CONFERENCE PROCEEDINGS

INTERNATIONAL CONFERENCE ON

BIOCHEMICAL UNDERSTANDING OF CANCER CELL SURVIVAL AND PROGRESSION"

(ICBUCCSP – 2018)

Sponsored by ICMR

5th – 7th February, 2018

Organized by

DEPARTMENT OF BIOCHEMISTRY

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KARPAGAM
ACADEMY OF HIGHER EDUCATION
(Deemed to be University)
(Established Under Section 3 of UGC Act, 1956)

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Department of Biochemistry, Karpagam Academy of Higher Education, Coimbatore

Contents

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KARPAGAM UNIVERSITY
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PREAMBLE FROM THE ORGANISING TEAM

Bone is a dynamic tissue which often appears to be dead. It undergoes constant remodeling, whichrequires the balance between bone forming osteoblast and bone resorbing osteoclast. The fluctuationsin the activity of these cells often results in a variety of bone disorders which are due to primary andsecondary factors. The bone disorders are often ignored as the symptoms are slow to manifest. A varietyof drugs used to treat bone disorders are associated with side effects. Hence usage of herbalcomponents is traditionally followed to cure bone disorders. However they lack scientific validation.

This seminar is intended to gather the scientist who are working on natural products and bone healthand disseminate the knowledge to young scholars.

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Dr. R. Vasanthakumar

Chancellor
Karpagam University
Coimbatore

MESSAGE

Bone is a very dynamic organ in the body that is constantly remodeling and changing shape to adapt to the daily forces placed upon it.There are various medical conditions that cause bone diseases like Osteoporosis, Osteogenesis imperfecta, Paget disease of bone,Osteomalacia, Rickets, bone tumors etc. Many recent studies have come up to understand the mechanism behind the healing of bone and one such approach is use of growth factors. To improve healing, platelet gel or platelet rich plasma (PRP), Fibrin glue (Platelet poor plasma-PPP), Hyualuronic acid, Mesenchymal stem cell usages are used for clinical application.

For the most common bone diseases, drugs that prevent bone breakdown (antiresorptives) have been shown to be effective in reducing the risk of future fractures. These drugs not only slow any further deterioration of the skeleton, but also allow for some repair and restoration of bone mass and strength.It is also important to recognize that the ideal drugs for the treatment of osteoporosis or other bone disorders have yet to be developed. Inexpensive, effective agents with few side effects are needed so that they can be used broadly to prevent fractures and deformities in the enormous number of individuals who will be at risk of bone disease as the population ages. There is now good evidence that dietary components and herbal products can influence these processes, particularly by inhibiting bone resorption, thus having beneficial effects on the skeleton. Osteoporosis is one of the main disorders observed in post menopausal women.

Worldwide, osteoporosis causes more than 8.9 million fractures annually, resulting in an osteoporotic fracture every 3 seconds.Osteoporosis is estimated to affect 200 million women worldwide. It is more common in women than men. Worldwide, 1 in 3 women over age 50 will experience osteoporotic fractures, as will 1 in 5 men aged over 50. By 2050, the worldwide incidence of hip fracture is projected to increase by 310% and 240% in men and women, respectively compared to rates in 1990.The combined lifetime risk for hip, forearm and vertebral fractures coming to clinical attention is around 40%, equivalent to the risk for cardiovascular disease.According to 2015 census 20%, i.e., ~46 million women in India have osteoporosis.

The incidence of bone disorders are alarmingly increasing in our country. Hence, I am happy to note that Department of Biochemistry is organizing a national seminar on indigenous herbs and bone health. I am sure that the deliberations during the seminar could be productive and lay foundation for young researchers to understand the disease and methodologies used to circumvent this disease. I wish all participants a great success.

R. VASANTHAKUMAR

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K. Murugaiah

Chief Executive Officer
Karpagam Educational Institutions
Coimbatore

MESSAGE

Osteoporosis is a condition in which there is a loss of mineral part of the bone and thinning and disintegration of the spongy part of the bone. Osteopenia is basically the same condition as osteoporosis just of milder degree. Osteomalacia a bone condition similar to that of osteoporosis caused by prolonged and severe deficiency of vitamin D. Vitamin D is very important for absorption of calcium from guts into the blood stream. Paget's disease of bone is a condition different from osteoporosis in which part of the skeleton (sometime just one bone) suffers from greatly increased and irregular remodeling.

