Maharani Lakshmi Ammanni
College For Women Autonomous
Affiliated to Bangalore University
Re-accredited by NAAC with "A" grade, Recognised by UGC
under Section 2(f) and 12(b) of the UGC Act 1956
Conferred the Status of 'College with Potential for Excellence' by UGC

An Integrated Approach to Diagnosis and Therapy in Cancer

(A National Symposium)

Supported By -
STAR Scheme & CTEP

सत्यमेव जयते
Department
of Biotechnology
Govt. of India

TECHNICAL EDITORS
Dr. Sushil Kumar Middha
Dr. Jolitha A. B.
Dr. M. Reema Kumari
Dr. S. Saraswati

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About Us

Maharani Lakshmi Ammanni College for Women (mLAC), established in 1972, has carved a niche for itself in imparting quality education along with instilling moral values and transforming each student into a responsible citizen. This is reflected by the college being awarded *Autonomous*status by the University Grants Commission(UGC) in the year 2016. The college has been recognized as a *Centre with Potential for Excellence*, in both Phase I (2010) and Phase II (2014) by the UGC and been awarded with *STAR College Status* by the DBT, Govt. of India. It has been re-accredited with *"A" grade by NAAC in the year2016. Bioinformatics Infrastructure Facility (BIF) and Biotechnology Finishing School (BTFS) recognition from DBT, Govt. of India and KBITS, Govt. of Karnataka , respectively* are the exclusive milestones of mLAC.

The Star College Scheme was initiated in 2008 by DBT, Govt. of India to nurture excellence in undergraduate science education for holistic development of colleges. The program emphasizes improvement of science education at undergraduate level with special focus on practical training. The science association of mLAC, *SAMAGATHA*(An Enigma) is an initiative by the faculty and students to promote the spirit of scientific enquiry, under the umbrella of star college status. The association is involved in organizing various intercollegiate competitions and national level conferences and workshops to stimulate the enthusiasm of students and kindle their interest towards basic sciences.

About the Symposium

Cancer is one of the major non-communicable diseases (NCD) worldwide, accounting for 22% deaths in 2012 worldwide. The number of cases is projected to increase to 17 million by 2020. According to ICMR, almost half of the cases will be in Asia with more than 17 lakh cases expected to occur in India by 2020. In such a scenario, early diagnosis and cost-effective treatment will play a major role in effective patient management. Developing the infrastructure required to cater to a vast population requires substantial effort in research and development.

The National Symposium on **"An Integrated Approach to Diagnosis and Therapy in Cancer"** aims to create awareness about cancer etiology and stimulate the interest of students in cancer research. It has become unequivocally evident that tumor development depends on the intricate reciprocal interplay of tumor cells with their local and distant environments. Mutations in genes regulating cell cycle/cell proliferation can also contribute to tumorigenesis and is of great relevance in both diagnosis and disease management. One of the major focus of the symposia is developing diagnostics and therapeutics through translational research. The invited speakers will make presentations on emerging areas in cancer research likenanomedicine, personalized medicine, etc. Reputed clinicians and researchers will provide different

perspectives on cancer biology. Thus, this symposium aims at a comprehensive functional understanding on the integrated role of physical and life sciences in diagnostics and therapeutics of cellular and molecular events that are responsible for the plasticity of tumor cells. Moreover, it will bring together experts in cancer and molecular biology who will share their expertise on a new generation of effective diagnostic tools and therapeutic approaches in cancer.

One of the objectives of the symposium is to provide students and researchers a platform for exchange of knowledge and innovative ideas towards a comprehensive approach in cancer biology. It provides them with an ample opportunity to present their research work related to the conference theme.

mLAC
Excellence in Education
Since 1972

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Department of Biotechnology Govt. of India

MAHARANI LAKSHMI AMMANNI COLLEGE FOR WOMEN AUTONOMOUS

IISc Post, Malleswaram, Bengaluru-12

Schedule For Inauguration

Time	Events
10.30 - 10.35 a.m	**Invocation**
10.35 - 10.40 a.m	**Lighting of Lamp**
10.40 - 11.00 a.m	**Welcome Address by Convenor** Dr.M.B.Nagaveni Dean of Sciences, mLAC
11.00-11.30 a.m	**Address by Guest of Honour** Dr. Vijay Chandru Chairman, Strand Life Sciences
11.30-11.40 a.m	**Presidential Address** Padma Vibushan Roddam Narasimha
11.40-12.10 a.m	**Address by Chief Guest** Dr. Binay Panda, Ganit Labs
12.10-12.20 p.m	**Address by Co-Patron** Dr.Shantha T.L Director, mLAC
12.20-12.30 p.m	**Address by Co-Convenor** Prof.Vijaya T.M., Principal, mLAC
12.30-12.40 p.m	**Vote of Thanks** Prof.B.N.Nagalakshmi, HOD, Dept of Chemistry, mLAC
12.40-1.30p.m	**LUNCH BREAK**

Day 1, 7th March, 2017

Technical Session I

Chairpersons

DR. RITUPARNA SINHA ROY
Assistant Prof. Dept. of Biological Sciences
IISER, Kolkota Bangalore University.

PROF. K MANJUNATHA
Dept. of Biotechnology,

Topics	Resource Persons	Time
"Cancer : a disease of stem cells?"	**Dr. Annapoorni Rangarajan** Assistant. Prof, Molecular Reproduction, Development and Genetics Dept.IISc, Bengaluru	1.45- 2.15 p.m
"Genomics and Childhood Cancer, what's new?"	**Dr. Intezar Mehdi** Director & Head Dept. Of Pediatric Oncology, Hematology and BMT HCG, Bengaluru	2.15-2.45 p.m
"Inhibition of DNA Repair as a Strategy to Treat Cancer"	**Dr.Sathees. C. Raghavan** Associate Prof. Dept. of Biochemistry IISc, Bangalore	2.45-3.15 p.m

Tea Break 3.15 - 3.45 pm

Technical Session II

Chairpersons

DR. PRASANNA VENKATRAMAN
Assistant Prof. ACTREC, Mumbai

DR. MANISH THAKUR
Senior Research Scientist,
Jubilant Biosys, Bengaluru

Topics	Resource Persons	Time
"**Mechanism of DISC Formation- a Prerequisite for Initiation of Extrinsic Cell Death Pathway**'	**Dr. Kakoli Bose** Assistant Prof. ACTREC, Mumbai	3.45-4.15pm

Oral Presentations

4.15-5.30pm

Technical Session II

Chairpersons

DR. PRASANNA VENKATRAMAN
Assistant Prof. ACTREC, Mumbai

DR. MANISH THAKUR
Senior Research Scientist,
Jubilant Biosys, Bengaluru

Day 2, March 8, 2017
Technical Session III

Chairpersons

DR. KAKOLI BOSE
Assistant Prof. ACTREC, Mumbai-Bangalore University

DR. V. R. DEVARAJ
Dept. of Biochemistry

Oral Presentations 10.00- 11.00 a.m

Topics	Resource Persons	Time
"Structural Assessment of Cancer-Causing Mutations for Translational Research"	**Dr. Ashok K. Varma** Principals Investigator ACTREC, Mumbai	11.00-11.30 a.m

Tea Break 11.30-12.00 p.m

Technical Session IV

Chairpersons

DR. SUMA S,
Asst. Prof, Dept. of Biotechnology
Christ University, Bengaluru

DR. ASHOK K. VARMA
Principal Investigator ACTREC, Mumbai

Topics	Resource Persons	Time
"Personalized Medicine for Cancer"	**Dr. Ajit Kamath** Executive Director, External Research and BD Mitra Biotech, Bengaluru	12.00-12.30pm

Topics	Resource Persons	Time
"Novel Molecular Targets and New Strategies on the Path from Bench to Bedside"	**Dr. Prasanna Venkatraman** Asst Prof. ACTREC, Mumbai	12.30-1.00pm
"From Bench To Bed Side: Theranostics"	**Dr. Prashanth G. R** Consultant, Molecular Imaging HCG, Bangalore	1.00-1.30pm

Lunch 1.30-2.15pm

Technical Session V:

Chairperson

PROF. PUTTARAJU H. P
Dept. of Life Sciences
Bangalore University

Topics	Resource Persons	Time
"Nanoscale Materials for Engineering improved cancer Nanomedicine"	**Dr. Rituparna Sinha Roy** Assistant Prof., Dept. of Biological Sciences IISER, Kolkota	2.15-2.45p.m
	Poster viewing	2.45-3.15p.m

Tea Break 3.15-3.30p.m

Cultural Program 3.30-4.30 p.m

Valedictory and Prize Distribution 4.30PM onwards

Oral presentations on 07/03/2017

OP	Name of the paper presenter	Title of the paper
1	G. Hema, D. Subbarao and B.S. Thippeswamy	Apocynin as an antigenotoxic and anticytotoxic agent - Investigations through Micronuclei induction, *Allium cepa* root tip assay, MTT assay and DNA fragmentation
2	Venkata Naga Raju E	Development of arginine based targeted nanocarriers for gastrin releasing peptide receptors in colon cancer
3	Sarina. P Khabade	Extraction and characterization of L asparaginase from *Spinaceaoleracea*
4	Chinnappa Reddy, Abhaykumar Kamble and Sharangouda J. Patil	Anticancer activity of *Achyranthusaspera* leavesin albino mice
5	Syed Murthuza, B.K. Manjunatha	Antiinflammatory and Radioprotective Activity of *Saracaasoca* against Whole Body Electron Beam and Gamma radiation in Swiss Albino Mice and RAW 264.7 cells

6	Sayeeda Mussavira, S. Raghothamaand Bindhu O S	NMR based Salivary Metabolomics as a Complimentary Approach for Oral Squamous Cell Carcinoma Diagnosis
7	Nagamani T.S.	*In vitro* cytotoxic activity of *Stereospermumcolais* leaf extract on HeLa (Human cervix carcinoma) cell lines
8	Vasanth Kumar Bhaskara, Indra Mohanam, and Sanjeeva Mohanam	Effect Of Hypoxia And Intermittent Hypoxia On Hif-1á Mediated Neuroblastoma Cell Metastasis
9	Anupama O.P., Subina Bharathan, Swetha Raghavan, Yogesh B.J, Bharathi S and Pramod T.*	Screening Of Novel Strains For L-Asparaginase Production From Various Soil Samples

Oral presentations on 08/03/2017

OP	Name of the paper presenter	Title of the paper
1	C. Mahendra Kumar	Anti-Inflammatory Activity of Lignans from Sesame (*Sesamum indicum* L.): Implications for their Inflammatory Response
2	Manjula B.L.	Seasonal variation in the production of Psoralen, Bergapten and Xanthotoxinin *Ruta graveolens* L., an anticancerous plant
3	Rashmi P.	Causes of Carcinogens from Environmental Pollution
4	Rajarajan P, Amudha, Kanchana Panditha, Komal Jakkar	Assessment of Antineoplastic Potential of *Annona muricata* on Human Cancer Cell Lines
5	Mahesh Arvind	Bioremediation for the harmful effects of Phenolic pollutants that cause Lymphoma
6	Jayashree S., Meghana V., K.Vijayalakshmi	Evaluation of antioxidant properties of *Cyperus rotundus* rhizomes
7	Bhavana Bhat, Shraddha KJ and Soma Chaki	Immunotherapeutics in Cancer
8	Akanksha, Prakriti Chauhan, George Santhosh, and Soma Chaki	Lifestyle and Cancer

List of Poster Presentations

PO	Name of the paper presenter	Title of the paper
1	Ranjitha A., Sathyashree P.V., Beena Babu, Jolitha A.B., Sunitha P.	Human Umbilical Cord Blood (HUCB) Proteins from aged pregnancy as validated biomarkers
2	Derhasat Narzary, Birendra Kumar Brahma, Dhirasree Talukdar, Junu Boro, Arvind Kumar Goyal, Usha T, Sushil Kumar Middha	Phytochemicals and Morpho-Anatomical study of *Hodgsonia heteroclita,* encounter to district Kokrajhar, BTAD, Assam, North-East, India
3	Chitrali Laha Roy, Sushmitha H S, Radha Devi V, Dishamoni Gogoi, Akki Suma,Vasanth Kumar Bhaskara	Role of ERK1/2 in tumour progression of N-Ethyl N Nitrosourea (ENU) induced transplacental wistar rats glioma models
4	Amrutha U. and Ananda H.V	A review about effects of Propyl Paraben with respect to Cancer
5	Vijetha B.V., Navneetha R., A.M. Natarajan	Development of modified method for preparation of full and low calorie rasomalai with enhanced sensory attributes
6	Varsha V., and Basu N.	Significance of [-2] proPSA as a novel and early diagnostic marker for prostate cancer

7	Rajeev R. Kolgi, Shivaraj Yellappa and Subramanya Hegde	Study of the electrochemical redox characteristics of Quinoline Carboxamide Derivatives and their derivatives
8	Praveen Kumar L., Lijin K. Litson, Akash R., Shivaraj V., Prashanth Kumar H.P.*	Myricetin: A natural anti-cancerous dietary agent
9	Vijetha B.V., Navneetha R., Lalitha Reddy,and A.M. Natarajan	Development of full and low calorie mysore pak fortified with effective functional ingredients to enhance its nutritive and therapeutic value
10	Navneetha R., Vijetha B.V., and Roopa K., M. Natarajan	Development of full and low calorie probiotic along with yakult cultured mishti dahi fortified with functional nutrients, enhancing its nutritive and therapeutic value
11	Shobha K. Jayanna, Swetha V, and Kushalatha	Study on PCB contamination, its impact on Environment in ship breaking event and biological remedy to control PCB contamination
12	Deepshikha Shahdeo, Sonu Mehta, Abhirup Ganguli	Phytochemicals And Cancer

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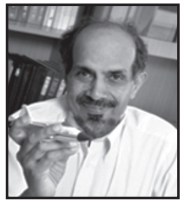

MESSAGE FROM THE CHAIRMAN

I am very happy that the Maharani Lakshmi Ammanni College (mLAC) has taken the initiative to arrange this National Symposium on "An Integrated Approach to Diagnosis and Therapy in Cancer". The Symposium is supported by DBT-STAR, DBT-CTEP, Government of India, and is organised by Samagatha, the Science Association at mLAC. This Symposium is an indication of the continuing progress that mLAC has achieved during recent years. Last year the College was awarded the autonomous status by the UGC and given the 'A' grade by NAAC. Three years ago the Department of Biotechnology awarded mLAC Star College status. It is clear that the vision of the founder Dr KNV Sastri, who established these College 45 years ago, is now being realised. mLAC has shown how hard work, good governance and committed teachers can accomplish a great deal even on a crowded campus and with only modest funding. I congratulate

the Principal and her colleagues on the effort they have put into organising the Symposium. The Trustees are keen on achieving even greater heights for this institution, without departing from its traditional emphasis on excellent education and high moral values.

