.com)

### **Abstract:**

Globally, 10-20 per cent of adolescents suffer from psychiatric illnesses. About half of these illnesses have their onset before fourteen years of age and three quarters by 25 years old. India has the largest number of children and adolescents in the world. According to census 2011, the population of India is 121.1 crore of which 30.1 per cent is below the age of 10-24 years. As per the National Mental Health Survey (2016), the prevalence of psychiatric illness was about 7.3 per cent in adolescents aged between 13-17 years. The prevalence of psychiatric illness in the community and school setting was found to be 6.5 and 23.3 per cent respectively in the country. Some of the common psychiatric illnesses reported in children include; depression, anxiety disorders, substance use disorder, attention-deficit/hyperactive disorder and conduct disorder. Suicide is reported to be the leading cause of death in the adolescent age group in India. The mental health gap is large, with less than 1 per cent of children with psychiatric illnesses receiving treatment. Stigma, poor mental health literacy, limited focus on child and adolescent mental health services are some of the barriers purported for this gap. School Mental Health Services (SMHS) have been attributed for improvement of the mental health of children with multipronged effects on the family, society and the nation. Hence, there is a tremendous need to scale up the SMHS in India. This paper is an attempt to understand what mental health is, why it is necessary for schools to promote mental health and well-being for children and adolescents and presents brief overview of SMHS for children and adolescents in the country. It also focuses on the problems of SMHS and provides solutions for effective implementation of SMHS in the country.

**Key Words:** Mental health services, Children, Adolescents, Problems, Solutions.

## **Enhanced Photocatalytic Nanostructured Fe-Cobalt Bimetallic Oxide/Activated Carbon Composites for the Removal of Cationic Dyes from Aqueous Solutions**

K.R.Shylaja<sup>1a</sup>, N.P.Radhika<sup>2b</sup>, T.R.Divakara<sup>3c</sup>, B.K.Jayanna<sup>4d</sup>

<sup>1a</sup> Department of chemistry, KS Institute of Technology, Bangalore 560109, Karnataka, India, [shylaja.kr@gmail.com](mailto:shylaja.kr@gmail.com)

<sup>2b</sup> Department of chemistry, KS Institute of Technology, Bangalore 560109, Karnataka, India, [npradhika.chem@gmail.com](mailto:npradhika.chem@gmail.com)

<sup>3c</sup> Department of chemistry, Sri H N Ananthkumar P U College, Ramanagar, Karnataka, India, [dibakaratr1977@gmail.com](mailto:dibakaratr1977@gmail.com)

<sup>4d</sup> Department of chemistry, B.N.M. Institute of technology, Bangalore 560070 Karnataka, India, [ninge1973@gmail.com](mailto:ninge1973@gmail.com)

### **Abstract:**

Bimetallic nanomaterial composites are of great interest in scientific research and applications in dye degradation from waste water. An Fe-Co nanoparticles with large spherical cages with uniform size distribution on the surface of activated carbon. The physicochemical and electrochemical properties of the metal oxide composites were evaluated to examine the photocatalytic degradation of Crystal Violet (CV). Potential of supercapacitors as electrode material and also photocatalytic nanocomposite material of Iron and Cobalt oxides were synthesized by combustion method with high purity of nitrates of Iron and Cobalt and the surface was modified by carbon. The NPs were analyzed by using X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Transmission electron microscopy (TEM), Energy Dispersive X-ray Analysis (EDX), Thermo-Gravimetric Analysis (TGA), X-ray Photoelectron Spectroscopy (XPS) and Brunauer–Emmet–Teller (BET) surface area techniques. The synthesized NPs were utilized for removal of Crystal violet (CV) dye from wastewater. The effect of various experimental parameters such as pH, adsorbent dosage, concentration of dye, photocatalyst concentration on the degradation efficiency of the effluent has been studied. The equilibrium studies for adsorption were done using Langmuir and

Freundlich isotherms and better agreement was attained with the Langmuir model. The maximum adsorption capacity ( $q_0$ ) was calculated as 88.1057 mg/g using Langmuir equation. The kinetic parameters displayed that CV adsorption onto the NPs followed pseudo-second-order kinetics model. In this paper, removal efficiencies of three different techniques Photocatalysis, adsorption and electrolysis treatments were compared for Crystal violet abatement using surface modified Nps. The results indicated that, photocatalytic and adsorption methods showed 1 and 60.70 percent of removal of dye at chosen higher initial dye concentrations of 25 mg/L and 50 mg/L respectively, whereas electrolysis methods showed 94.95 percent removal of dye even at higher initial concentration of dye (50 mg/L).

Electrolysis method seems to be more superior, possibly because of continuous flow of electric current through conductive electrode surface which generates the negative charges and these charges are capable of degrading the dye into constituent products more effectively than the other two methods. Mechanisms for removal/degradation dye from waste water.

**Keywords:** Ferric oxide/Cobalt oxide, Crystal violet, Nano particles, Photocatalysis.

**Synthesis of Two [2+2] Ionic Metallomacrocycles: Design of Flexible Organometallic Ligand, Self-Assembly, Characterization Of Hexagonal Macrocycles and health science applicability**

Arnab Chakraborty, Khushwant Singh, Neeladri Das\*

Department of Chemistry, Indian Institute of Technology Patna, Bihta 801 106, Bihar, India

Email: arnabchakrabortyme@gmail.com

**Abstract:**

A pyrimidine based “flexible” ligand was reacted to platinum (II) to produce a new organometallic molecule which was self-assembled with two donors. Thus, two new hexagonal [2+2] ionic supramolecular coordination complex was prepared. Characterization of these macromolecules were done using  $^1\text{H}$  NMR,  $^{31}\text{P}$  { $^1\text{H}$ } NMR, 1H DOSY NMR, 1H COSY NMR, IR and ESI-MS. Distorted hexagonal cavity which were nanoscalar in dimension was suggested by the PM6 molecular modeling of these [2+2] macrocycles.