Postmenopausal osteoporosis is a condition that weakens bones over time, making them thinner, more brittle, and more likely to break. Every woman past menopause, especially those at high risk for fracture, should make strengthening her bones a priority because: Upto 20% of bone loss happens in the 5 to 7 years just after menopause. 1 in 2 women over age 50 will have an osteoporosis-related fracture in her lifetime.

Cissus quadrangularis and *Ocimum sanctum* help in fracture healing, and use of such traditional drugs will be a breakthrough in the management and early mobilization of facial fractures. *Cissus quadrangularis* (*Harjor*) has been known for its bone healing properties for many centuries. It has been prescribed by the bone setters in a crude form both for external use, as a paste over the fractured limb, and internal use, as a decoction. *Ocimum sanctum* (*Tulsi*) is considered the best adaptogen, as it brings the pathological process occurring in the body to a normal physiological process.

Certain natural herbs have potential effects in promoting gonadal function and fracture healing, therefore are suitable candidates to counteract and prevent postmenopausal osteoporosis.They are: *Herba epimedii*, *Fructus psoraleae*, *Radix rehmanniae*, *Rhizoma drynariae*, *Herba cistanches* and *Cortex eucommaie*. I am happy to note that the goal of this seminar is to enlarge a multi-disciplinary group of experts including researchers, clinicians, and to advance understanding of skeletal biology and encourage the development of novel therapies to improve outcomes for individuals with both common and rare bone diseases. We hope you enjoy the all the scientific sessions and take advantage of this opportunity to interact with other researchers and clinicians. I wish the event a great success.

K. MURUGAIAH

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Dr. S.Sudalaimuthu

Vice-Chancellor
Karpagam University, Coimbatore

MESSAGE

There are four types of bone cells; they are osteoprogenitor cells, osteoblasts,osteocytes and osteoclasts. Bone tissue is continuously remodeled through the concerted actions of bone cells, which include bone resorption by osteoclasts and bone formation by osteoblasts, whereas osteocytes act as mechanosensors and orchestrators of the bone remodeling process. This process is under the control of local (e.g., growth factors and cytokines) and systemic (e.g., calcitonin and estrogens) factors that all together contribute for bone homeostasis. An imbalance between bone resorption and formation can result in bone diseases including osteoporosis. Recently, it has been recognized that, during bone remodeling, there are an intricate communication among bone cells. For instance, the coupling from bone resorption to bone formation is achieved by interaction between osteoclasts and osteoblasts.

Ginger, Aloe vera, garlic, turmeric, aandelion leaves and *Peppermint eucalyptus* are some herbs to strengthen bone cells. Due to some adverse effects or lack of efficacy of synthetic drugs, the potential efficacy of traditional medicines has stimulated the interest of scientists and doctors to turn on to traditional medicines for treatment of some chronic and difficult diseases, including the treatment for osteoporosis. Today, it is estimated that about 80% of individuals in thedeveloping countries still rely on traditional medicine-basedlargely on plants and animals for their primary health care.Herbal medicines are currently in demand, and their popularity is increasing day by day. Herbal drugs are fairlypreferred due to their effectiveness, fewer side effects, andrelatively low cost. In Ayurvedic culture, the young bark of *Ficus religiosa* (family-Moraceae) also known as Ashwatha or Ashvattha, has been widely used in the treatment of bone fracture.

I appreciate the efforts taken by the organizing team to gather the experts working in this area and young researcher to discuss key process of herbal therapies for variety of bone diseases. I am sure this will be a useful gathering and a timely one.

S. SUDALAIMUTHU

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Dr. R. Sundararajan

Registrar
Karpagam University, Coimbatore

MESSAGE

On behalf of Karpagam University, I welcome the participants to the National Seminar On "Indigenous Herbs and Bone Health" NSIHBH 2017(21st& 22nd June, 2017) for active deliberations.