The theme of the Symposium is appropriate in more ways than one. It highlights the strength of the college in life sciences, the importance of giving greater attention to the spreading of cancer in India and the need for more vigorous programmes of research in the country, to which this College can make its own special contribution.

I take this opportunity to welcome the distinguished scientists who have come here from across the country for sharing their knowledge and experience on this important problem with each other and the participants in the symposium.

Roddam Narasimha
Chairperson
mLAC

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DIRECTOR'S MESSAGE

The Department of Life science of mLAC has organized a National Symposium on ***"An Integrated Approach To Diagnosis And Therapy In Cancer".*** Cancer is considered to be one of the leading causes of morbidity and mortality worldwide. According to the World Health Organization, the number of new cancer cases is expected to rise by about 70 percent over the next 20 years. In such scenario early diagnosis and cost effective treatment will play a major role in effective patient management. This National Symposium is aimed at creating awareness about cancer and creates interest among students in cancer research.

I take this opportunity to wish all success to the organizing team members.

Dr. T. L. Shantha
Director
mLAC

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सत्यमेव जयते
Department of
Biotechnology Govt. of India

I on the behalf of Department of Biotechbology, Government of India and Star College Scheme, congratulate the MLCAW, Bangalore for organising the National Symposium "An Integrated Approach to Diagnosis and Therapy in

Cancer".The Department of Biotechnolgy and various other departments in Goverment sector have been instrumental in funding various projects related to this field but we are yet to come up with a integrated approach in this area.

It is one of the most pertinent topics of the current times and it is heartening to see that the college is organising this under the aegis of Samgatha and has utilised the platform of intercollege science festival to spread awareness and consciousness among the students and faculty. I wish heartfelt success to the organisers for this event.

Dr. Garima Gupta
Scientist 'D',
DBT, Govt. of India

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MESSAGE FROM CONVENOR

I am delighted to welcome you to this two-day National Symposium on "An Integrated Approach to Diagnosis and Therapy in Cancer" organized by the Department of Life Sciences and Physical Sciences of the mLAC. Rapidly increasing incidents of cancer worldwide and its debilitating effect on patients is a matter of serious concern. Both scientific and medical community need to strive very hard to address this grave health issue with multi pronged approach and find fruitful solution. The main focus of the conference is to emphasize the importance of basic science research in the development of strategies for cancer diagnosis and therapy. During these two days of conference, several eminent cancer researchers and renowned doctors will come together to share their knowledge and give insight into different aspects of cancer.

The organizers fondly hope that the discussions and deliberations held during the conference would ignite young minds

and motivate them to pursue science research which may pave the path for advancements in cancer diagnosis and treatment. I hope that the conference acts as a platform for the participants to interact with distinguished scientists and help in the development of newer strategies for the diagnosis and therapy of cancer.

Dr. M.B.Nagaveni
Dean of Sciences
mLAC

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MESSAGE FROM THE CO-CONVENOR

I am extremely happy that our college is hosting a two day national symposium on "An Integrated Approach To Diagnosis And Therapy In Cancer". The topic is so appropriate and relevant in today's world and has not come a day too soon. The battle against cancer is a long drawn one.

When we hear the word cancer or when we come across somebody fighting cancer, the immediate reaction is one of shock, disbelief, denial, etc., so much so that a diagnosis of cancer is associated with certain death and a very painful one at that. The patient or the immediate family's immediate reaction is Why me or Why us!!

Such a reaction is normal as most cancer cases that people have seen have unfortunately ended in death. Fully recovered cancer patients that one has seen are very few. A major reason for this is the late discovery or diagnosis of cancer in a patient. Most likely a

patient is diagnosed with cancer by accident, when undergoing some other test for an ailment. Needless to say an early diagnosis is critical and key to a successful fight against cancer.

Thus the fight against cancer calls for an integrated approach to both diagnosis and therapy. Our National symposium will focus on these and has involved experts from the field to bring the latest developments, trends and the future course in the epic battle against Cancer.

I wish the symposium the very best and hope that it will overachieve its objective. I also hope and wish that this beautifully designed symposium will spur more research in the cancer diagnosis and therapy.

Prof. Vijaya T.M.
Principal
mLAC

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The idea of organizing a National symposium addressing the most relevant issue for societal benefit and well-being was the prime concern of the organizing members of Science association-'Samagatha'. The current theme of the symposium "An Integrated Approach to Diagnosis and "Therapy in Cancer" focuses on the multidimensional aspects of the topic in the perspective of physical and life Sciences"

Apart from guest lectures from the eminent speakers there shall be free scientific research paper and poster presentation by researcher, faculty and students of all the science streams. In addition to this the symposia also encourages the young scientist to present their research work and the best research work will be aptly rewarded.

The endeavour of the conference will be an integration of science fraternities from all the disciplines at a common forum to bring about exchange of innovative ideas. On behalf of the college management, we thank all the people who made this a possibility and also extend our gratitude and thanks to all the delegates for their overwhelming participation.

Dr. Jolitha A.B
Asst Prof. Dept of Biotech,
mLAC
Organizing Secretary

Dr. Saraswati. S
Asst Prof. Dept of Biotech,
mLAC
Organizing Secretary

INVITED TALKS

RECENT ADVANCES IN CANCER DIAGNOSIS

Vijay Chandru*
Chairman, Strand Life Sciences
Corresponding Author : chandru@strandls.com

New generation healthcare and the diagnosis of cancer. The role of next generation sequencing (NGS) of genomes in the diagnosis of cancers is now about a decade old. Genomics has represented a paradigm shift in the standards of care of cancer patients and in preventive strategies for high citizens at risk for hereditary forms of cancer. In this talk we will address three topics. (i) Hereditary breast and ovarian cancer in Indian women. (ii) Deep somatic profiling of tumour DNA using NGS. (iii) Emerging technology of liquid biopsies for cancer care.

Vijay Chandru, PhD
Chairman, Strand Life Sciences
Adjunct Faculty, BSSE, IISc
Visiting Professor, RBCCPS, IISc
EA: Lorraine Saldanha
+91.80.40787301

HOW BIG DATA IS CHANGING BIOLOGY?

Binay Panda*
Head, Ganit Labs
Corresponding Author: binay@ganithlabs.in

Rapid advancements in technology in the last decade are aiding our understanding of many fundamental biological processes. Introduction of large amount of data, especially those coming out from the second- and third-generation DNA sequencing instruments, is helping us identify key mutations in cancer to unraveling genome and transcriptome sequences in important plant species. The amount of data produced by these high-throughput instruments is massive, often in the range of tens to hundred of terabytes, even from a small single-investigator driven lab in a year. Managing such large amount of data along with its storage, analysis, sharing and interpretation remain the hardest task for any biology-driven lab today. I shall discuss how tackling biology-driven problems have changed in the face of this challenge with a few examples from diseases like cancer and plant biology.

INVITED TALKS

TECHNICAL SESSION-1

CANCER: A DISEASE OF STEM CELLS?

Annapoorni Rangarajan
Associate Professor, Department of Molecular Reproduction, Development and Genetics
Indian Institute of Science, Bangalore

A fundamental property of cancer cells is uncontrolled growth. Yet, very few cancer cells initiate colony formation in soft-agar assays – an *in vitro* assay for carcinogenicity. Furthermore, injection of less than one million cancer cells fails to initiate tumor formation in nude mice. These observations suggest that not every cell within a cancer possesses unlimited growth potential. Based on this, a '*cancer stem cell*' hypothesis has been put forward which predicts the existence of a small sub-population of cells within a cancer that alone has the potential to initiate new tumors, while the bulk of the cancer cells are non-tumorigenic. Owing to their similarities with normal stem cells, specifically in their ability to self-renew and differentiate to give rise to other cell types, this sub population of cells has been termed as *cancer stem cells (CSCs)*. Recently, such CSCs have been identified in a wide variety of cancers, thereby lending strong support to the '*cancer stem cell*' hypothesis. The identification of *CSCs* has tremendous therapeutic implications. Conventional anti-cancer therapies kill the majority of tumor cells, thereby causing the tumor to shrink; however, tumor relapses within months. It is predicted that current therapies kill the bulk of tumor cells leaving behind the *cancer stem cells,* which then regenerate the tumor. Therefore, to eradicate cancer completely, one must target these *cancer stem cells*. I will discuss possible origins of CSCs and strategies to target them.

INHIBITION OF DNA REPAIR AS A STRATEGY TO TREAT CANCER

Sathees C. Raghavan
Associate Professor, Department of Biochemistry, Indian Institute of Science, Bangalore, India

Repair of DNA breaks is critical for maintenance of genomic integrity. DNA double-strand breaks (DSBs) are the most deleterious types of DNA damage. Nonhomologous end joining (NHEJ) is the predominant DNA DSB repair pathway in higher eukaryotes. DNA Ligase IV is one of the most critical components of NHEJ, involved in final sealing of DSBs. Inhibition of DSB repair pathway proteins can be used as a strategy to induce apoptosis in cancer cells. Recently we have chemically synthesized and characterized a novel inhibitor of Ligase IV, SCR7. Using radioactively labeled oligomeric substrates mimicking various *in vivo* DSBs, we showed that addition of SCR7 to rat testicular extracts abolished joining by NHEJ. Further, SCR7 interfered with the joining of compatible DSB ends catalysed by purified Ligase IV. Electrophoretic mobility shift and circular dichroism studies suggest that SCR7 binds to Ligase IV and interferes with its interaction to DNA ends. Further using animal models, we find that SCR7 treatment can inhibit progression of breast adenocarcinoma but not haematopoeitic cancers, resulting in a significant increase in life span. Interestingly, SCR7 impedes tumor progression in haematological cancers significantly, when coadministered with existing DSB inducing therapeutic modalities. More importantly, we show that when coadministered, SCR7 could reduce the effective dosage of g-radiation from 2 Gy to 0.5 Gy, in cancers derived from breast cancer, colon cancer and B-ALL. Histopathological and immunofluorescence evaluation of tumor and other tissues suggest that the cytotoxicity induced is mostly restricted to the tumor. We also find that encapsulation of SCR7 in micelles can improve its efficacy by ~4-fold. Thus, by using various biochemical and biophysical approaches, we show that SCR7 is a potent inhibitor of NHEJ, can be used as a chemotherapeutic agent against multiple cancers.

GENOMICS AND CHILDHOOD CANCER- WHAT'S NEW?

Dr. Intezar Mehdi
MBBS, DNB (Pediatrics), MRCPCH (UK)
Director & Head of the Department
Department of Pediatric Oncology, Hematology & Blood and Bone marrow transplant
HCG Hospital, Bangalore, India

Cancer in children is not uncommon. It is estimated that approximately 1 in 10,000 kids suffer from cancer in India. Globally, unfortunately every 4 hours a child dies from cancer. Approximately 70 to 80 % of childhood cancers are curable, if diagnosed and treated correctly. In India, unfortunately the figures are much poorer; this may be due to lack of awareness, affordability and access to health care. Leukemia, Lymphoma and Brain tumors are the commonest cancers in children, followed by kidney tumors, Bone and soft tissue tumors, eye tumors, liver tumors and others. Majority of the childhood cancers do not have a known cause. A few cases may have genetic, environmental or infectious cause (especially viruses).

In recent times, there has been a tremendous turnaround in understanding the biology of cancer. These developments have aided and have been instrumental in changing the outcome of this dreadful disease. We are moving from evidence based medicine to personalized medicine wherein the treatment is tailor made as per the requirement of the person who is having the problem. Every living thing is made of cells. Inside the cells, there is chromosomes which is a thread-like structure of nucleic acids and protein found in the nucleus of most living cells, carrying genetic information in the form of genes. Genes are a portion of a DNA molecule that serves as the basic unit of heredity. Genes control the characteristics that an offspring will have by transmitting information in the sequence of nucleotides on short sections of DNA. In humans, genes vary in size from a few hundred DNA bases to more than 2 million bases.

Genome is an organism's complete set of DNA, including all of its genes. Genomics is the study of the collection of a person's genes and their interactions with each other and the internal and external environment they are exposed to. Cancer Genome is very complex and strikingly heterogeneous at the whole genome level between histologically similar tumors. Genomics is very important to understand the cancer biology and for Individualized/ personalized therapy for a better outcome.

Cancer is not a single disease. It basically represents uncontrolled growth and spread of abnormal cells. There is aberrant expression of genes with a variety of cellular functions and also there is variation in the number of deregulated genes. The genomic instability in cancer may be accumulation of extra copies of DNA or chromosomes, chromosomal translocations, inversions, deletions or single-strand breaks in DNA or double-strand breaks in DNA etc.The causes of cancer are mutlifactorial and include an interplay of genetics, environmental factors like radiation/carcinogens and infections especially viruses.

Cancer is a genetic disease and all cancers involve genetic changes in somatic cells, the germ line, or both. Most gene mutations in cancer occur in somatic cells and are acquired (multifactorial etiology). However, some mutations do occur in the germline and may be inherited and passed on to future generations. The goal is to detect the mutations at the genetic level which are actionable, and use treatment strategies to break that particular pathway in causation of cancer because some standard treatments in some cancers do not get the desired outcome. In other words, common cancers with usual treatment fail, implicating a genetic basis and unless that particular pathway is tackled (if feasible), cancer cannot be conquered. Currently testing is available for both somatic and germline mutations.