Keywords: Metallomacrocycles, Self-assembly, Organometallic, Platinum (II), Macrocycles.

## **Regenerative Medicine: A revolutionary approach to modern healthcare**

Kalyani Behera

Trident Academy of Creative Technology, Bhubaneswar, Odisha

### **Abstract:**

Regenerative medicine is defined as the process of replacing or “regenerating” human cells, tissue or organ to restore or establish normal function. This field leads to regenerate damaged tissues & organs in the body by replacing damaged tissues or by stimulating the body’s own repair mechanisms to heal tissues or organs. It may also possible to grow tissues & organs in the laboratory & safely implant them when the body is unable to heal itself. The organs & tissues, loss through disease & injury, motivate the development of therapies that can regenerate tissues & decrease reliance on transplantation.

Regenerative medicine an interdisciplinary field that applies engineering & life science principles to promote regeneration, can potentially restore diseased & injured tissues & whole organs .A number of regenerative medicine therapies, including those designed for wound healing & orthopedics applications have received Food & drug administration (FDA) approval & are commercially available. Regenerative medicines has the potential to heal or replace tissues & organs damaged by age, disease or trauma as well as to normal congenital defects, treating both chronic & acute disease, including dermal wounds, cardiovascular diseases & traumas, treatment for certain type of cancer also. Therapy for transplantation of intact organs & tissues to treat diseased organ & tissue, loss suffers from limited donor supply & often severe immune complication, but these obstacles may potentially be bypassed through the use of regenerative medicine strategies. Some of the examples are stem cell therapy, platelet rich plasma therapy( PRP), prolotherapy, cartilage regeneration etc. Regenerative medicine has been recognized worldwide as a developing research field that offers the potential to revolutionize patient care in the 21<sup>st</sup> century. According to world regenerative medicines market 2013-2020 the global regenerative medicines market for small molecules & biologics, gene therapy & cell therapy is expected to reach \$67.5 billion by 2020 from \$51.1 billion by 2013. The fast moving & versatile field of regenerative medicine is at the cutting edge of translational research & could shift the paradigm in healthcare from symptomatic to curative treatment.

## **Role of Plant Quarantine in Prevention of Plant Diseases**

Sushree Sangita Barik

Khallikote University Berhampur, Ganjam, Odisha, India

### **Abstract:**

The first legal restrictions to hinder the spread of disease were enacted against human disease and later used to control spread of exotic plant diseases. Plant quarantine may be defined as the restriction imposed by duly constituted authorities on the production, movement and existence of plants or plant materials, or animals or animal products or any other article or material is brought under regulation in order to restrict the introduction or spread of a pest that may not exist there before. When plant pathogens are introduced into an area in which they did not previously exist, they are likely to cause much more catastrophic epidemics than do the existing pathogens. Some of the worst plant disease epidemics that have occurred throughout the world, for example the downy mildew of grapes in Europe and the bacterial canker of citrus, the chestnut operation of the quarantine regulations. It is extremely difficult to predict accurately whether an exotic organism will become established, and once established, become economically important.

The National Plant Quarantine Station at Rangpuri, New Delhi and four Regional Plant Quarantine Stations at Amritsar, Chennai, Kolkata and Mumbai are the major stations and are located at places having international airport/seaport/land frontier with neighboring countries. National Bureau of Plant Genetic Resources, New Delhi which is the nodal institution for exchange of plant genetic resources has been empowered under PQ order to handle quarantine processing of germplasm and transgenic planting material being imported for research purposes in the country. As per the recent amendments made under the PQ order, the Advanced Centre for Plant Virology at JARI, New Delhi, Indian Institute of Horticultural Research, Bangalore and Institute of Himalayan Bioresource Technology, Palampur have been identified for ensuring virus-free status in the imported in vitro material. Under the DIP Act, there is a provision of Domestic Quarantine to restrict the inter- state movement of nine invasive pests viz flute scale, san jose scale, coffee berry borer, codling moth, banana bunchy top and mosaic viruses, potato cyst nematode, potato wart and apple scab.

Plant Quarantine regulatory measures are operative through the "Destructive insects & pests Act, 1914 (Act 2 of 1914)" in the country. The purpose and intent of this Act is to prevent the introduction of any insect, fungus or other pest, which is or may be destructive to crops. The import of agricultural commodities is presently regulated through the Plant Quarantine (Regulation of Import into India) Order, 2003 issued under DIP Act, 1914 incorporating the provisions of New Policy on Seed Development, 1988. Further, the significance of Plant Quarantine has increased in view of Globalization and liberalization in International trade of plants and plant material in the wake of Sanitary and Phytosanitary (SPS) Agreement under WTO. The phytosanitary certification of agricultural commodities being exported is also undertaken through the scheme as per International Plant Protection Convention (IPPC), 1951.

**Keywords:** Plants, disease, Quarantine, Spreads, Precautions.

## **Vaccine Perplex and Exigent Challenges**

Sangeeta Kumari

Amity Institute of Biotechnology, Amity University, Haryana 122413

Corresponding Author: Email: [sanshnic@gmail.com](mailto:sanshnic@gmail.com)

### **Abstract:**

The entire world has come under a serious threat of dreadful CoVid-19 pandemic because of miniscule covert beings called virus. While we have been able to discern only 1 % of its whole population, 99% still remain unexplored. Main challenge, while dealing with these microscopic organisms, is its unpredictable nature as viruses mutate rapidly. In medical sciences the great discovery of vaccines by Edward Jenner revolutionized the treatment of the deadly microbial diseases. The vaccination drive was a great success for the eradication of a few deadly viral and bacterial diseases, like Poliomyelitis, smallpox, measles, meningitis and few more. This paper deals with the Vaccine success stories as well as the challenges.