A growing number of Indians are becoming prone to bone disorders. Doctors are coming up with novel cures to fend off the pain. According to the World Congress on Osteoporosis at Toronto announced out loud to the world that Indians could be having the highest prevalence of bone disorders in the world. Checking out the ground reality,a conservative estimates suggest that 20 per cent of women and about 10-15 per cent of men out of this would be osteoporotic.

Why is India groaning with aches and pains? Blame it on vitamin D. That's what medics are telling patients who fill up their chambers with brittle bones.Everybody knows that calcium is needed to build strong bones. But not everybody is aware that vitamin D-available from sunlightis vital for the body to absorb that calcium. And there is an epidemic of vitamin D deficiency, that is causing severe bone loss, says Dr. Ambrish Mithal, a well known endocrinologist.

The department of Biochemistry and Bioinformatics have chosen this topic "Indigenous Herbs and Bone Health" at the right time. The department has been active in terms of conducting such health concerned seminars and conferences, for instance the National Seminar on Diabetes.

I would like to wish the organizing team and the participants all the best. Hope this event would bring a change in thinking towards treating bone related disorders.

R. SUNDARARAJAN

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Dr. M. Palaniswamy

Dean, Faculty of Arts, Science and Humanities
Karpagam University, Coimbatore

MESSAGE

About 99 per cent of the calcium in the body is in bones though calcium is also required byother organs. Childhood and adolescence is the time when bones are beginning to be modeleduntil around the age of 30 when peak bone mass is achieved. Thereafter rate of bonedepletion exceeds rate of bone formation, the rate of decline being higher in post menopausalwomen due to fall in estrogen levels in the modeling phase is extremely important. Acritical element that helps absorb deposition of dietary calcium into bone mass is vitamin D.

Deficiency of vitamin D is one of the major contributory factors responsible for lower bonemineral density (BMD).India reveals significant vitamin D deficiency among all sections ofpopulation. BMD is significantly lower in Indians compared to the Caucasians. The mostcommon bones that are affected are hip bone, spine and wrist. Osteoporosis is a globalproblem. Genetic factors also play an important part. Apart from the normal aging processleading to bone loss, osteoporosis can be induced by other causes like endocrine diseases,drugs, etc. Osteoporosis is both preventable and treatable though it is better prevented thantreated. In this line, we are bestowed with natural resources that could potentially preventand/or treat bone disorders.

I am pleased to note that the theme of this conference isimportant considering these points and I am sure the discussions of this seminar could pave apath to find remedy for bone disorders.

M. PALANISWAMY

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ORGANISING COMMITTEE

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Dr. R. Vasanthakumar
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Convenor

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Organizing Secretaries

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Dr. A. Manimaran, Assistant Professor, Department of Biochemistry, KAHE

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PROGRAMME SCHEDULE

Day 1, Feb 5, 2018 Architecture Block	**Seminar Hall**
09.00am to 10.00am	**Registration of Delegates**
10.00am to 11.45 am	**Inaugural Meet**
Inaugural Agenda	
10.00 am	**Prayer**
10.05 am to 10.15 am	**Welcome Address** **Dr. K. Devaki,** *Convener ICBUCCSP'18 & Head, Department of Biochemistry, KAHE*
10.15 am to 10.30 am	***Presidential Address*** **Dr. S. Sudalaimuthu** *Vice Chancellor, KAHE*
10.30 am to 11.00 am	***Inaugural Lecture*** **Speaker: Prof. Woo-Yoon Park,** *Head, Department of Radiation Oncology, Chungbuk National University, Cheongju, South Korea.* **Topic :** Fused Toes Homolog (FTS), a Novel Oncoprotein Involved in the Progression of Cervical Cancer
11.00 am to 11.20 am	**Tea break**
SCIENTIFIC SESSION I	
11.20 am to 12.05 pm	***Invited Lecture 1*** **Speaker: Dr. N. Selvamurugan** *Professor, Department of Biotechnology, School of Biomedical Engineering SRM Institute of Science and Technology* **Topic:** Regulation of Transforming Growth Factor-β1-stimulation of Activating Transcription Factor 3 in Human Breast Cancer Cells
12.05 pm to 01.00 pm	***Oral Presentation Session– I*** **Chair person: Prof. Woo-Yoon Park** **Co-chair person: Prof. N. Selvamurugan**
01.00 pm to 02.00 pm	**Lunch break**
SCIENTIFIC SESSION II	
02.00 pm to 02.40 pm	***Invited Lecture2*** **Speaker : Dr. B. Ravi Sankar** *Head, Department of Endocrinology, University of Madras* **Topic:** Glycogen Synthase Kinase-3β (GSK-3β): A tumor suppressor in hormone-dependent breast cancer cell line (MCF-7)
02.40 pm to 03.20 pm	***Invited Lecture3*** **Speaker: Prof. P.R. Padma,** *Department of Biochemistry, Biotechnology & Bioinformatics, Avinashilingam Institute for Home Science & Higher Education for Women* **Topic:** Strategies to Identify a Herbal Anticancer Agent based on the