The role of genomics in planning treatment in adult cancers is relatively better understood and is being done in specialized centers. Similar approach in childhood cancers is in the developing phase. Some of the childhood cancers with well known genetic basis are Wilm's tumor, Retinoblastoma, Osteosarcoma, Leukemias, and Neuroblastoma etc.

Besides these there are also some inherited/genetic syndromes with stronger predisposition to development of cancers like

Beckwith-Wiedemann syndrome
Bloom syndrome
Diamond-Blackfan
Down syndrome
Fanconi anemia
Neurofibromatosis type I and II
Gorlin syndrome (basal cell nevus syndrome)
Rothmund-Thomson syndrome
Tuberous sclerosis
Werner syndrome

Then there are some inherited cancer syndromes like

Hereditary Breast/Ovarian Cancer Syndrome
Li-Fraumeni Syndrome
Lynch syndrome
Familial Adenomatous
Polyposis (FAP)
Diffuse Gastric Cancer Syndrome
PTEN Hamartoma Tumor Syndrome
Peutz Jeghers Syndrome
Cowden Syndrome

Currently most of the childhood cancer treatment protocols take into account the genetic and molecular analysis both for diagnosis as well as planning treatment strategies essentially aimed at improving the outcome. An index case will be presented to highlight the importance of understanding the genomic basis of childhood cancer while managing, otherwise if the child had been managed with usual protocols, the outcome would have been inferior.

To conclude, the future of cancer treatment is looking bright with better understanding of the disease biology, availability of better diagnostic methods with radiology and nuclear medicine attaining the molecular imaging techniques, better pathological tests, and genetic and molecular tests to further not only refine the diagnostic methods but also to plan treatment in a rational and personalized manner.

DAY-2

TECHNICAL SESSION

INVITED TALKS

MECHANISM OF DISC FORMATION-A PREREQUISITE FOR INITIATION OF EXTRINSIC CELL DEATH PATHWAY

Kakoli Bose
ACTREC, Tata Memorial Centre, Kharghar, Navi Mumbai-410210, INDIA

Apoptosis or programmed cell death is a key phenomenon in multicellular organisms that are essential for embryonic development, cellular homeostasis, and immune regulation. Imbalance in this tightly controlled process results in severe pathologic conditions, such as cancer, autoimmune diseases, and neurodegenerative disorders. Classical apoptotic cascades follow two distinct pathways: the intrinsic pathway, which originates in the mitochondria, and the extrinsic pathway, which is triggered by ligation of cell-surface death receptors, followed by formation of a multiprotein death-inducing signaling complex (DISC). The caspases, a family of cysteinyl proteases that initiate and execute apoptosis, rely on these events for their activation and subsequent proteolytic functions. In the Fas-receptor-mediated extrinsic cell death pathway, activation of the initiator caspase-8 is achieved through interaction of its pro-form (procaspase-8) with an adapter protein, Fas-associated death domain (FADD). This interaction is mediated via their similar death effector domains (DEDs) leading to a functional DISC formation and subsequent activation. Although much progress has been made in decoding the major players in this pathway, the structural overview of DISC is still elusive, mainly because of its complicated interaction networks and lack of information on DED proteins. Dissecting the precise mode and the binding interface of DED–DED interaction network holds the key to identifying the missing links in deciphering the unknown steps in DISC formation and subsequent cell death. Here, we provide an intriguing insight into the molecular basis of DED chain formation and define the surface for the physical interaction between FADD and procaspase-8 using interdisciplinary tools. Based on the detailed analyses of the interface for DED–DED interactions, together with data on the FADD–procaspase-8 complex, we propose a new model for DISC formation, regulated at the level of DED-containing proteins.

STRUCTURAL ASSESSMENT OF CANCER-CAUSING MUTATIONS FOR TRANSLATIONAL RESEARCH

Ashok K Varma
Tata Memorial Centre, Advanced Centre for Treatment, Research and Education in Cancer, Kharghar, Navi Mumbai - 410 210, INDIA.

The overall aim to study the three dimensional protein structure is to visualize the complexities of disease associated molecule at atomic level. Precisely determined protein structure helps in understanding the function associated to protein. However, it is still a challenge to correlate the structural information for translational research. BRCA1 (Breast Cancer Susceptibility gene 1) is one of the most studied genes for breast and ovarian associated cancers. Familial inheritance of breast and ovarian cancer is also due to mutations in different domains of BRCA1. We have analysed different mutations from Indian families and from Breast Cancer Information Core (BIC). Now, challenges lays on scientists/clinicians for the possibilities to explore the pathogenicity of mutations identified in different genes. Hence, we decided to evaluate pathogenicity of mutations discovered in different domains of BRCA1. BRCA1 comprises different functional domains like N- terminal RING domain, tandem repeats of C-terminal and the central DNA binding domain. N-terminus, RING domain of BRCA1 interacts with BARD1 whereas C-terminal region of BRCA1has been reported for transactivation function through the protein-protein interactions. Different regions of BRCA1 have been evaluated to categorise the pathogenic mutations. The protein-protein interactions (PPIs) with the binding partners of BRCA1 like RAP80, MERIT40, and ABRAXAS have been explored. Furthermore, germ -line mutations screening in BRCA1 has helped in clinical management.

PERSONALIZED MEDICINE FOR CANCER

Ajith V. Kamath, Ph.D
Executive Director
External Research and BD
Mitra Biotech

There has been significant progress in drug discovery for many diseases, particularly cancer. The availability of human genome has helped better understanding of the basis of disease, identification of novel targets and discovery of target specific drugs such as tyrosine kinase inhibitors (TKIs).

Various molecular tools have become available to diagnose cancer and facilitate personalized treatment. Tumor is heterogenous in nature and this heterogeneity varies from patient to patient. Different components such as, cancer cells, stromal cells, endothelial cells, autocrine & endocrine factors and infiltrating immune cells collectively contribute to the tumor microenvironment. This might be one of the primary reasons for differential clinical response with the same drug in similar subgroup of patients. Mitra Biotech has developed a technology named CANscript™ that reliably replicates a patient's tumor microenvironment. Selected drug therapies are applied to the tumor and multiple functional response parameters are measured to predict the efficacy of the drug and hence facilitate personalized treatment.

This presentation will primarily focus on recent advances made in the area of drug discovery for cancer. The gene family and personalized medicine approaches being taken for cancer drug discovery will be discussed in detail with examples. Its impact on individualized cancer treatment will be discussed.

NOVEL MOLECULAR TARGETS AND NEW STRATEGIES ON THE PATH FROM BENCH TO BEDSIDE

Prasanna Venkatraman
ACTREC, Tata Memorial Centre, Kharghar,
Navi Mumbai-410210, INDIA

In this talk, I will briefly introduce the concept of drug targets and the many means by which such targets are identified or discovered. Within this definition and scope I will bring to focus how an enzyme involved in seemingly unimportant job of routine protein turnover namely the proteasome, took the centre stage as an important anticancer drug target. We will see some of the retrospective arguments for: why anti proteasome active site inhibitors are effective as anticancer drug targets, why they are tumor specific (if they are) and why they are not universally applicable to all cancer types. Then we will see how such discoveries both by their success and limitations open up other avenues of opportunities for new target discovery. I will illustrate this using an example from our own investigations which branches off from where the proteasome inhibitor was proposed to have had its maximum influence and highlight the challenges and promises on the road ahead.

FROM BENCH TO BED SIDE: THERANOSTICS

Dr. Prashanth G.R
Consultant, Molecular Imaging
HCG Hospital, Bangalore, India

Imaging plays a vital role in oncology, because it gives the clinician, objective evidence of the response of the tumor to therapy. Imaging with form only has its limitations, hence fusion imaging with PET (POSITRON EMISSION TOMOGRAPHY) plays a vital role in every step to assess disease status and also therapy planning. Similarly targeted radionuclide therapies is gaining a vital role is oncology. This presentation gives a bird's eye view of the various molecules and their use in clinical practice.

NANOSCALE MATERIALS FOR ENGINEERING IMPROVED CANCER NANOMEDICINE

Rituparna Sinha Roy
Assistant Professor
Department of Biological Sciences, IISER Kolkata

The development of new materials and technologies has enabled nanotechnology an exciting platform to impact medicine in a paradigm shift manner. Nanoparticles confer promises to improve the efficacy of current cancer therapeutics by providing enhanced drug's half-life and targeting efficacy, sustained release of drugs and reduced drug toxicity. The development of adaptive resistance is the major cause of mortality in cancer. Nanoparticle mediated combination therapy could emerge as powerful strategy for targeting adaptive resistance, resulting in increased antitumor efficacy. In my talk, I will discuss several nanobiotechnology approaches to formulate next-generation therapeutic molecules for translating basic research into clinical applications.

DAY I

ORAL PRESENTATIONS

Apocynin as an Antigenotoxic and Anticytotoxic Agent - Investigations Through Micronuclei Induction, *Allium cepa* Root Tip Assay, MTT Assay and DNA Fragmentation

G. Hema[1, 2*], D. Subbarao[2], and B.S. Thippeswamy[3]

[1]*Department of Biotechnology, Maharani's Science College for Women Bangalore, India,*

[2]*Jawahar Lal Nehru Technological University Anantapur, Anantapur, Andhra Pradesh, India,*

[3]*Sree Siddaganga College of Pharmacy, B.H. Road, Tumkur, Karnataka, India.*

***Corresponding Author** E-mail : hema_h_t@yahoo.co.in*

Background: The demand for herbal medicines is greater than ever due to their efficacy and fewer side effects. Apocynin is a proven inhibitor of NADPH oxidase with strong free radical scavenging properties. Oxidative DNA damage is an important cause of pathological processes like aging and cancer. Substances which can counteract this damage are of great significance in chemoprevention of cancer as well as in adjuvant therapy for chemotherapy patients.

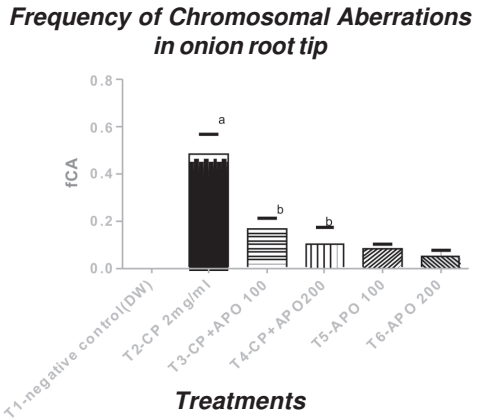
Objective: To assess the ability of Apocynin to act as an antigenotoxic as well as a cytoprotective agent through various established experimental methods.

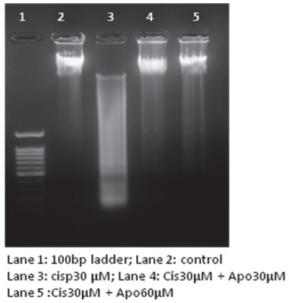
Materials and Methods: The mammalian *in vivo* micronucleus test is used for the detection of damage caused by the test substance to the chromosomes or the mitotic apparatus of erythroblasts sampled in the bone marrow. The *Allium cepa* assay is a plant based *in vivo* test system used to assess the genotoxic and antigenotoxic properties of substances by ascertaining the induction of chromosomal aberrations. The MTT Colorimetric assay is based on the capacity of mitochondrial succinate

dehydrogenase in living cells to reduce the yellow water soluble substrate (MTT) into an insoluble, purple coloured formazan product, which is solubilized and measured spectrophotometrically. The DNA fragmentation assay provides a qualitative method for assessing cell death by detecting DNA fragments using agarose gel electrophoresis.

Results: Apocynin showed significant reduction in the formation of micronucleated polychromatic erythrocytes in animals exposed to cyclophosphamide. Apocynin showed a dose dependent reduction in the frequency of chromosomal aberrations induced by cyclophosphamide in the root tip meristems. Apocynin did not show cytotoxicity towards either of the tested cell lines CHO-K1 and HepG2 in the MTT assay. It decreased the cytotoxicity of Cisplatin towards the tumour cells as well as the tested cell lines HepG2 and CHO-K1. Cisplatin alone lead to fragmentation of DNA in CHO-K1 cells; however, co-treatment with Apocynin rescued DNA from fragmentation.

Conclusions: These results indicate the ability of Apocynin to act as an antigenotoxic agent. The results also indicate that Apocynin can ameliorate the cytotoxic damage caused by Cisplatin in general but is not selective towards protection of non-tumor cells.





Keywords: Apocynin, cyclophosphamide, micronuclei, Onion root meristems, cisplatin, MTT assay, DNA fragmentation.

Conflict of Interest: The authors declare no conflict of interest

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OP-2

Development of Arginine Based Targeted Nanocarriers for Gastrin Releasing Peptide Receptors in Colon Cancer

Venkata Naga Raju E*

Associate Professor, Department of Life Sciences, Garden City College of Science and Management Studies, 16th KM, Old Madras Road, Bangalore-560049, Karnataka, India

***Corresponding author** **E-mail:** evnrazbiotech@gmail.com

Background: Treatment of cancer with the aid of nanotechnology has been a field of intense research over the past few years. Although advantages of nanocarriers include improved pharmacokinetics, encapsulation of cytotoxic agents and enhanced accumulation of therapeutics in the tumor microenvironment, the scope of improving selectivity through design of 'target specific' nanovehicles has been the most sought after avenues of nanomedicine research (Figure 1).

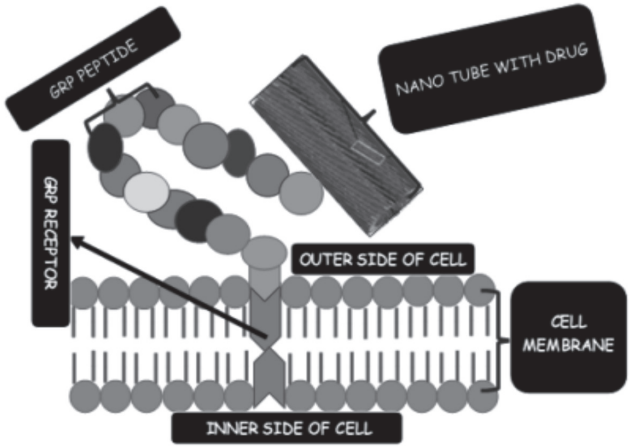

Figure: Nanocarriers

Objective: Objective of this current work was to discover novel soft nanostructures with the capability of specifically targeting colorectal cancer.