**Keywords:** Vaccine, WHO Guidelines, Development stages, Challenges.

**Comparison of assembly tools using bacterial genome sequence data:  
Insights in to next generation sequencing data analysis**

Sahu Satya Narayan , Mishara Biswajit , Sahu Rojalin \*

School of Applied Sciences, Kalinga Institute of Technology (KIIT) Deemed to be  
University, Bhubaneswar -751024,India

\*Corresponding authors: [rsahufch@kiit.ac.in](mailto:rsahufch@kiit.ac.in)

**Abstract:**

Next generation sequencing (NGS) is a technology, which is used for greater sequencing of the nucleotides in a small time period. The objectives of the NGS are to obtain fidelity, read length, infrastructure cost and handle large volume of data. NGS technology plays an important role in Biology, especially in human genome study. For the analysis of NGS data there is several software and techniques are developed in the field of Bioinformatics. NGS technologies are implicated for several applications including gene expression profiling, genomic identification, genetic testing, drug discovery, disease diagnosis, de novo assembly, resequencing, transcriptomics sequencing at both DNA and RNA level. Metagenomics and Microbial diversity and Epigenetic changes are deciphered by using this technique. This study was compares the different assembly tools (Velvet and SOAPdenovo2) by using *Xylella fastidiosa* (DSM 10026) bacterial genome. De novo assembly sequencing assembles the genome of a particular organism without a reference genome sequence, which may lead to a better understanding at the genomic level and may assist in predicting genes, protein coding regions, and pathways. We compare and the studied that the commonly used assembly tools which specially designed for next generation sequencing are Velvet and SOAPdenovo2. The performance of each assembly was measured by a matrix called N50 length. N50 length is the longest length such that at least 50% of all base pairs are contained in contigs. The greater N50 length gives the better performance, according to N50 length the best result were found in Velvet at the kmer value 89 having N50 length 104919 bp.

**Key words:** Next generation sequencing, Assembly, Velvet, SOAPdenovo2, *Xylella fastidiosa*.

**Evaluation of the anti-cancer mechanism of berberine in human cervical cancer cells using mammalian cell culture and multiple spectroscopic approaches.**

Darpan Raghav, Shabeeba M. Ashraf, Krishnan Rathinasamy

School of Biotechnology, National Institute of Technology Calicut, Kerala – 673601

Email: darpan1991\_raghav@yahoo.com

**Abstract:**

Berberine is an alkaloid which is mainly found in the plants from Berberidaceae, Ranunculaceae, and Papaveraceae families. Berberine has been used in different traditional systems of medicine due to its remarkable anti-inflammatory, anti-diabetic, anti-microbial, and anti-oxidant actions. More importantly, berberine has shown to possess tremendous anti-cancer potential against different cancer types. One of the major mechanisms behind the anti-proliferative effect of berberine is the induction of G2/M phase cell cycle arrest followed by apoptotic cell death. Several speculations have been made to explain the anti-cancer attributes of berberine; however, the exact cytotoxic mechanism and major cellular target of berberine remains elusive. In this study, we evaluated the anti-proliferative mechanism of berberine in HeLa cells by performing SRB cytotoxicity assay. The effect of berberine on the cell cycle progression of HeLa cells was evaluated by executing FACS analysis. The impact of berberine on the interphase and mitotic spindle network of HeLa cells was analyzed by carrying out immunofluorescence microscopic analysis using antibody specific for  $\alpha$ -tubulin. The interactions between berberine and tubulin were characterized by employing fluorescence spectroscopy, computational docking analysis, and Fourier-transform infrared spectroscopy. The results indicate that berberine inhibited the proliferation of HeLa cells with an IC<sub>50</sub> value of 18  $\mu$ M and induced G2/M phase cell cycle arrest in a concentration dependent manner. At its IC<sub>50</sub> concentration, berberine depolymerized the cellular microtubules of HeLa cells and inhibited the migration of HeLa cells in a wound closure assay. The *in-vitro* and *in-silico* experiments specify that berberine bound to purified tubulin at a novel site and inhibited its polymerization into microtubules.

Data from FTIR study indicated that binding of berberine perturbed the secondary structure of tubulin. Collectively, our findings suggest that inhibition of tubulin polymerization could be the major molecular mechanism behind the G2/M phase arrest induced by berberine.

**Keywords:** Berberine, cancer, microtubules, tubuli

## **An insight into Colour Perception in Males**

Samar Kumar and Vedant Gattani

The Doon School, Dehradun-248001

### **Abstract:**

**Background:** Color vision deficiency is quite a common phenomenon and affects a substantial portion of the human population today. A recent study from Eastern India has reported 8.73% of males and 1.69% of females as color blind.<sup>1</sup> As color perception defects with growing age, it can have a huge impact on someone's life, thus it is imperative that we discover the problem as soon as possible. This study was done to investigate the change in colour perception ability in males with an increase in age.

**Method:** Total 105 non-myopic healthy males were observed of age groups 30-35, 15-17, and 12-13. The Farnsworth-Munsell 100-hue test was used twice with each subject to screen for congenital colour vision perception. Accumulated results report the relationship of age with varying sensory color perception.

**Results:** The mean score of the two tests taken for each subject was 128.09 for 12-15-year-old individuals, 20.94 for 15-17-year-old individuals, and 53.35 for 30-35-year-old individuals. These values show a significant change in the 'Total Error Score' (TES) recorded in the FM-100 test with a change in the age group.

**Conclusion:** The findings of the experiments indicate that the data are also in agreement with other reports of colour perception in males, showing that the performance in this task varies as a U-shape function with age. For the age bracket of 30-35 year old, the mean TES indicated higher results than that of the 15-17 year age group, denoting deteriorating colour vision ability in the higher age bracket. Unexpectedly, the lowest age bracket of 12-13 years showcased a high mean TES, surpassing that of the highest age group assessed.