Materials and Methods: A unique process of co-assembly has been employed to develop these superior nanocarriers. Briefly, Bombesin (7-14) (Q-W-A-V-G-H-L-M) was tagged to amyloid 17-21 A*â* residue (R-L-V-F-F-A-L) and co-assembled with untagged RLVFFAL sequences to generate a novel class of target specific nanotubes. Also, Rhodamine was tagged to these sequences (Rh-L-V-F-F-A-L) to investigate the mechanism of cellular uptake of the nanostructures through confocal microscopy. Similarly, Fmoc based gelators featuring Arginine were developed and then functionalized with Bombesin (7-14) sequences. Drugs like Campothecin, Curcumin and Irinotecan were loaded on to these soft nanostructures. Finally, the cytotoxicity of these soft nanostructures and their efficacy to deliver cargo (drugs) was probed in HT-29 cell lines (overexpressing GRP cell lines).

Results: These soft nanostructures were installed with target specific moieties like gastrin releasing peptides (receptors overexpressed in cell surface of several malignant tissues, particularly in colon cancer).

Conclusions: Studies have shown that colorectal cancer is the third leading cause of death worldwide. Arginine-based peptide nanotubes (soluble) and fibres (gels) have been synthesized by solid phase peptide synthesizer and developed as nanocarriers of small molecular drugs.

Keywords: Nanotechnology, colon cancer, bombesin, rhodamine

Acknowledgement: The authors would like to thank the Chairman, Garden City Group of Institutions, Dr. Joseph VG for providing laboratory facilities and supporting this work and also DST-INST for financial support.

Conflict of Interest: The author has declared that no conflict of interests exists.

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OP-3

Extraction and characterization of L-asparaginase from *Spinacea oleracea*

Sarina. P Khabade
Department of PG studies and Research in Biotechnology, Government Science College, Bangalore-01, India.
Corresponding Author: Sarin28@rediffmail.com

Background:

L-asparaginase (E. C. 3.5.1.1) is an enzyme that catalyzes the hydrolysis of L-asparagine into L-aspartate and ammonia. It is identified as an effective antitumor agent in human clinical trials and is now recognized as one of the important component of antitumor therapy. The purpose of the present study was to screen for the production of L-asparaginase in *Spinacea oleracea*. The presence of the enzyme was confirmed by the formation of ammonia which was detected using UV-Visible spectrophotometer at 460nm.

Objective: The objective of this study was to find novel source of L-asparaginase enzyme from *Spinacea oleracea* and to study biochemical characterization of this enzyme.

Materials and Methods:

- **Extraction of crude enzyme:** 1g of leaf sample was weighed, washed under tap water then rinsed with distilled water. They were ground in a chilled mortar and pestle with two volumes of 0.1M phosphate buffer of pH 7.5 at 4°C containing 5mM DTT and 1mM EDTA. The homogenate was passed through cheese cloth, centrifuged at 12,000 rpm for 30 minutes at 4°C.The supernatant served as crude enzyme extract.
- **Estimation of total protein:** This was carried out by Lowry's method

- **Enzyme assay of L-asparaginase in *Spinacea oleracea*:** Enzyme assay was carried out by Nessler's method.
- **Enzyme Kinetics:**
- ***pH Kinetics:*** L-asparaginase enzyme assay protocol was followed and tubes were incubated at different pH of 7, 7.5, 8.0, 8.5, and 9.0.
- ***Temperature Kinetics:*** L-asparaginase enzyme assay protocol was followed and tubes were incubated at different temperatures of 4ÚC, 27ÚC, 37ÚC and 100ÚC.
- ***Time Kinetics:*** L-asparaginase enzyme assay protocol was followed and tubes were incubated at different time intervals of 0,5,10,15,20,25 and30 minutes.
- ***K_m and V_{max}*:** Different aliquots of L-asparaginase substrate ranging from 0.1-0.5 mL were pipetted into different test tubes and enzyme assay was carried out.

Results:

Enzyme Assay: The enzyme activity was found to be 1.926 IU and specific activity was 6.878 µmoles/mg/min (Figure 1)

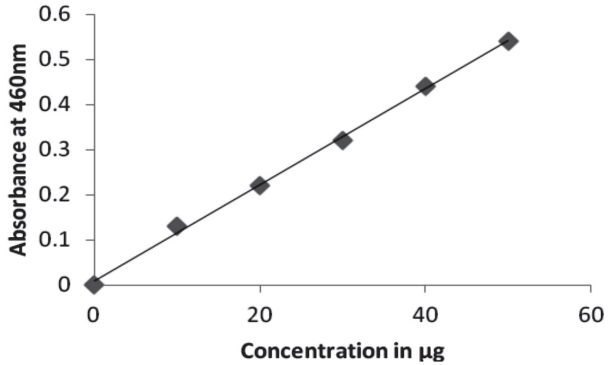

Figure 1: Ammonium sulphate standard graph to calculate the enzyme activity

Enzyme Kinetics: ***pH kinetics:*** The optimum pH of L-asparaginase enzyme in *Spinacea oleracea* was found to be 8.

Temperature kinetics: The optimum temperature of L-asparaginase enzyme in *Spinacea oleracea* was found to be 37°C

Time kinetics*:* The optimum time interval for L-asparaginase was found to be 15 minutes.

K_m of Lasparaginase enzyme in *Spinacea oleracea* was found to be 5 ìM.

V_{max} of L asparaginase enzyme in *Spinacea oleracea* was found to be 2.5µmoles/ml/min.

Conclusion:

Spinacea oleracea was found to be a good source of L-asparaginase, which showed similar kinetic parameters to the L-asparaginase reported till date. Hence further purification and characterization of this enzyme from *Spinacea oleracea* will count this plant as a medicinal herb to fight human blood cancer.

Keywords*:* L-asparaginase, *Spinacea oleracea*, UV-Visible Spectrophotometer, enzyme activity, kinetics.

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OP-4

Anticancer activity of *Achyranthus aspera l*eaves in Albino Mice

Chinnappa Reddy[1], Abhaykumar Kamble[2], and Sharangouda J. Patil[3]*

[1]Department of Environmental Science, Gulbarga University, Gulbarga-585106, Karnataka,
[2]Department of Biochemistry, Gulbarga University, Gulbarga-585106, Karnataka, India
[3]Department of Life Sciences, Garden City College, Bengaluru-560049 Karnataka, India

***Corresponding Author:** *E-Mail:* **shajapatil@gmail.com; sjpatil@gardencitycollege.edu**

Abstract

Background: Cancer is defined as a disorder in which cells in the organism begin to grow in an unchecked fashion. In ancient Indian Medical compendia of Ayurveda (about 2000 B.C.) recommended, herbal remedies, red arsenic and minerals in variety of combination for the treatment of cancer.

Objective: The present study is one of the approaches that are being perused to identify potent anticancer agents in methanolic extract of *Achyranthus aspera* (MEAa) leaves against Ehrlich Ascites Carcinoma (EAC) cell lines in Swiss albino mice.

Material and Methods: In case of EAC induced liquid tumor, after 24 hours of tumor inoculation, the extracts were administered daily for 14 days. On day 15 the mice were sacrificed for observation of antitumor activity. The effect of methanol extract on the growth of tumour, mean body weight, mortality rate, tumor cell viability test, lifespan and median survival time of EAC bearing mice were estimated.

Results: The methanol extract showed decrease in the tumor volume, tumor weight, viable cell count and increase in the mean survival time, thereby increasing the life span of EAC tumor bearing mice. From the present study the methanol extract of *A. aspera* leaves exhibited the antitumor effect in a dose dependent manner comparable to that of standard drug, 5-Fluorouracil.

Table-1: Effect of MEAa leaves on the life span of EAC tumor bearing mice.

Treatment	No. of Mice	Schedule days	Median survival time ±SEM	% of ILS
Control	10	14	15.4± SEM	0
5-Fluorouracil (20 mg/kg)	10	14	23± 1.3*	32.1
50 mg/kg	10	10	22.1 ± 0.9*	31.6
100 mg/kg	10	10	19.4 ± 1.0	25.6
200 Smg/kg	10	10	16.9 ± 1.1	9.5

Note: * = significant compared to control (*=p < 0.05)

Conclusion: Thus, the present study reveals that anticancer potential of the tested MEAa against EAC in experimental animals.

Keywords: Anticancer, Mice, *Achyranthus aspera*, Ehrlich Ascites Carcinoma

Conflict of interest: None

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OP-5

Anti Inflammatory and Radioprotective Activity of *Saraca asoca* against Whole Body Electron Beam and Gamma radiation in Swiss Albino Mice and RAW 264.7 cells

Syed Murthuza, and B.K. Manjunatha*
Department of Biotechnology, The Oxford College of Engineering, Bommanahalli Bengaluru-560068

***Corresponding author E-mail: professorbkm@gmail.com**

Background: Planned/accidental exposure to ionizing radiation is dangerous as it generates reactive oxygen species (ROS) and reactive nitrogen species (RNS), the deleterious effects of ionizing radiation on living cells are often mediated by increased production of ROS which in turn causes cellular damage, lipid peroxidation, and oxidative damage to DNA. Free radical damage to protein can result in depletion of enzyme activity leading to DNA damage, mutagenesis and carcinogenesis. Hence, any natural compounds which protect the normal cells from deleterious effect of radiation during planned/unplanned exposure are of high significance. In this context, the plant *Saraca asoca* was selected to screen radioprotective and anticancer potency based on its ethnomedicinal claims (for treating cancer and as rejuvenator).

Objective: The prime objective of this study was to evaluate radioprotective and anticancer potency of the ethnomedicinal plant *Saraca asoca* against whole body electron beam radiation in Swiss albino mice and RAW 264.7 cells.

Materials and Methods: Shade dried, powdered stem bark was used to extract the crude drug. Parameters such as spleen index, thymus index, Hb content, WBC count, bone marrow micronucleus rate, estimation of *in vivo* antioxidant (enzymatic and nonenzymatic) viz., GSH, SOD, catalase, estimation of lipid peroxidation was studied in the mice exposed to whole body EBR to assess the radioprotective potency. Antiinflammatory activity was evaluated using the lipopolysaccharide (LPS)-activated murine macrophage RAW 264.7 model carrageenan-induced paw edema in Wistar albino rats.

Results: The present study reveals the ability of the drug (SaM) in protecting the normal cells against whole body electron beam irradiation in mice. The efficacy was evaluated in both pre- and post-administration model. The results indicated that the group pre administered with SaM exhibited marked increase in splenic (2.203±0.0002), thymus (6.051±0.008) index with decrease in formation of micronucleus rate in polychromatic (mnPCE) and normochromatic erythrocytes (mnNCE), significant increase in WBC count (6230±191.7 WBC/cm^3), Hb content (10.94±0.6056g/dL), GSH (3.888±0.08260 mM/L), SOD (5.192±0.3451 U/mg protein), catalase (3.137±0.3908 m/min/mg protein) compared to the radiation group which recorded a significant decrease in antioxidants levels, hematological profile, lipid profile and kidney dysfunction, increase in lipid peroxidation (0.4585±0.2318). Histopathology study of the jejunum, spleen, liver and kidney tissues also confirmed the findings. Pretreatment of *Saraca asoca* methanol extract at non-cytotoxic concentrations reduced the LPS-induced protein levels of pro-inflammatory enzymes (41.12±1.852) at 100 ìM concentration with the IC_{50} value of 110±5.993ìM and 0.5833±0.01667 (68.33%) of reduction in volume of paw edema in the Wistar albino rats indicating its potency as antiinflammatory drug.

Conclusion: The results clearly indicated that *Saraca asoca* possess bioactive metabolites capable of mitigating radiation-induced damage through its free radical scavenging and anti-inflammatory potency. The study on its molecular mechanism of the radioprotection and active constituent responsible for it is under progress**.**

Keywords: Free radicals, Antioxidants, Radioprotection, Antiinflammatory, lipopolysaccharide.

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Conflict of Interest: Authors declares ther is no conflict of interest.

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OP-6

NMR based Salivary Metabolomics as a Complimentary Approach for Oral Squamous Cell Carcinoma Diagnosis

Sayeeda Mussavira[1], S. Raghothama[2] and Bindhu O S[1]*

[1] Department of Biochemistry, Centre for Post Graduate Studies, Jain University, Bangalore, India

[2] NMR Centre, Indian Institute of Science, Bangalore, India

***Corresponding author E-mail:** bindhupradip@yahoo.co.in

Background: The widespread consumption of tobacco, along with other factors like alcoholism, poor oral hygiene, infections etc. has resulted in an increased incidence of oral cancer in India. Early diagnosis and availability of easy and affordable diagnostic methods is fundamental towards management of this condition. Saliva has emerged as a prospective biofluid medium for biomarker identification in the recent decades. It is non-invasive, easy to access, collection is economical and is the tumor vicinity fluid here. Hence it is evolving as a prospective biofluid for studies aimed at augmenting the current diagnostic/prognostic methodologies. Metabolomics, study of small metabolites, presents a single platform for measurement of several metabolites at a time. This can help in the identification of key metabolic variations that may be a cause or effect of any physio-pathological alterations.

Objective: To investigate the possible variations in the salivary metabolite composition of oral cancer patients and healthy subjects.

Materials and Methods: Saliva samples from defined oral cancer patients (n = 17) and age, gender and socio-economically matched

healthy (n = 12) subjects were collected by expectoration method. 1D 1H NMR spectra of all samples were acquired on a 700 MHz spectrometer using a CPMG pulse. Spectra were processed and integrated using MestreNova. Principle Component Analysis and t-test were performed, mean and SD were calculated using MATLAB and Excel. Metabolites were identified and mapped to respective pathways using Biological Magnetic Resonance Database and Metabo Analyst.