**Key Words:** Farnsworth-Munsell 100 hue test, Color Perception, Total Error Score, Age

## **A computational approach to tackle the pandemic.**

Manvi, Siddhi Kumari & Prateek Paul

Jacob Institute of Biotechnology and Bioengineering

Sam Higginbottom University of Agriculture, Technology and Sciences, Naini -  
211007

Email: [meprateekpaul@gmail.com](mailto:meprateekpaul@gmail.com)

### **Abstract:**

Begun in December 2019, a cluster of several serious pneumonia cases of unknown epidemiology were reported in Wuhan City, in China Province of Hubei. Shortly after, Betacoronavirus, SARS-CoV-2, was identified as a microbial causative agent causing severe acute respiratory disease. Computationally, the potential T cell and B cell epitopes from the SARS-CoV-2 sequence(UniProt) are brought and screened using bioinformatics tools like IEDB(Immune Epitope Database and Analysis Resource). Concerning the sequence of UniProt, the analysis for B-Cell and T-Cell epitope predictions are being performed for the handling of the global pandemic, with different tools available to IEDB. Inhibiting the spike protein synthesis in the virus can halt the spread of the infection, and binding the expected epitope can help the B-cells and T-cells do so (immunoinformatics).

The formulation of an epitope-based peptide vaccine using rDNA technology requires RNA of the epitope of B & T-cells and an expression system such as *Escherichia coli*. In the first stage, epitopes of B and T cells are designed using the *in silico* method. These epitopes are then transformed into the 3D structure and docking analysis is performed to show the interaction of the determined epitopes with different HLAs(Human Leukocyte Antigens). This step is vital for predicting the allergic reaction that may develop after giving the vaccine into the body. In the second stage, peptides are chemically synthesized in the laboratory which are characterized and purified after this process. In the last stage, the evaluation of vaccine formulation in *In vitro* and *In vivo* is done to determine the immune response against the peptide.

**Keywords :** Spike-protein, Epitope based peptide, rDNA technology & in silico method.

**Role of melatonin in regulation of immune responses of spleen and head kidney  
cells in fresh water teleost, *Channa punctatus***

Manish Kumar Tripathi

Department of Zoology, School of Life Sciences, Guru Ghasidas Vishwavidyalaya (A Central  
University), Bilaspur, India

Email – [manish10aug@gmail.com](mailto:manish10aug@gmail.com)

**Abstract:**

Pineal is an important endocrine organ and its hormone melatonin plays important functions in animals. Pineal hormone plays critical roles in sleep wake cycle, circadian rhythms, immunity and gonadal maturation. The role of melatonin is scarcely verified in immunity. The aim of the current work was to evaluate the effect of exogenous melatonin on innate and cell mediated immune responses of *Channa punctatus*. Fishes were divided into control and experimental groups and melatonin injections (5 and 10 µg/g body weight for 10 days) were given to experimental fishes. Following the completion of experiment, fishes were mildly anaesthetized and spleen and head kidney were isolated aseptically. Single cell suspension was prepared from each tissue and various immune parameters like macrophage phagocytosis, superoxide production, nitrite release and lymphocyte proliferation were assessed. Melatonin treatment resulted in increase in superoxide production while macrophage phagocytosis was unchanged. Nitrite release by cells of spleen and head kidney was significantly increased after melatonin treatment when compared with control animals. Proliferation of lymphocytes from spleen and head kidney was also enhanced and this enhancement was more pronounced when mitogens were used. It was concluded that melatonin is involved in modulation of immune responses in *Channa punctatus*.

**Key words:** Melatonin, immunity, fish, phagocytosis, proliferation

## **Quality of Life of People Living with Cancer under Institutionalized Palliative Care and Community Based Palliative Care in Kerala**

Kiirri Aniljoy & Jona V.

1. Department of Social Work, Jamia Millia Islamia, New Delhi - 110025, [kiirri.aniljoy@gmail.com](mailto:kiirri.aniljoy@gmail.com)
2. Medical Social Worker, North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIHMS), Shillong, Meghalaya – 793018, [jona.mssu@gmail.com](mailto:jona.mssu@gmail.com)

### **Abstract:**

This study compares the Quality of Life (QoL) of Cancer Patients under Institutionalized Palliative Care (IPC) and Community Based Palliative Care (CBPC) in Kerala. A Comparative and descriptive research designed was adopted for the study. The universe of the study included two IPC centers in Thiruvananthapuram district and two CBPC centers in Malappuram district. A total of 100 respondents (50 respondents each from IPC & CBPC) drawn up using purposive sampling technique was the sample of the study. Data for the research was collected using a semi-structured interview schedule and WHO Quality of Life (WHOQOL) Assessment scale of 26 items (2001) for assessing the QoL. Statistical Analysis was performed using statistical analysis software SPSS version 11.5. T-test was performed for finding out significance difference between domain scores. The findings suggest that the QoL of cancer patients under IPC is lower compared to the QoL of cancer patients under CBPC. A vital issue underpinning this study is the choice of location of care, which depends on a range of factors. Although the research was conducted in Kerala, the findings are relevant to the attention of terminally ill cancer patients worldwide..