Results: Such metabolites which presented a significant variation between the two study groups were shortlisted. These were mapped to their respective pathways to assess if the observed variations are specific to oral cancer.

Conclusions: Saliva can be a complementary medium for diagnosis / prognosis / management and treatment progression in oral cancer. With a bigger sample size the observed variations can be further validated.

Keywords: metabolomics, saliva, oral cancer.

Conflict of Interest: None

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OP-7

In vitro cytotoxic activity of *Stereospermum colais* leaf extract on HeLa (Human cervix carcinoma) cell lines

Nagamani T.S.
Department of PG studies and Research in Biotechnology.
Government Science College, Bengaluru-01, India.
Corresponding author E-mail :naguts@gmail.com

Background

Carcinomas are the most common types of cancer and result from altered epithelial cells, which cover the external and internal body surfaces like skin, lung, breast and colon. Cytotoxicity is the quality of being toxic to cells. These assays are widely used by researchers and by the pharmaceutical industry to investigate the toxicity of compounds on cellular systems. *Stereospermum colais* is a large, straight stemmed deciduous tree, found chiefly in deciduous forest and is known as Yellow snake tree. All the parts of the tree are useful in treating many disorders like rheumatalgia, malarial fever, wounds and chronic dyspepsia. The MTT (3-[4, 5-dimethylthiazol-2-yl]-2, 5 diphenyl tetrazolium bromide) assay is an enzyme- based assay for determining mitochondrial dehydrogenase activity in living cells. The reduction of MTT into formazan by dehydrogenase occurs only in metabolically active cells and the level of activity is a measure of the viability of the cell. This assay is broadly used to measure the *in vitro* cytotoxic effects of drugs on cell lines or primary patient cells. Methanol extracts of *Stereospermum colais* leaf were evaluated for their cytotoxicity against HeLa cell lines. Different concentrations of leaf extract was used. The percentage of growth inhibition was observed with the increase in the concentrations.

Objective: To study the cytotoxicity of the plant extract on cell lines**.**

Materials and Methods: 3-(4,5–dimethyl thiazol–2–yl)–5–diphenyl tetrazolium bromide (MTT), Fetal Bovine serum (FBS), Phosphate Buffered Saline (PBS), Modified Eagle's Medium (MEM), Dulbecco's Modified Eagle Medium (DMEM) and Trypsin were obtained from Sigma Aldrich. EDTA, Glucose and antibiotics from Hi-Media Laboratories Ltd., Dimethyl Sulfoxide (DMSO) and Propanol from E.Merck Ltd., Mumbai, India. HeLa (Human cervix carcinoma) cell line was procured from National Centre for Cell Sciences (NCCS), Pune, India.

The monolayer cell culture was trypsinized and the cell count was adjusted to 1.0 x 10^5 cells/ml using MEM/DMEM containing 10% FBS. To each well of the 96-well microtitre plate, 0.1 ml of the diluted cell suspension (approximately 10,000 cells) was added. After 24 h, when a partial monolayer was formed, the supernatant was removed, the monolayer was washed once with medium and 100 ml of different concentrations of test drugs were added on to the partial monolayer in microtitre plates. The plates were then incubated at 37°C for 3 days in 5% CO_2 atmosphere, and microscopic examination was carried out and observations were noted every 24 h. After 72 h, the test solutions were subjected to quantitative estimation The absorbance was measured using a microplate reader at a wavelength of 540 nm. The percentage growth inhibition was calculated using the formula and concentration of test drug needed to inhibit cell growth by 50% (CTC_{50} values) is generated from the dose-response curves for cell line.

Results:

Table :CTC value of test sample.

Name of Test sample	Test Conc. (µg/ml)	% Cytotoxicity	CTC_{50} (µg/ml)
RR 2328	1000	27.94±4.6	>1000
	500	18.88±1.2	
	250	17.64±3.7	
	125	16.99±3.3	
	62.5	5.58±3.2	

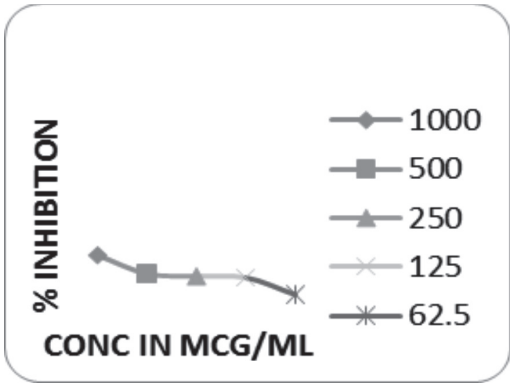

Figure-1 **Cytotoxic properties of test sample against HeLa cell line with graph**

Conclusion: Since the methanol extract of the leaf showed a significant cytotoxic effect on HeLa cells with increasing concentration, further identification of the particular compound will count this drug as a possible cure for cancer.

Key words: *Stereospermum colais,* methanol extract leaf, HeLa, MTT assay.

Conflict of Interest: The authors declare there is no conflict of interest.

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OP-8

Effect of Hypoxia and Intermittent Hypoxia on Hif-1á Mediated Neuroblastoma Cell Metastasis

Vasanth Kumar Bhaskara[1,2*], Indra Mohanam[2] and Sanjeeva Mohanam[2]

[1]Department of Biochemistry, R.C.A.S.C, MSR Nagar, Bangalore, India,
[2]Department of Cancer Biology and Pharmacology, University of Illinois College of Medicine at Peoria, Peoria (IL), USA.

Background: Neuroblastoma is the most common extracranial pediatric solid tumor, containing cells derived from the developing sympathetic nervous system (SNS) and results from improper differentiation of neural crest cells. Hypoxia and Intermittent Hypoxia (IH) can influence the stabilization of HIF-1á and which may further affect the cells to undergo metastasis to specific sites mainly to bone. Hence, understanding the exact biochemical mechanism of metastasis will be a salient objective in finding key drug targets.

Objectives: This study is carried out to understand the effects hypoxia mediated HIF-1á stabilization and its influence on metastasis of SHSY5Y neuroblastoma cells.

Methods: Neuroblastoma cell lines of SHSY5Y were subjected to 1% hypoxia and normoxia for ten cycles to get IH conditioned SHSY5Y cells. The effect of IH on HIF-1á stabilization was analyzed by real-time RT-PCR, western immunoblotting, and immunofluorescence analyses. Effect of IH on CXCR4 and other osteoclastogenic factors were analyzed by RT-PCR analysis. Stable cell lines of shHIF-1á and HIF-1á overexpressing SHSY5Y cells were studied for altered inductive abilities of RAW 264.7 cell osteoclastogenic tendencies by TRAP assay, CaSR expression status, and effects of MAPK inhibitors. Further, the effects of shHIF-1á and HIF-1á overexpressing SHSY5Y cells on osteoclastogenesis were also observed *in vivo* by injecting the stable cells into the tibia of SCID mice.

Results: IH conditioning of SHSY5Y cells, which are parental or untreated, shHIF-1á stable expressing cells, HIF-1 overexpressing stable cells showed influence of HIF-1á on osteoclastogenic factor production and abilities to induce RAW 264.7 cell osteoclastogenesis. Higher tumorigenic and osteoclastogenic effects of IH conditioned SHSY5Y cells over the parental cells were observed in intra-tibial SCID mice.

Conclusions: Our results clearly show that Hypoxia and IH conditionings are responsible for enhanced stabilization of HIF-1á, which is an important event associated with CXCR4 up regulation and osteoclastogenic induction in neuroblastoma cells.

Keywords: Neuroblastoma, metastasis, hypoxia, HIF-1á

Conflict of interest: None

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OP-9

Screening Of Novel Strains For L-Asparaginase Production From Various Soil Samples

Anupama O.P., Subina Bharathan, Swetha Raghavan, Yogesh B.J, Bharathi S and Pramod T.*

Dept. of Microbiology, The Oxford College of Science, HSR Layout, Bangalore-102, Phone: 9880887367, Fax:91-80-30266349

Corresponding author: *drpramodtaranath@gmail.com

Background: L-asparaginase aminohydrolase (L-asparaginase, EC 3.5.1.1), has gained a lot of importance in recent years due to its important applications, in the pharmaceutical industry as an alternative for the treatment of various cancers such as acute lymphoblastic leukemia, malignant diseases of the lymphoid system and Hodgkin's lymphomas. Industrial L-asparaginase production offers some challenges, in the search for new microorganisms capable of producing it with less adverse effects. The strains capable of producing L-asparaginases were isolated and subjected to thin layer chromatography for rapid confirmation. These strains were then used for optimization studies.

Objective: The present study focuses on the exploration of newer strains for the production of L-asparaginases, which is a very promising agent in treating some forms of neoplastic cell diseases in humans.

Materials and Methods: In all 06 soil samples were subjected for screening of isolates for L-asparaginase production. The isolates were further screened by the plate assay of Gulati et al.,(1997). The confirmations of the strains were carried out by thin layer chromatography (Shah *et al.,* 2010).

Results: The isolation pattern of the strains is presented in Table 4.1. In the present study 60 strains were isolated. The medium

employed contained L-asparagine with phenol red and after incubation pink zone around the colonies was observed. These colonies were taken for further studies. The L-asparaginase positive colonies were identified by formation of pink zone around the colonies of the medium (Table- 4.2). It indicates deamination with release of ammonia. For the confirmation the L-asparaginase activity was detected by spot inoculation of L-asparaginase on TLC plates to check the end product of L-asparaginase breakdown i.e. aspartic acid. The extract from the best strain, a Gram-positive bacillus showed similar R_f values (0.71) in comparison to standard aspartic acid (0.72) suggesting that the end product was indeed aspartic acid.

Table 4.1 Isolation pattern of L-asparaginase producing strains

SL.NO.	LOCATION	TOTAL ISOLATES	NO. OF STRAINS POSITIVE
1.	**KERALA**	60	20
	TOTAL	**60**	**20**

Table 4.2 Rf values of Standard and Test organism.

SL.NO.	SAMPLE	Rf Values
1.	Standard Aspartic acid	0.72
2.	Gram positive Bacilli	0.71

CONCLUSION

In conclusion, a total of 60 strains were isolated, amongst them 20 were positive for L-asparaginases, the best isolate exhibited a zone of (2.0 cm) in the plate assay, which was tentatively identified as Gram-positive bacillus. This when subjected to rapid

confirmation by thin layer chromatography showed similar R_f values as that of the standard aspartic acid. This was used for optimization studies.

Keywords: ALL, Asparaginase, plate assay, thin layer chromatography

Conflict of interest: Declared none.

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Anti-Inflammatory Activity of Lignans from Sesame (*Sesamum indicum* L.) : Implications for their Inflammatory Response

C. Mahendra Kumar
Assistant Professor, Department of Biotechnology,
Government First Grade College, Kolar 563101.
Corresponding author: **cmahendrakumar@gmail.com**

Background: An association between the development of cancer and inflammation has long-been appreciated. Non-steroidal anti-inflammatory drugs, usually abbreviated to NSAIDs, are drugs with analgesic, antipyretic and anti-inflammatory effects - they reduce pain, fever and inflammation. The term “non-steroidal” is used to distinguish these drugs from steroids, which (among a broad range of other effects) have a similar eicosanoid-depressing, anti-inflammatory action. As analgesics, NSAIDs are unusual in that they are non-narcotic. NSAIDs are sometimes also referred to as non-steroidal anti-inflammatory agents/analgesics (NSAIAs) or medicines (NSAIMs). The most prominent members of this group of drugs are aspirin, ibuprofen, and naproxen partly because they are available over-the-counter in many areas.

Sesame seed (*Sesamum indicum* L., Pedaliaceae) is a highly valued source of both edible oil as well as protein. Sesame oil, with a mild pleasant taste, is a natural salad oil requiring little or no winterizing (Lyon 1971). The presence of endogenous antioxidants – lignans that act synergistically with tocopherols in preventing oxidation imparts remarkable stability to the oil (Yoshida 1994). The antioxidant activity of sesame lignans, have been adequately demonstrated earlier (Kikugawa and others 1983; Wu 2007; Suja and others 2004). Sesamin and sesamolin are naturally

present lignans in sesame while sesamol content is negligible. The superior oxidative stability of roasted sesame oil relative to other oils is largely due to sesamol, which is released from sesamolin during thermal processing or storage of the oil (Namiki 1995). Addition of sesamol to sesame oil also leads to increased stability (Fukuda and others 1986; Kikugawa and others 1983).

Objective: Objective of this study was to understand the anti-inflammatory activity of Lignans from Sesame.

Materials and Methods: Dehulled white (commercial variety) sesame seeds were purchased from the local market (Mysore, India). Sesamol (>97% purity) was purchased from Sigma Chemical Co., lignans were purified from sesame seeds. We have studied the role of lignans in mitigating the inflammatory response in the rat model. Rats were fed with isolated lignans at 5 mg/ kg body weight for 15 days. Local inflammation in paw was induced by injecting carrageenan. Rats fed with sesamin had 37% reduced inflammation compared to control.

Results: Anti-inflammatory activity of lignans is postulated to be through the inhibition of D 5-desaturase activity leading to decreased production of the pro-inflammatory leukotrienes. In order to understand the role of physiological role lignans, inhibition of lipoxygenases from plant (soybean lipoxygenase 1) and animal systems (mammalian 5-lipoxygenase) has been followed by enzyme kinetics, spectroscopic and biophysical methods. Sesamol and sesamin were potent inhibitors of 5-lipoxygenase activity with IC_{50} values of 77 and 192 mM, respectively. Soybean lipoxygenase-1 was inhibited by sesamol, sesamin and sesamolin with IC_{50} values of 57, 203 and 280 mM, respectively. Inhibition of lipoxygenase activity could be one of the factors contributing to the anti-inflammatory effects of lignans

Conclusions: This result suggests that sesame lignans shows anti inflammatory activity by inhibiting the lipoxygenase pathway and can be good candidates for the Non steroidal anti-inflammatory drugs in the near future.

Keywords: sesamolin, Lipoxygenase, inflammatory disease.

Acknowledgement: The author wish to thank, Dr. Sridevi Annapurna Singh, Department of Protein Chemistry and Technology, Central Food Technological Research Institute, Mysore for her keen interest in the work and kind permission to present this work.

Conflict of Interest: None

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Seasonal variation in the production of Psoralen, Bergapten and Xanthotoxin in *Ruta graveolens* L., an anticancerous plant

Manjula B.L.
KLE S. Nijalingappa College, Rajajinagar, Bengaluru, Karnataka, India.
Corresponding author: manjulasrivats@gmail.com

Background and Objective: Furanocoumarins namely psoralen, bergapten and xanthotoxin which are novel potent topoisomerase I inhibitors from *Ruta graveolens,* is of interest as they can be applied as anticancer agents.

Methodology: Hence, Reversed – Phase HPLC analysis was done to analyse the content of psoralen, bergapten and xanthotoxin during different seasons of the year April 2014- January 2015, before and after flowering. The leaves harvested after flowering during the month end of September 2014 contained more of psoralen, bergapten and xanthotoxin.

Results and Conclusion: In general the stem and leaf of *Ruta graveolens* contained more of bergapten followed by psoralen whereas the concentration of xanthotoxin was very less.

Keywords: Furanocoumarins, Cancer

Acknowledgement: The authors wish to thank funding agency, UGC [(MRP(S)/13-14/KABA023/UGC-SWRO] and management, KLE society for providing facilities.

Conflict of Interest: None

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Review
Causes of Carcinogens from Environmental Pollution

Rashmi P
Department of Botany, Surana College, South End Road, Basavagudi, Bengaluru – 560004.
Corresponding author: ravishmiharshil@gmail.com

Toxic substances that can lead to cancer are called carcinogens. Inventions, developments and changes in technology and lifestyle of mankind are indirectly affecting the growth and development rate of all living organisms. Recent studies show that the disease burden due to environmental pollution has contributed 3.2 million premature deaths in people worldwide during 2010, largely due to cardiovascular disease and lung cancer. Pollutants are unwanted chemicals or other materials found in the environment, at high concentrations to endanger the environment and mortality rate. A pollutant may cause long or short term damage by changing the growth rate of living organism. Cancer may be defined as a group of disease characterized by an abnormal growth of cells and may occur in any type of cells or tissues of the body. Most cancers start due to gene changes that happen over a person's lifetime and are related to environmental, lifestyle or behavioral exposures. According to World Health Organization, the environment in which many of us live poses serious health risks like cancer. Environmental pollution is the occurrence of harmful substances present in the atmosphere and sources may be man-made, such as smoke from vehicles and burning fuels. Both indoor and outdoor air pollutants have been shown to increase the risk of cancer.

Keywords: Lung cancer, Pollutant, Carcinogens, Environmental pollution.

Acknowledgement: The authors wish to thank management, Surana College for providing facilities.

Conflict of Interest: None

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OP-13

Assessment of Antineoplastic Potential of *Annona muricata* on Human Cancer Cell Lines

Rajarajan P[1*], Amudha[2], Kanchana Panditha[1], and Komal Jakkar[1]

[1]Department of Microbiology, Indian Academy Degree College (Autonomous), Bangalore

[2]Department of Biosciences, CMR Institute of Management Studies (Autonomous), Bangalore

Corresponding author: **rajarajan@indianacademy.edu.in**

Background: The plant *Annona muricata* possesses potent bioactive principles in all its parts. The antitumor effects of the extracts from *Annona muricata* include interfering with microtubule polymerization and depolymerization (G2/M phase), inducing cell apoptosis, altering the cell cycle and interrupting signal transduction.

Objective and Methods: The present study with its methanolic leaf extract was undertaken to establish the anti-neoplastic potential of *Annona muricata* by MTT, Cell cycle (, DNA Tunnel (FITC-dUTP), Apoptosis-Necrosis (AnexxinV-FITC) and Caspase 3 (Caspase-3 FITC) assays.

Results: The extracts showed dose dependant growth inhibition of MCF-7(Breast cancer), A549 (Lung Cancer) and HCT116 (Colorectal Cancer) cells. Extract treated HCT116, MCF-7 and A549 cells exhibited significant cytotoxicity with an IC50 value of 292.71, 339.52 and 347.7 µg/ml respectively. In cell cycle analysis, cells were arrested in G0/G1 (MCF-7), but significant cell arrests were absent in A549 and HCT116. 84.79% of HCT116 and 91.97% of A549 cells exhibited DNA damage in DNA tunnel assay. Apoptosis was observed in MCF-7 (6.85%), HCT116 (75.04%)

and A549 (40.78%) cells respectively. Significant results were shown in caspase -3 assay on HCT-116 and A-549 cell lines with a mean value fluorescence of 18.91 and 24.26 respectively.

Conclusion: The above results derive inference that *A. muricata* is a good lead as an anticancer agent.

Keywords: Cancer, *Annona muricata*, MTT

Acknowledgement: The authors wish to thank management, Indian Academy Degree College and CMR Institute of Management Studies for providing facilities.

Conflict of Interest: None

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Bioremediation for the Harmful Effects of Phenolic Pollutants that Cause Lymphoma

Mahesh Arvind

Dept of Biochemistry, Vijaya College, Basavanagudi, Bangalore – 4

Corresponding author: drmhsharv@gmail.com

ABSTRACT

Environment pollution results in the uptake and accumulation of toxic chemicals in food chains and drinking water thereby posing a health hazard in present and future generations. Aromatic compounds and their derivatives can exist in the environment at a higher concentration than desired due to anthropogenic activities and can be a source of environment pollution. Lymphoma is a group of cancers that affect the cells that play a role in the immune system. Exposure to toxic chemicals is one of the factor being linked to an increased risk of developing lymphoma. Toxic chemicals include pesticides, herbicides or benzene and/or other solvents. Most of these are phenolic derivatives which cause harmful effects to mankind even in small concentrations. Studies have revealed that they cause skin cancer and lymphatic cancer. Bioremediation is a cost effective technique to remove phenolic pollutants from the environment. In bioremediation microorganisms convert these substrates to cell biomass, carbon dioxide and water which are readily accommodated in the ecosystem. In the present study a microorganism which is promising for bioremediation of phenolic compounds was isolated from contaminated soil and it has shown degradation of high concentrations of phenols. Taxonomic evidences have suggested that the bacterial strain is a novel species within the genus

Arthrobacter. Results presented here indicate that the microorganism has the ability to degrade various aromatic pollutants that are harmful for the mankind. Thus there is a high potential for its use in the development of microbial technology for bioremediation as well against harmful effects of phenols which cause cancer.

***Key words*:** Bioremediation, Phenols, *Arthrobacter,* Lymphomas

Conflict of Interest: None

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OP-15

Evaluation of Antioxidant Properties of *Cyperus rotundus R*hizomes

Jayashree S.[1], Meghana V.[1] and K.Vijayalakshmi[2]
[1]REVA University, Bangalore, [2]Bharathi Women's College, Chennai.
*Corresponding author: **jayashree@revainstitution.org**

Background: Free radicals or reactive oxygen species (ROS) such as singlet oxygen ,super oxide, peroxyl radicals ,hydroxyl radicals and peroxynitrite can damage the body by cellular or oxidative stress This leads to the development of diseases like diabetes, cirhossis, cardiovascular and cancer. The efficacy of plant extract as an antioxidant is long been well established. Many more plants or plant extracts are under way. Plants contain a rich source of free radical scavenging molecules. *Cyperus rotundus* (Family Cyperaceae) is used both as a functional food and as a drug. The rhizome of *Cyperus rotundus* was selected in this present study to evaluate the antioxidant activity, which is capable of treating various diseases including cancer.

Objective: The objectives of this studies are findings for phytochemicals which are proven to possess antioxidant properties such as flavonoids, tannins, phlobatannins, alkaloids, total phenols from the qualitative analysis of *Cyperus rotundus.*

Methodology: The antioxidative potential of alcoholic extract of *C. rotundus* (CRE) was also evaluated by various antioxidant assays, 1,1- diphenyl-2-picrylhydrazyl (DPPH), superoxide, hydroxyl radicals, and nitric oxide (NO) scavenging system.

Results: The effect of Plant extract on cell cycle as analyzed by flow cytometry showed to possess anti cancerous, antioxidant, and anti-diabetic property.

Conclusion: Thus our findings reveal *Cyperus rotundus* exhibit anticancerous, antidiabetic because of the presence of bioactive compounds which exhibit antioxidant property.

Keywords: Cyperus rotundus, anti-oxidants, anti-cancerous, anti-diabetic

Acknowledgement: Authors thank Principal, staff and students of RISM for their support.

Conflict of Interest: None

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OP-16

Review
Immunotherapeutics in Cancer

Bhavana Bhat, Shraddha KJ, and Soma Chaki*
PG Department of Biotechnology, Acharya Bangalore B-School, Andrahalli Main Road, Off Magadi Road, Bangalore 560091
*Corresponding author: **hod.biotechnology@acharyabbs.ac.in**

The human body has the ability to retort back to the presence of any foreign body by the activation of its immune system, which is called as the immune response. The treatment of any disease by inducing, enhancing or suppressing this immune response is known as Immunotherapy. Immunomodulators are the active agents of immunotherapy, which are a diverse array of recombinant, synthetic and natural preparations. The molecular identification of cancer antigens has opened new possibilities for the development of effective immunotherapies to boost the body's natural defences to fight the cancer. The immunotherapy for cancer includes Monoclonal Antibodies, Non-specific Immunotherapies like Interferons and Interleukins, Oncolytic Virus Therapy, T-Cell therapy and Cancer Vaccines including DC vaccine, Tumour vaccine. The scope of Immunotherapy also encompasses research areas such as allergy, autoimmunity diseases, transplantation and other infectious diseases like HIV, hepatitis.

Keywords: Immune response, Immunomodulators, T-Cell Vaccines, Immune Cells, Cancer Vaccines, Tumour vaccines.

Acknowledgement: The authors wish to thank management, ABBS, Bangalore for the providing facilities.

Conflict of Interest: None

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Review
Lifestyle and Cancer

Akanksha, Prakriti Chauhan, George Santhosh, and Soma Chaki*

PG Department of Biotechnology, Acharya Bangalore B-School, Andrahalli main road, Off Magadi Road, Bangalore 560091

***Corresponding author**: **hod.biotechnology@acharyabbs.ac.in**

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body. It is a degenerative process that develops over a long period of time and goes through many stages which start out with damage to a cell.

Around 134,000 cancers each year are the result of a poor lifestyle, Cancer Research UK has found. In the most wide reaching study yet conducted into the issue, it was found that 14 different lifestyle factors ranging from smoking, to lack of exercise, eating too much salt, not having babies, drinking too much and being overweight contributed to four in every ten cancers diagnosed in the UK.

Smoking is a leading cause of cancer and death from cancer. It causes cancers of the lung, oesophagus, larynx, mouth, throat, kidney, bladder, liver, pancreas, stomach, cervix, colon, and rectum. Alcoholic beverages are classified by the International Agency for Research on Cancer (IARC) as a Group 1 carcinogen (carcinogenic to humans.3.6% of all cancer cases and 3.5% of cancer deaths worldwide are attributable to consumption of alcohol. There is now a clear body of evidence that bowel cancer is more common among those who eat the most red and processed meat.

Psychological stress describes what people feel when they are under mental, physical, or emotional pressure. When it comes to beauty products, the effects of the ingredients they contain can be more than just skin deep. Getting to and staying at a healthy weight is important to reduce the risk of cancer and other chronic diseases, such as heart disease and diabetes. These are few of the factors that can lead to cancer. And thus by making healthy changes to our lifestyle in this fast paced world we can reduce the risks of cancer.

Keywords: Carcinogen, cosmetics, cancer, overweight, smoking.

Acknowledgement: The authors wish to thank management, ABBS, Bangalore for the providing facilities.

Conflict of Interest: None

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PO-1

Human Umbilical Cord Blood (HUCB) Proteins from Aged Pregnancy as Validated Biomarkers for Cancers

Ranjitha A., Sathyashree P.V., Beena Babu, Sunitha P., and Jolitha A.B*

Maharani Lakshmi Ammanni College for Women, Malleshwaram, Bengaluru-560029

Corresponding author: jolithasagar@gmail.com

Objective: To assess oxidative stress (OS) status in aged pregnancy (HUCB) and non-pregnant normal blood samples (NPNB), isolation and identification of protein biomarkers from HUCB in aged pregnancy. Validation of isolated proteins such as Periostin and Alpha-fetoprotein as validated probable biomarkers.

Materials & Methods: Human umbilical cord blood was obtained from the first pregnancy between the age group of 19-30 were considered (N=4). The subjects were pre-evaluated in terms of gestational complications such as diabetic, hypertension, thyroid etc., and not included in the studies. Biochemical analysis of oxidant biomarkers (Total AOA, GPx activity, GR activity, SOD activity, PXn, AOPP and LPO) was analyzed. The proteins present in the sample were identified by SDS-PAGE.

Results: Our results revealed oxidative stress as an associated parameter with aged pregnancy as hypothesized. Protein expression increased with increase in age from which it is evident that these protein biomarkers could be an early diagnostic tool for validating the risk factors. This data has to be further validated and confirmed.

Conclusion: The current project has successfully investigated OS status in aged pregnancy. The current study showed that advanced pregnancy exerts a maximal oxidative stress, but is characterized by minimal compensatory upregulation of antioxidant enzymes. The protein biomarkers such as Periostin and alpha-feto protein were over-expressed in HUCB with advancing age. Oxidative stress is associated with pregnancy, which probably could be counteracted with suitable interventions such as administration of antioxidant vitamins during the course of pregnancy.

***Key words*:** Oxidative stress (OS), Antioxidant Enzymes (AOE), Thiobarbituric acid reactive substances (TBARS), advanced oxidation protein products (AOPP), Superoxide dismutase (SOD), Glutathione reductase (GR), and Glutathione peroxidase (GPx).