**Keywords:** Quality of Life, Cancer Patients, Institutionalized Palliative Care, Community Based Palliative Care.

## **Studies on antibacterial activity and physicochemical properties of LDH/Ag reinforced chitosan-g-poly acrylonitrile nanocomposite**

Shaikh Nazrul <sup>a</sup>, Lingaraj Behera <sup>b</sup>, Sarat Kumar Swain <sup>c, \*</sup>

1. <sup>a</sup>*P. G. Department of Chemistry, North Orissa University, Baripada -757003, Odisha, India, [nazrulshaikh2@gmail.com](mailto:nazrulshaikh2@gmail.com)*
2. <sup>b</sup>*P. G. Department of Chemistry, North Orissa University, Baripada -757003, Odisha, India, [lrbehera@yahoo.com](mailto:lrbehera@yahoo.com)*
3. <sup>c</sup>*Department of Chemistry, Veer Surendra Sai University of Technology, Burla, Sambalpu-768018, Odisha, India, [skswain\\_chem@vssut.ac.in](mailto:skswain_chem@vssut.ac.in)*

\*Corresponding author

### **Abstract:**

The design of advanced materials with antimicrobial properties has emerged in response to the need for preventing and controlling the growth of pathogenic microorganisms without the use of antibiotics. The present work deals with the application of a relatively new class of hybrid filler, Mg-Al LDH/Ag was incorporated as a reinforcing filler with antibacterial properties to chitosan-g-poly(acrylonitrile) for synthesizing CS-g- PAN/Mg-Al LDH/Ag nanocomposites. A series of CS-g-PAN/Mg-Al LDH/Ag nanocomposites have synthesized by in situ polymerization method. The nanocomposites are systematically characterized by Fourier Transform Infrared Spectroscopy (FTIR), X-ray Diffraction (XRD), Thermogravimetric analysis (TGA), Field Emission Scanning Electron Microscopy (FESEM), High-Resolution Transmission Electron Microscopy (HRTEM), Energy Dispersive Spectroscopy (EDS), UV-Vis spectrophotometer and Oxygen Permeability Test. The tensile strength and antibacterial activity are studied. Antibacterial properties of such nanocomposites were determined by using an agar diffusion test against both Gram positive bacteria (*Staphylococcus aureus*) and Gram negative bacteria (*Escherichia coli*).

The interaction between hybrid filler and polymer matrix is studied by FTIR. TGA reveals CS-g-PAN/Mg-Al LDH/Ag nanocomposites have more thermal stability over virgin PAN and CS-g-PAN copolymers. The morphology of the CS-g- PAN/Mg-Al LDH/Ag nanocomposites is explored by using XRD, FESEM and HRTEM. The as-synthesized nanocomposite has appreciable thermal stability in combination with reduction in oxygen permeability and better antibacterial activities by which the material with potential use in diverse applications such as packaging or paper coatings.

**Keywords** - LDH, AgNPs, Nanocomposites, Antibacterial activity

## **Monitoring pesticides in agroecosystem: The need of the hour**

Krishna Priyadarshini<sup>1</sup>, Pratikshya Jena<sup>1</sup>, Itishree Behera<sup>1</sup>, Sukanta Kumar Nayak<sup>2</sup> and Sanjay Kumar Raul<sup>1\*</sup>

1. Department of Biotechnology, Rama Devi Women's University, VidyaVihar, Bhubaneswar-

751002, India

2. Department of Biotechnology, North Orissa University, Sri Ram Chandra Vihar, Baripada- 757003, India

### **Abstract:**

Agriculture always plays an essential role in providing food security of any country and India is no exception. While, substantial improvement in agricultural productivity has been achieved in past several decades, the sustainability of this sector is at stake due to insect, pests, weeds etc. Pesticides have now become an integral part of agriculture especially in reducing production and subsequent economic loss. Pesticides which include agrochemicals like fungicides, insecticides, rodenticides, molluscicides, nematocides, herbicides *etc.*, are predominant and routinely used in Indian agricultural system. The use of such pesticides has tremendous positive impact on agricultural practices beyond any doubt but long-term exposure to these compounds have serious environmental issues as well as adverse health consequences of non-targeted species including human beings. The effects could be acute or chronic leading to neurological, patho-physiological, immunological and reproductive disorders in sensitive individuals depending upon type and concentration of exposure of these substances. Even, fatal consequences have been demonstrated when their concentrations in food exceed the permissible limits. Further, routine use of certain persistent organochlorine DDT, endosulfan, glyphosate not only impact on soil microbiota but also influence various nutrient cycles in both terrestrial and aquatic environments. Although, pesticides are banned in several advanced countries, they are still used in India. Therefore, there is an urgent need for more sustainable and ecological approaches to regulate pesticide use and to implement appropriate strategies to

minimize the residual/harmful effects of these pesticides through modern technology-based agriculture.

**Keywords:** Endosulfan, Environment, Glyphosate, Health, Pesticides

## Phytochemical screening and antibacterial activity of potential mangroves of sartha estuary

Sujit Kumar Nayak

P. G. Department of Environmental Science, Fakir Mohan University, Balasore-756089,

E-mail: Email: [contactsujit98@gmail.com](mailto:contactsujit98@gmail.com)

### Abstract:

Mangroves are special group of salt tolerant plants which grow in the coastal intertidal zone and easily distinguished from other species by tangled, prop roots. The underwater habitat of their root provides nursing environment for juveniles of fish species. Physically, they keep balance between marine and terrestrial communities and protect shoreline from damaging winds, waves and floods. From the ancient times, we are using plant based drugs and chemicals for curing various diseases. This study was carried out with an objective to investigate the qualitative phytochemical screening of different compounds such as alkaloids, flavonoids, glycosides, phenols, tannins, saponins and antimicrobial potentials of leaves of some potential mangroves of Sartha estuary in the Balasore district of Odisha coast. These species are *Sonneratia caseolaris* (L.) Engl., *Acanthus ilicifolius* L., *Avicennia alba* Blume, *Avicennia marina* (Forssk.) Vierh. and *Rhizophora apiculata* Blume. The results reveal the presence of alkaloids in *S. caseolaris*, *A. alba* and *A. marina*, flavonoids in *S. caseolaris*, *A. ilicifolius* and *A. alba*, glycosides in *A. alba* and *R. apiculata*, phenols in *S. caseolaris* and *A. marina*, tannins in *S. caseolaris*, *A. alba*, *A. marina* and *R. apiculata* and saponins are found to be present in all the above mentioned species. The antimicrobial activity was determined in the ethanolic extracts using agar disc diffusion method. The antibacterial activities of all these mangrove plants species were tested against Gram-positive *Brevibacillus sp.* and Gram-negative *Escherichia coli* bacteria. The results showed that remarkable inhibition of the Gram-positive bacterial growth was shown by *Avicennia marina* (Forssk.) Vierh. and inhibition of the Gram-negative bacterial growth was shown by *Sonneratia caseolaris* (L.) Engl. respectively. Hence, these plants can be used to discover bioactive natural products that may be used in the development of new pharmaceutical products which can be used for the treatment of various diseases.