Conflict of interest: None.

Acknowledgement: The authors wish to thank management, mLAC for providing facilities.

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PO-2

Phytochemicals and Morpho-Anatomical study of *Hodgsonia heteroclita,* Encounter to District Kokrajhar, BTAD, Assam, North-East, India

Derhasat Narzary[1, 2*], Birendra Kumar Brahma[1, 3], Dhirasree Talukdar[2], Junu Boro[2], Arvind Kumar Goyal[1, 3] Usha T[4], Sushil Kumar Middha[4]

[1]Department of Biotechnology, Bodoland University, Kokrajhar-783370, BTAD, Assam, India,[2]Department of Botany, Bodoland University, Kokrajhar-783370, BTAD, Assam, India,
[3]Centre for Bamboo Studies, Bodoland University, Kokrajhar-783370, BTAD, Assam, India,
[4]Department of Biochemistry and Biotechnology, MLA College for Women, Bangalore -560012, Karnataka.

Corresponding author: sushil.middha@gmail.com

Background: *Hodgsonia heteroclita* Hook.f. & Thomson, a magnificent species, belonging to the Cucurbitaceae family is believed to have originated in North east India, China and Malaysia (Hu, 1964). In India, *H. heteroclita* is encountered in the hilly areas of Assam, Manipur, Meghalaya, Nagaland, Arunachal Pradesh, Tripura and Sikkim (Arora and Hardas, 1976). In BTAD Assam, tribal community Bodo locally called as Hagrani jwgwnar and use it as anti diabetic agent.

Objective: The present study is aimed to a comparative study on the morphology and anatomy of the male and female plants of *H. heteroclita*. The morpho-anatomical features of leaves, petiole, stem, root, flowers, ovary, placentation, fruits and seeds of the male and female plants are the comparatively study. Some important observations have been done on the vascular tissues of different parts of the plant. The magnificent structural features of the plant parts and morpho-physiology are evaluated. A study on phytochemical screening of the leaf, stem, root and flowers were comparatively studied for the male and female plants of *H. heteroclita.*

Methodology: The preliminary Phytochemical screening of different parts of *Hodgsonia heteroclita* revealed the presence of various bioactive compounds like carbohydrate, reducing sugar, tannin, Saponnins, Flavanoids, steroids, alkaloids and Glycosides.

Results:

Male plant: The preliminary Phytochemical screening of different parts of *Hodgsonia heteroclita* revealed the presence of various bioactive compounds like Carbohydrate, Reducing Sugar, Tannin, Saponnins, Flavanoids, Steroids, Alkaloids, Glycosides. The test results positive for carbohydrate, reducing sugar, tannin, Saponnins, Flavanoids, alkaloids. Flavanoids present in leaf and stem in high amount. Whereas phytoconstituents like Steroids and Glycosides are absence in stem, leaf, root and flower. Each and every Phytochemical have one or the other biological property.

The preliminary phytochemical analysis of test samples of leaf, stem, root and flower of male plant of *Hodgsonia heteroclita* has been reveals the presence of carbohydrates, Reducing sugar, Saponnins, Steroids, Flavanoid, Alkaloid and Tannins. However, Glycosides were not detected almost in all the test samples. In the leaf, flower and stem samples the flavanoid and tannins constituents were the most prominent compound followed by very less amount of carbohydrate, reducing sugars and alkaloids were observed, however the steroids and glycosides were not detected. In the stem and flower sample tannins were also found when compared to leaf sample. In the root alkaloid was observed as most prominent and other compounds were generally observed in very less inference but the glycoside was not detected. In the result observation of preliminary phytochemical analysis the flavonoid constituent was most prominent which was observed in the leaf sample and glycosides was almost nil in the all test samples of male plant of *Hodgsonia heteroclita.*

Female plant:

The preliminary phytochemical analysis of test samples of leaf, stem and root of female *Hodgsonia heteroclita* has been revealed

the presence of carbohydrates, Reducing sugar, Saponnins, Steroids, Flavonoid, Alkaloid and Tannins. But Glycosides was not detected almost in all the test samples. During preliminary phytochemical screening flavonoids, alkaloid and tannins were detected as most prominent phytoconstituents female *Hodgsonia heteroclita*. In the leaf samples the flavonoid, alkaloids, and Tannins constituents were the most prominent compound but very less amount of carbohydrate, reducing sugars, steroids were observed and the Glycosides was not detected. In the stem flavonoid, alkaloids, and Tannins were most prominent constituents, but very less amount of carbohydrate, reducing sugars, steroids were observed and the Glycosides was not detected in leaf. In the root alkaloid was observed as most prominent and other compounds were generally observed in very less inference but the glycoside was not detected. In the result observation of preliminary phytochemical analysis the flavonoid constituent was most prominent which was observed in the leaf sample and glycosides was almost nil in the all test samples of female plant of *Hodgsonia heteroclita.*

Key Words: *Hodgsonia heteroclita,* Male & Female Plant Parts, Morpho-Anatomy, Phytochemical Screening, Vascular Bundles.

Acknowledgement: Bodoland University, Kokrajhar and MLACW, Bangalore for providing laboratory facility for the research work

Conflict of Interest: None

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PO-3

Role of ERK1/2 in tumour progression of N-Ethyl N-Nitrosourea (ENU) induced transplacental wistar rats glioma models

Chitrali Laha Roy, Sushmitha H S, Radha Devi V, Dishamoni Gogoi, Akki Suma, Vasanth Kumar Bhaskara*
Department of Biochemistry, R.C.A.S.C, MSR-Nagar, Bangalore, India.
Corresponding author:chitraliroy12@gmail.com

Background: Gliomas are the common form of brain cancers amongst which astrocytomas are the predominant forms. Glioblastoma multiforme (GBM) represent the high grade glioma which may occur either directly (Primary or *de novo*) or may recur from low grade astrocytomas (secondary GBM). The *Wistar* rats were administered with n-Ethyl n-Nitrosourea (ENU) transplacentally during the critical days of gestation. The pups with glioma were examined for the role of Extra-cellular signal Regulated Kinase (ERK1/2) on cell proliferation during early (90 days of post neonatal age) and later stages (180 days of post neonatal age) of glioma tumor progression.

Objectives: This study is carried out to understand the role of Extra-cellular signal Regulated Kinase (ERK1/2) in unregulated cell proliferation of early and later stages of ENU induced glioma rats.

Methods: Pregnant *Wistar* rats were administered with ENU (75 mg/Kg Body Weight) through intra-peritoneal administrations. Pups after 90 days (Early) and 180 days (Later) of post neonatal age were decapitated and their brain tissues were used for morphological, immunohistochemical and western blot analyses.

Results: The early stage gliomas developed early neoplastic cell proliferation centers which developed into highly vascularized tumor phenotypes in later stage. The later stage tumors have shown higher (30%) Ki67 index compared to early stage (10%). Increased expression levels of GFAP, pERK1/2, pBad and Bcl-2 proteins were found in later stage tumors.

Conclusions: Our results have clearly shown that in ENU induced transplacental Wistar rats, tumor progression is mediated through increased rates of cell proliferation, pERK1/2 activation and anti-apoptotic characteristics.

Keywords: Glioma, Immuno-histochemistry, Tumor, GFAP, pBAD, Bcl-2

Acknowledgement: The authors wish to thank management, MSR for providing facilities.

Conflict of Interest: None

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PO-04

Review

A review about effects of Propyl Paraben with respect to Cancer

Amrutha U.*, and Ananda H.V.

Department of Biotechnology, Sapthagiri College of Engineering, Bangalore-57, Karnataka

***Corresponding authors**: amrutha.nami1996@gmail.com

Background: Propyl Paraben, the n-propyl ester of *p*-hydroxyl benzoic acid, occurs as a natural substance found in many plants and some insects, although it is manufactured synthetically for use in cosmetics, pharmaceuticals and foods. It is a preservative typically found in many water-based cosmetics, such as creams, lotions, shampoos and bath products. Parabens can be absorbed through the skin. Intake of parabens is a possible concern because studies have shown that parabens have weak estrogen-like properties. Estrogen is a female hormone known to cause breast cells (both normal and cancerous) to grow and divide.

Objective: New research has detected the presence of paraben esters in 99 percent of breast cancer tissues sampled. The study examined 40 women, who were being treated for primary breast cancer. In 60 percent of cases, five of the different esters were present. Parabens are chemicals with estrogen-like properties, and estrogen is one of the hormones involved in the development of breast cancer.

Introduction: Parabens are preservatives that are used in a wide range of cosmetic, pharmaceutical and some food products. Studies have confirmed the ubiquitous presence of parabens. These are esters of para-hydroxyl benzoic acid and commonly include methyl paraben, ethyl paraben, propyl paraben and butyl paraben. The recent health concerns regarding parabens stem

from a study published in 2004 that detected parabens in breast tissue from patients with breast cancer. Public pressure has persuaded several governments to introduce regulations on the use of parabens in consumer products. Parabens have also been detected in human tissues and bodily fluids, but it is the discovery of these chemical compounds in the breast tissue of patients with breast cancer that has raised public concern over their use. It is hypothesized that the estrogenic properties of parabens may play a role in breast cancer development

Effects of Propyl Paraben: It can be absorbed through the skin. Intake of parabens is a possible concern because studies have shown that parabens have weak estrogen-like properties. Parabens can enter the human body through the skin and parentally Parabens have been detected in urine, serum, breast milk and seminal fluid, but most worrisome has been the detection in breast tissue from patients with breast cancer. Since decades Propyl Paraben are used as preservatives for their anti-bacterial and anti-microbial resistance properties. They are synthetically preservatives. Although there are several problems regarding the paraben usage in cases such as paraben relating to breast cancer, improper functioning of male reproductive systems and mainly the experts are concentrating on long term chronic effects caused by parabens. Some have hypothesized that the higher concentration in the upper lateral breast near the axilla correlates with exposure from underarm deodorant and an increased incidence of breast cancer development in the area.

Results: Since decades Propyl Paraben are used as preservatives for their anti-bacterial and anti-microbial resistance properties. They are synthetically preservatives. This Propyl Paraben is used in many sectors such as food, cosmetics etc. propyl paraben is used in very less concentrations for the safety purposes. Although there are several problems regarding the paraben usage in cases such as paraben relating to breast cancer, improper functioning of male reproductive systems on which experiments are being carried out and mainly the experts are concentrating on long term

chronic effects caused by parabens. Till date parabens are considered as safest preservative being used.

Conclusions: Government regulatory boards have examined parabens and most have agreed that current concentrations of parabens are safe for consumer use. However, studies investigating the health effects of parabens are conflicting. At this point, there is an insufficient amount of data suggesting serious consequences from paraben use and exposure to warrant drastic avoidance measures or government regulations. There are numerous preservatives that could be used in place of parabens. Some other commonly used preservatives include formaldehyde, quaternium-15, imidazolidinyl urea, diazolidinyl urea and dimethyl oldimethyl hydantoin.

Keywords: Propyl Paraben, Breast Cancer, Estrogen

Acknowledgement: Authors thank Dr. Ananda S. and Department of Biotechnology, Sapthagiri College of Engineering.

Conflict of Interest: None

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PO-05

Development of modified method for preparation of full and low calorie rasomalai with enhanced sensory attributes

Vijetha B.V. [1]*, Navneetha R. [1], and A.M. Natarajan[2]

[1]Department of Food and Nutrition, Smt.VHD Central Institute Home Science, Bangalore, [2]R & D Center, K C Das Pvt. Ltd. Bangalore.

Corresponding author: **vijetha.bv@gmail.com**

Background: The flavour of the new millennium is confined largely in varieties of indigenous milk based sweets. Each sweet product has its distinctive taste and flavour which has been evolved through ages. This concept of consuming nutritionally rich milk based sweet with exceptional taste as with stood test of time not withstanding cholesterol scare of the west. One of the milk chhana based sweet known for its unique based taste gaining popularity is rasomalai, Much of the processing involved in this preparation is done on a small scale by traditional confectionaries.

Objective: To prepare sweetened condensed milk adjusting the fat content to 6 percent.

Materials and Methods: In this investigation an alternate method was developed to prepare rasomalai with attractive flavour and taste. Rasomalai liquid base. The standardised sweetened condensed milk was flavoured with saffron and permitted colour and was subjected to chemical, microbiological and sensory qualities by adopting standard procedure. Similarly rasomalai was prepared by using combination of cream and skim milk liquid base followed with addition of flavour and colour.

Results: Rasomalai obtained using sweetened condensed milk and flattened rosogolla gave a unique taste with very good flavour

and taste with high sensory attributes better than the normal conventional rasomalai. Rasomalai prepared by using cream and skim milk also gave similar sensory attributes to that of usual rasomalai. The liquid base of rasomalai was fortified with functionally ingredients namely green tea extract, phytosterol, vitamin A, E, C and iron to impart health benefits. Apart from this low calorie rasomalai was standardised by replacing fat with maltodextrin and sugar with sucralose for the benefits of diabetic and diet conscious consumers.

Conclusion: Development of value added rasomalai with health providing functional ingredients would offer good market demand.

Key words: Rasomalai, maltodextrin, sucralose, skim milk, chhana, fortification

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Conflict of Interest: None

Review

Significance of [-2] proPSA as a novel and early diagnostic marker for prostate cancer

Varsha V., and Basu N.