**Key words:** Phytochemical screening, antibacterial activity, mangroves, Sartha estuary

**Socio-Economic Impact of COVID-19 Pandemic on Fisheries  
Community of Coastal District of West Bengal**

Asim Kumar Giri and Bishruti Chowdhury

Department of Fishery Sciences, Vidyasagar University, Midnapore-  
721102 Department of Industrial Aquaculture and Fisheries, Asutosh College,  
Calcutta University

Email: aquacultureakg@gmail.com, cbishruti143@gmail.com

**Abstract:**

Our planet Earth is knocked down by the COVID-19 pandemic. This can be the toughest time for us to measure on Earth and within the current situation; there are such a big number of reasons that polarize our mental health like, financial and economical state. We are in trouble due to the immediate actions of the COVID-19. This virus can be our resilient time to steer and control us mind from a serious financial state crisis because this virus is doing away with many lives from our planet every minute. Because of economic problems the psychological discomfort is escalating in our society. We all are apprehensive about infection, dying, and losing our members of the family by this deadly Corona Virus. This detrimental disaster is crashing on mainly the fisheries sector. Everywhere the planet, this pandemic situation is hampering the fisheries economy. Many people cultivate fish with a loan. They could not cultivate a loan due to this pandemic situation. Some make their living by fishing. They are in trouble too. Many people working in the fish industry have lost their jobs. They are afraid to lose their source of income. Globally, countless people directly or indirectly rely on fisheries for his or her livelihoods. Fish gives essential nutrients and micronutrients that are most important for this pandemic situation. Thriving economical, mental, and social care will provide us to form an improved world. We have to find solutions for the economic and financial problems that will make a better world.

**Key words:** Socio-Economical, COVID-19, Mental health, Fisheries community

## **Mental Health Disbalance by COVID-19 with Special Reference of Fisheries Community**

Joydeep Das And Asim Kumar Giri

Department of Fishery Sciences, Vidyasagar University, Midnapore-  
721102

Email: joydeepdaas@gmail.com , aquacultureakg@gmail.com

### **Abstract:**

In present, all over the world is suffering from COVID-19 pandemic. This is very toughest time for living in Earth. There are so many reasons to disbalance our mental health. We all are distress because of the immediate actions of the SARS-2CoV-2. This virus is taking away many lives from our life. So, this is our toughest time to handle and control our mind from a major mental health crisis. Our societies have been hardly impacted by this type of crisis. These are a priority to be addressed urgently to control this violence disaster. In our society, psychological distress is spreading quickly. We all are afraid of infection, dying and losing our family members by this deadly Corona Virus. We all have been both physically and mentally distanced from our loved once. People are facing lot of problems like economic turmoil, lost their jobs, risk of losing income etc. A common source of distress is the frequently misinformation's and rumours. This type of information will keep a mark in future to create such type of distress. This deadly disaster is crashing on fisheries sector. We all know that fish is very important source of animal protein. Fish gives essential nutrients and micronutrients for the development our body specially children and it is an important diet. All over the world, this pandemic situation is hampering in fisheries economy. People of Fisheries community like fisherman, fish famer, fisheries employee etc are afraid to lose their income. Globally, millions of people directly or indirectly depend on fisheries for their livelihoods. This is very important to protect our people from pandemic related adversities. Good mental health and social care will provide us to create a better world.

**Keywords** -Mental health, COVID-19, fisheries community, psychological distress

## **Implementation of Artificial Intelligence in sight to COVID-19 Drug Repurposing**

Satpathy Sneha shriparna <sup>a</sup>, Mohanty Sweta<sup>b</sup>, Mohanty Chandana\*

School of Applied Science, Biology Department KIIT, Deemed to be University,  
Bhubaneswar, Odisha, India, Pin:751024.

### **Abstract:**

The novel coronavirus disease 2019 (COVID-19), caused by the Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2), continues to spread aggressively bringing down the entire world to a complete standstill. According to the World Health Organization (WHO), 213 countries and territories around the world have reported a total of 7,030,166 confirmed cases with a death toll of about 893,712. A quick cure for the disease will be a therapeutic medicine that has a usage history in patients in order to resolve the current pandemic situation before it gets worse. But a new drug discovery process being time-consuming, the pharmaceutical industry is also looking for novel leading-edge technologies to monitor and restrict the spread of COVID-19 disease. Drug repurposing is one such technique of applying the chemical combinations of the existing drugs in treatment of a new disease. Artificial intelligence (AI) is another technology that can help us to fight this virus by population screening, medical help, notification, and suggestions about the infection control. With technological advancements in AI coupled with increased computational power, the AI-empowered drug repurposing can prove beneficial in the COVID-19 scenario. With a drug repositioning strategy, AI can quickly detect drugs that can fight against emerging diseases such as COVID-19. This, technology has the potential to improve the drug discovery, planning, treatment and reported outcomes of the COVID-19 patient, being an evidence-based medical tool. In the age of big data, drug repurposing can be done in an efficient way by using deep learning methods. The significance of application of AI in the process of drug development has been identified. The AI-based drug repurposing is cheaper, faster and effective approach and can reduce the failures in clinical trials. The repurposed drug can directly enter the advanced phases for trial without the initial trials and toxicity tests.

This paper reviews the recent developments and future prospects of AI based drug repurposing for COVID-19 pandemic.

**Keywords:** Artificial Intelligence (AI), Machine learning, Deep learning, COVID-19, Coronavirus, Drug Repurposing, Drug repositioning

## **Impact of pandemic covid-19 and tuberculosis**

Bandana Khuntia

IHSE,SOA Deemed to be University,Khandagiri,Bhubaneswar-751003

Email: [danakhuntia38@gmail.com](mailto:danakhuntia38@gmail.com)

### **Abstract:**

In late 2019, a novel infectious disease with human to human transmission ( Covid-19) was identified in Wuhan , China , which now has turned into a global pandemic. Half of the world 's population is under some form of lockdown due to Covid-19. Tuberculosis and Covid-19 are infectious disease that attack primarily the lungs. Both diseases have similar symptoms such as cough, fever and difficulty in breathing and biological agents are the mode of transmission during close contact. However TB has longer rate of incubation period with a slower onset of disease. Experience of Covid-19 infection in Tuberculosis patients remain limited, it is anticipated that people suffering from both TB and Covid-19 may have poorer treatment outcomes especially if TB treatment is interrupted. Government of high burden countries need to ensure the continuity of TB services in the time of Covid-19. WHO is continuously monitoring Tuberculosis prevention and care during the Covid-19 pandemic. Health services need to be actively engaged for an effective and rapid response to Covid-19 while ensuring that TB and other essential health services are maintained. We must overcome the challenges that Covid-19 presents and use the opportunities it affords us to achieve a new approach in treatment of TB and care. There is no doubt that India is putting every effort to stop ongoing novel Covid-19 pandemic, but old silent killer, TB is preventable and treatable .

**Key words** – Covid-19,new challenges,Tuberculosis.

## **Recent research and development of drug delivery procedure**

Mitrabrata Goswami

Department of Food Technology, Hemnalini Memorial College of Engineering,  
MAKAUT, West Bengal 741246

Email: goswamimitrabrata@gmail.com

### **Abstract:**

Delivering drug is a pharmaceutical approach of therapies of different diseases in humans along with animals. To treat human diseases, nasal and pulmonary routes of drug delivery is an important field of research. These routes provide promising alternatives to parenteral drug delivery, particularly for peptide and protein therapeutics. It becomes particularly the parenteral drug delivery for peptide and protein therapeutics appreciable. Different drug delivery mechanisms developing, for example, delivering the drug in nasal and pulmonary system. Which includes liposomes, proliposomes, microspheres, gels, prodrugs, cyclodextrins, among others. Biodegradable polymers are the component of the nanoparticles to fulfilling the requirement of drug delivery, for example, targeting of exact sites or cell populations in the lung, stabilization against the forces occurs during aerosolization, biocompatibility, delivered the drug in a predetermined method.

**Key words:** Aerosolization, Diseases, lung diseases, transdermal

## **Emerging New Technologies in Health Care: A Need for Gadchiroli District Maharashtra.**

1Dr Sandeep Nivruttirao Niwadange and 2Dr Hemaraj Madhukar Meshram

1Assistant Professor, Department of Chemistry, S G M College,  
Kurkheda. Gadchiroli. 441209. [sandip.niwadange@gmail.com](mailto:sandip.niwadange@gmail.com)

2Assistant Professor, Department of Zoology, S G M College,  
Kurkheda. Gadchiroli. 441209. [hemantmeshram4@gmail.com](mailto:hemantmeshram4@gmail.com)

### **Abstract:**

Since the mid of 1980's and even now the Gadchiroli district is been consider as the most backward area with it's tribal community in Maharashtra. According to the study of Dr Rani Bang, a famous Gynaecologist and co-founder of Gadchiroli-based NGO "SEARCH" claims that, despite the developments in the medical field, most of the peoples in tribal and rural areas are devoid of health-care facilities, especially Gynaecological issues and many others like infant mortality rate, Sickle Cell carrier rate and annual parasite incidence of malaria treatment and surgical care as well in the district. However, the quality of medical care in Gadchiroli varies considerably and is limited or inaccessible to the population of tribal areas. Therefore, it is important to analyze the structure of the health system at the local level to solve the problems regarding health issues. In Gadchiroli district there are many types of herbs used as a traditional medicines by the tribal peoples to solve the health problems at ground level. But when we consider their cultures practices and livelihood, however, at present; traditional medicine have been recovered and been positioned as a prominent one. One of these traditional medicines is known as 'Zadipatti' (Herbal) Treatment.

The emerging health technologies need to identify the problems of the tribal people and developing new, appropriate solutions to the health related issues of the peoples in Gadchiroli district. These new health technologies along with traditional one will add a healthy contribution to the peoples and voluntary organizations can make to build the society.

**Keywords:** Tribal peoples, Zadipatti treatment.

## Studies on volatile constituents and biological properties of the essential oils from fruits of *Solanum pubescens* Willd

Haseebur Rahman <sup>a</sup>, Nazneen Rahman <sup>a</sup>, Mir Haris <sup>a</sup>, Riaz Mahmood <sup>a</sup>

<sup>a</sup> Department of Biotechnology and Bioinformatics, Kuvempu University, Jnanasahyadri,  
Shankaraghatta – 577 451, Shimoga Dist. Karnataka. INDIA.