T. John College, Department of Biosciences, Bangalore

Corresponding author:

Prostate cancer (PCa) continues to be a leading cause of cancer mortality in men, Prostate specific antigen (PSA) which is a glycoprotein is the most widely used serum marker for early PCa detection. Use of PSA in PCa screening has revolutionized the clinical practice of PCa detection. Under normal conditions, PSA is produced as a pro-enzyme (proPSA) by the secretary cells that line the prostate glands (acini) and secreted into the lumen where the pro-peptide is removed to generate active PSA. The active PSA can then undergo proteolysis to generate inactive PSA. Of which a small portion then enters the bloodstream and circulates in an unbound state (free PSA). Alternatively, Active PSA can diffuse directly into the circulation where it is rapidly bound by protease inhibitors including alpha-1- antichymotrypsin (ACT) and alpha -2 macroglobulin. Although generating less PSA per cell than normal tissue, prostate cancer cells lacks basal cells, resulting in the disruption of the basement membrane and normal lumen architecture. As a result, the secreted proPSA have direct access to the circulation resulting in “leakage” of PSA into the blood stream. The majority of free PSA (fPSA) in the serum reflects the mature protein that has been inactivated by internal proteolytic cleavage. In contrast, this cleaved fraction is relatively decreased in prostate cancer. Typically, from 70-90% of the PSA in serum is combined PSA (cPSA), with the remainder being fPSA. The % fPSA (ratio

of fPSA to tPSA) in serum has been demonstrated to significantly improve the discrimination of prostate cancer from benign prostatic conditions, especially in patients with PSA levels in the≥ 4 to ≤ 10 ng/ml range. A higher % fPSA in serum is correlated with a lower risk of prostate cancer, while % fPSA values below 10% are more highly associated with cancer.

Amino acid sequencing of whole purified PSA isolated from prostate tissues showed that the proPSA in peripheral zone cancer consisted mainly of [-2]proPSA (p2PSA) rather than other 4 isoforms present in the serum of proPSA. The [-2] proPSA test is particularly useful for patients with a normal prostate, whose PSA levels is between the range 4 to 10ng/ml, a range considered the "diagnostic gray zone" because most men with higher levels have prostate cancer and most men with lower levels do not . Therefore, serum p2PSA emerged as a promising marker for PCa detection. The current study indicates that p2PSA is a promising screening tool with enhanced accuracy reducing number of unnecessary biopsies and thus the cost.

Keywords: **Prostate Cancer, Serum, PCa Markers**

Acknowledgement: The authors wish to thank the management, T. John College for providing facilities.

Conflict of Interest: None

Reference:

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Study of the electrochemical redox characteristics of Quinoline Carboxamide Derivatives and their derivatives

Rajeev R. Kolgi*, Shivaraj Yellappa, and Subramanya Hegde
[1]Department of Chemistry & Biochemistry, Government Science College, Bengaluru, Karnataka, India

* Corresponding author: **rajeevkolgi@gmail.com**

Background and Objective: A series of novel Quinoline-6-carboxamides and 2-Chloroquinoline-4-carboxamides were synthesized by the reaction of their analogous carboxylic acids with various amine derivatives in the presence of base TEA and protecting agent BOP at room temperature.

Methodology: Synthesized compounds were confirmed by spectral characterization viz IR, ^{1}H-NMR, and MS. The electrochemical behaviour of anticancer carboxamide and its derivates was studied at a glassy carbon electrode using cyclic and differential-pulse voltammetric techniques.

Results and Conclusion: The various parameters such as effects of anodic peak potential (E_p), anodic peak current (I_{pa}), scan rate, effect of substituent, heterogeneous rate constant (k^0), etc have been discussed. The shifts in peak potential were observed with the various in substituents.

Key words: Quinoline-6-carboxamides, 2-chloro quinoline-4-carboxamides, antibacterial activity

Acknowledgement: The authors wish to thank management, Govt Sci. College for providing facilities.

Conflict of Interest: None

Reference:

1. Kusama H., Arakawa H. (2004) Influence of quinoline derivatives in I"/I3" redox electrolyte solution on the performance of Ru(II)-dye-sensitized nanocrystalline TiO2 solar cell. J. Photochemistry and Photobiology A: Chemistry 165(1–3): 157–163.

PO-08

Review

Myricetin: A Natural Anti-Cancerous Dietary Agent

Praveen Kumar L., Lijin K. Litson, Akash R., Shivaraj V., and Prashanth Kumar H.P.*

Department of Biotechnology, Sapthagiri College of Engineering, Bangalore – 560057

*Corresponding author: **prashanthkumar.hp@gmail.com**

Flavonoids comprise the most common group of plant polyphenols and provide much of the flavor and color to fruits and vegetables. More than 5000 different flavonoids have been described. Myricetin belonging to the subclass of flavonol shows possible health benefits by their potent antioxidant and free-radical scavenging activities observed *in vitro*. Myricetin treatment on cancer cells exhibited anti-proliferative effects by inducing apoptosis and cell cycle arrest. Apoptosis of pancreatic cancer cells *via* the activation of caspase-3 and 9 is observed. It induces apoptosis of human bladder carcinoma cell line T-24 with activation of caspase-3 after DNA cleavage and cell cycle arrest in G2/M phase by a down-regulation of Cyclin B1 and cdc2. It inhibits the phosphorylation of Akt but increases the phosphorylation of p38 and decreases MMP-9 expression. The above mechanisms prove the potentiality of myricetin as a natural apoptotic & anti-cancerous dietary agent.

Keywords : Flavonoids; Myricetin; Apoptosis; Caspase; Anti-cancer

Acknowledgement: Management, Department of Biotechnology, Sapthagiri College of Engineering, Bangalore

Conflict of Interest: None

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PO-09

Development of full and low calorie mysore pak fortified with effective functional ingredients to enhance its nutritive and therapeutic value

Vijetha B.V. [1]*, Navneetha R. [1], Lalitha Reddy [1] and A.M. Natarajan[2]

[1]Department of Food and Nutrition, Smt. VHD Central Institute Home Science, Bangalore,[2]R & D Center, K C Das Pvt. Ltd., Bangalore.

Corresponding author: **Vijetha.bv@gmail.com**

Background: Traditional dairy products in India have a very long history and have been the nucleus of a vast variety of delicacies prepared by our ancestor. Among the indigenous sweets delicious mysore pak (ghee based sweet) occupies an important place of preference by virtue of its unique taste. So far very little improvement in the ghee based mysore pak have been noticed. Further mysore pak occupies a special place since it is made out of ghee being the dairy product. In this investigation attempts have been made to enhance its nutritive and therapeutic value since these sweet are popular among all sections of society.

Objective: Enhancement by fortifying the base ingredients with functional ingredients namely oats, barley (anticholesterol), fibre control for diabetic and improved digestion. Green tea extract and grape seed extract (source of polyphenols and antioxidant) wheat fibre, mulberry leaves extract (natural calcium, antioxidant, antimicrobial activity), Ginger extract (to provide good flavour, anti-inflammatory effect, gastro intestinal relief).

Materials and Methods: A method for standardization for low calorie mysore pak using appropriate low calorie fat substitute and synthetic sugar, a premix was compounded for fortification containing vital micronutrients and calcium and iron.

Results: All the experimental mysore pak were subjected to chemical, microbiological, and sensory qualities adopting standard procedures showing high level of acceptability.

Conclusion: Indian delicacies from indigenous sweets have been a source of joy for ages. Each delicacy involves a presenting and modified one as its distinctive charms and continuous to surprise and benefit the connoisseurs even today. The tenfold growth in demand for this delicacy mysore pak with enhanced nutritive and therapeutic value will provide a good opportunity in related industry to market value added mysore pak with enriched health attributes to benefit the consumers at large and thus provide health for all in the current millennium through consumption of this health oriented indigenous sweet.

Keywords:- Mysore pak, functional ingredients, sensory evaluation, therapeutic value.

Acknowledgement: KC Das Pvt. Ltd. for providing laboratory facility for the research work.

Conflict of Interest: None

PO-10

Development of full and low calorie probiotic along with yakult cultured mishti dahi fortified with functional nutrients, enhancing its nutritive and therapeutic value

Navneetha R.[1], Vijetha B.V. [1]*, Roopa K., and M. Natarajan[3]
[1]Department of Food and Nutrition, [2]Department of Human Development, Smt.VHD Central Institute Home Science, Bangalore,
[3]R & D Center, K C Das Pvt. Ltd. Bangalore.
Corresponding author: **Vijetha.bv@gmail.com**

Background: Burning issues like obesity, malnutrition, micronutrient deficiencies, lifestyle impacts throw considerable opportunities for food industry to address these health concerns. Industry and product related concerns cannot be addressed in isolation.

Objective: To develop products like misti dahi with enhanced nutritive and therapeutic value.

Materials and Methods: Yakult is fermented milk known to impart high therapeutic value such as modification of intestinal function, cancer prevention, restores impaired immune function, corrects sodium imbalance, antienterocolitis, preoperative symbiotic therapy which is prepared using health providing strain Shirota of *L. Casei* and is being marketed widely. Misti dahi preparation is standardized using concentrated milk with high sugar content. In this investigation a combination of probiotic cultures along with *L.Casei* Shirota strain were used in the preparation of Mishti dahi to further enhance the therapeutic value. There are a number of factors introduced to obtain a rich harvest of both probiotic and yakult cultures, fortifying with functional ingredients along with micronutrients which will be highlighted. Preparation of low calorie Mishti dahi possessing high nutritive and therapeutic value was standardized using appropriate fat replacer (maltodextrin) and sugar replacers (sucralose).

Result: All the experimental Mishti dahi were examined for chemical, microbiological, sensory quality parameters adopting standard procedures. Therapeutically and nutritionally enriched Mishti dahi recorded a high incidence of probiotic yakult lactic cultures with high growth density exceeding 1×10^{7}cfu per ml with almost equal proportion of *ST:LA:Bi:Lc* organisms.

Conclusion: Development of full and low calorie Mishti dahi with enhanced therapeutic value using combination of probiotic along with yakult lactic cultures would provide immense opportunity to market health oriented popular fermented milk to benefit both diabetic and diet conscious subjects in particular.

***Keywords*:** Mishti dahi, Probiotic culture, therapeutic value, standardization.

Acknowledgement: KC Das Pvt. Ltd. for providing laboratory facility for the research work

Conflict of Interest: None

PO-11

Review

Study on PCB contamination, its impact on Environment in ship breaking event and biological remedy to control PCB contamination

Shobha K. Jayanna*, Swetha V[1], and Kushalatha[2]

*School of Basic and Applied Sciences, Dayananda Sagar University.
[1]Microbiology, Dayananda Sagar University, [2]Department of Biotechnology, MLA College for Women, Bangalore -560012, Karnataka

Corresponding author: shobha_jayanna@rediffmail.com

Background: Ship breaking activities are carried out in Alang, coastal town in the state of Gujarat, India. Other places like Goa and Kular, Mangalore is also known for ship breaking activities. Ship breaking release toxic compound called Polychlorinated biphenyl (PCB's) to environment. Ship breaking near seashores may contain PCB containing wastes in the range of 200-800kg (Reddy 2006 and Devananthan et al., 2011). PCB's pose high toxicity to humans, animals, plants and environment due to its carcinogenic effect. PCB's have been widely used in industry as heat transfer fluids, hydraulic fluids, solvent extenders, flame retardants, organic diluents, dielectric fluids and transformer oils (Erickson and Kaley, 2011). PCB's are known to cause reproductive defect in humans (Loch-Caruso, 2002) and animals. PCB's also cause neurological (Schantz et al., 2003), endocrinal (Ross, 2004) and other defects. These also adversely affect foetal and infant development (Winneke et al., 2002). It has a higher mutagenic and carcinogenic ability (Faroon et al., 2001). The safe and cost effective methods of PCB's degradation are one of the urgent problems to be addressed immediately.

Microorganisms involved in biodegradation:

A number of PCB-degrading bacteria have been isolated from different regions of the world which may include Gram negative strains belonging to the genera *Pseudomonas, Alcaligenes,*

Achromobacter, Burkholderia, Acinetobacter, Comamonas, Sphingomonas and *Ralstonia* and Gram positive strains belonging to the genera of *Arthrobacter, Corynebacteria, Rhodococcus* and *Bacillus* (Pieper, 2005; Lindner et al., 2003). *Phanerochaete chrysosporium,* a fungus capable of degrading PCB has also been characterized (Beaudette et al., 1998).

Use of Consortium and genetically engineered organisms in bioremediation

Oil zapper (Consortium of five different bacterial strains) was employed to clean up the Mumbai shoreline affected by the soil spill occurred in Aug 2010), *Pseudomonas putida* (oil biodegradable agent)

Conclusion: Polychlorinated biphenyl is one of the major recalcitrant having potential danger to the ecosystem**.** Physical methods like Incineration can be used for removal of PCB compounds. Incineration plants for disposal of hazardous wastes including PCB's do not exist in India. Hence, bioremediation of PCB is one of the best methods to cleanup environment.

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Conflict of Interest: None

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Review

Phytochemicals And Cancer

Deepshikha Shahdeo, Sonu Mehta, and Abhirup Ganguli*
Acharya Bangalore B School, Andrahalli Main Road, Off Magadi Road, Bengaluru-560091

*Corresponding author: **abhirup@acharyabbs.ac.in**

Cancer remains to one of the leading causes of death around the world. Epidemiological studies showing a protective effect of diets rich in fruits and vegetables against cancer have focused attention on the possibility that biologically-active plant secondary metabolites exert anti-carcinogenic activity. This huge group of compounds, now collectively termed ‘phytochemicals’, provides much of the flavor and color of edible plants and the beverages derived from them. Many of these compounds also exert anti-carcinogenic effects in animal models of cancer, and much progress has been made in defining their many biological activities at the molecular level. Cancer chemoprevention with natural phytochemical compounds is an emerging strategy to prevent, impede,. delay, or cure cancer. Phytochemicals are compounds found in the plants, which protects us from environmental and ingested carcinogens by arming our antioxidant enzymes, enhancing DNA repair pathways and have direct effects on the fundamental hallmarks of cancer progression and metastasis. However, much of the research on phytochemicals has been conducted which shows that many phytochemicals present in plant foods are poorly absorbed by human subjects, and this fraction usually undergoes metabolism and rapid excretion.

Keywords: Phytochemicals, anti-carcinogenic activity, secondary metabolites, chemopreservation.

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Conflict Of Interest : None

Reference:

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With Best Regards :

K. R. Instruments

Ph. No : 91-9886143298, **Fax No. :** 080 26684492
Email : info@krinstruments.com / krinstruments@gmail.com
Web : http://www.krinstruments.com/

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