### Abstract:

*Solanum pubescens* Willd is growing wild in the hills of Rayadurg jurisdiction of South Western Andhra Pradesh. *S. pubescens* gained much attention as it has been constantly reported for its diverse folkloric uses, novel phytochemicals in leaf extracts were constantly proved for its medicinal efficacy. The study evaluates the chemical profiling of *S. pubescens* fruits essential oil (SPFO), acute toxicity, liver, kidney, and lungs protective potentials against CCl<sub>4</sub> induced oxidative stress in rats. The GC-MS examination uncovered thirty-six compounds, the significant segments were 3beta-Cholest-8(14)-en-3-ol, acetate, (13.21%), 3-(1,5-Dimethyl-Hexyl)- 3A,10,10,12B-Tetramethyl (11.16%), Stigmast-5-en-3-ol, 3.beta. (10.19%), 9,19-Cyclolanost-24- en-3-ol, 3.beta. (9.51%). The *in vitro* innocuous nature against Hep-G2 and MCF-7 cell lines at the tested concentrations (LC<sub>50</sub> value of >80 µg/ml), normal serum biochemical and tissue specific markers analysis in acute toxicity studies (2000mg/kg bw) advocating the non-toxic nature of the SPFO. The substantial *in vitro* antioxidant activity evaluated by scavenging DPPH radicles, reducing TPTZ (FRAP) and total antioxidant potential showed IC<sub>50</sub> of 172± 3.27 µg/ml, 115 ±3.98 µg/ml and IC<sub>50</sub> of 284.8 ± 20.89 µg/ml respectively. Pre-treatment of SPFO for seven days (100mg and 200mg/kg b.w.) ameliorated the CCl<sub>4</sub> toxicity evidenced by the series of biochemical and histological parameters, followed by a significant degree of antimicrobial, anti-inflammatory and analgesic promises. Consistently, SPO exhibit prominent wound healing potentials in excision, incision and dead space wound models with considerable elevation in granulation tissue parameters. The findings strongly validating nutritive therapeutic

potentials and suggests that the *S. pubescens* fruit essential oil can potentially be used as valuable new natural leads with promising properties in the pharmaceutical industries. To the best of our knowledge, this is the first ever report on the systematic phytochemical and therapeutic evaluation of *S. pubescens* fruit essential oil

## **Anti-cancer effect of cerium oxide nanoparticle**

**Tapas Ranjan Sahoo\***

Department of Chemistry, School of Applied Sciences, KIIT deemed to be University,  
Bhubaneswar-24, Odisha, India.

*Email:* [trsahoofch@kiit.ac.in](mailto:trsahoofch@kiit.ac.in)

### **Abstract:**

The bioactivity and physical characteristics of CeO<sub>2</sub> nanoparticles are significantly dependent on the type of the particle, particle size and defects. Herein, a facile and cost effective microwave-assisted combustion route was used to prepare pure CeO<sub>2</sub> nanoparticles (NPs). The samples were thoroughly characterized by various techniques and tested as anti-cancer therapeutic agent in colon cancer. The structural investigations (X-ray Powder Diffraction) revealed the formation of single phase cubic fluorite-type structure of CeO<sub>2</sub> with *Fm-3m* space group. Morphological analysis (FESEM), demonstrated the aggregation of irregular nanoparticles with grain size ~ 20-40 nm. To have more knowledge on the sample morphology, TEM and HRTEM images were taken. TEM image showed ceria NPs with squared shape and particle size in 50-95 nm range. Furthermore, HR-TEM micrographs confirmed the crystallinity of the CeO<sub>2</sub> sample, which was explored by calculating the distance between the fringes in the corresponding Fourier transformed images. The BET specific surface area (SSA) of as-synthesized ceria nanoparticles, was observed to be 25 m<sup>2</sup>/g.

It was interesting to observe that, the as prepared NPs exhibit remarkable differential cytotoxicity towards healthy (BHK121, Baby Hamster Kidney cells) and human Colon cancer cells (HCT116). Nuclear fragmentation assay indicated clear DNA fragmentation in HCT116 cells, whereas intact nucleus was observed in normal cells, suggesting ceria induced apoptotic cell death in colon cancer cells. In sum, MACS generated ceria nanoparticles could uncover a new avenue in cancer therapy.

**Keywords:** CeO<sub>2</sub> NPs, Microwave-Assisted Combustion Synthesis, Anti-Cancer, Colon Cancer

## **Modification of ivermectin- a novel idea for the cure of Covid 19**

Rajanikanta Acharya and Deoraj Sharma

Trident Academy of Creative Technology, Bhubaneswar, Odisha

### **Abstract:**

Corona virus disease is an infectious disease caused by Severe acute respiratory syndrome corona virus 2( SARS-COV2). Various clinical trials undergo to find out therapy. We report that IVERMECTIN is a FDA approved antiparasitic drug .In previous year it was shown to have broad spectrum antiviral activity in vitro. It was seen that when viral proteins of Severe acute respiratory syndrome corona virus 2( SARS-COV2) enter into the type2 pneumocytes cells nucleus, through nuclear pore complex with the help of transporter, importin Alpha and importin Beta 1. Viral protein bind importin Alpha and importin Beta1 to form importin Alpha and importin Beta1 heterodimer complex and enter into the nucleus. But here, ivermectine binds to the importin Alpha and importin Beta1 heterodimer complex and unstabilizes it so that viral protin can not binds to it. In this way it can inhibit the viral Replication. If a large number of protin come, it can not destabilize all the complexes, so some modification of drug is required. We know that LPVR is a protease inhibitor molecule which can inhibit the viral proteases from making polyproteins to nucleocapsid ,Spike proteins and other enzymes required for viruses .So if we add the LPVR (which has inhibitory activity) by modifying the drug IVERMECTIN ,large number of viral protins will be not produced and this leads to a better environment for ivermectin and to stop the viral replicatin. A recent study says that IVERMECTIN might be able to attach to the Severe acute respiratory syndrome corona virus 2( SARS-COV2) spike receptor binding domen bound with ACE2 .So that we can restrict it from root level. Here it proves that modified IVERMECTIN can be effective against acute respiratory syndrome corona virus 2( SARS-COV2) .Clinical trials should undergo to determine whether IVERMECTIN is an effective treatment for acute respiratory syndrome corona virus2(SARS-COV2) or not. IVERMECTIN therefore warents further investigation for future benefits in humans beings .



**Dr. Chandana Mohanty, Convenor, EFHD2020**  
**Department of Biology, School of Applied Sciences, , KIIT Deemed to be University,**  
**Bhubaneswar-751024, Odisha, India**