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	Biochemistry of Cancer Initiation
03.20 pm to 3.40 pm	**Tea break**
03.40 pm to 04.40 pm	***Oral Presentation Session– II*** **Chair person: Dr. P.R. Padma** **Co-chair person: Dr. B. Ravi Sankar**
05.00 pm to 06.00 pm	**Cultural Programme**
Day 2, Feb 6, 2018 **Architecture Block**	**Seminar Hall**
SCIENTIFIC SESSION III	
10.00 am to 10.40 am	***Invited Lecture 4*** **Speaker: Prof. Rakesh Kumar** *Distinguished Professor, Rajiv Gandhi Centre for Biotechnology, Trivandrum; Visiting Professor, BCM, USA.* **Topic:** Biology and Therapeutic Targeting of PAKs in Human Cancer
10.40 am to 11.20 am	***Invited Lecture 5*** **Speaker: Dr. R. Ilangovan** *Assistant Professor, Department of Endocrinology, University of Madras* **Topic:** From Benign to Malignancy: Decoding the Mechanism of Tumor Progression
11.20 am to 11.40 am	**Tea break**
11.40 am to 12.40 pm	***Oral Presentation Session– III*** **Chairperson: Prof. Rakesh Kumar** **Co-chair person: Dr. R. Ilangovan**
12.40 pm to 01.30 pm	**Lunch break**
01.30 pm to 02.10 pm	***Invited Lecture 6*** **Speaker: Dr. E.M. Shankar** *Head, Department of Life Sciences, School of Basic and Applied Science, Central University of Tamilnadu, Thiruvarur* **Topic**: Hypericin-photodynamic Therapy Leads to Apoptosis of HepG2 cells via Induction of IL-6 and Cytotoxic ROS: Newer Mechanisms of Anti-tumor Immunity in Hepatocellular Carcinoma
02.00 pm to 03.30 pm	**Poster Presentation Session (Parallel Session)** **Judges** 1. **Dr. K. Poornima** 2. **Dr. EM Shankar**
02.00 pm to 02.40 pm	***Invited Lecture 7*** **Speaker: Dr. S. Yuvaraj** ***Ramalingaswamy Fellow, Endocrinology, University of Madras*** **Topic :** Autoregulation of RANK Ligand in Oral Squamous Cell Carcinoma Tumor Cells
02.40 pm to 03.30 pm	***Invited Lecture 8*** **Speaker: Dr. Indranil Chattopadhyay** *Assistant Professor, Department of Life Sciences, School of Basic and Applied Science, Central University of Tamil Nadu, Thiruvarur, Tamil Nadu, India* **Topic**: Gene signatures that drive castration recurrent Prostate Cancer

ISBN: 978-81-944855-6-8

03.30 pm to 03.50 pm	**Tea break**
03.50 pm to 04.30 pm	***Speaker: Prof. Michael Aruldhas*** ***Former Professor and Head, Endocrinology, University of Madras*** ***Topic : Sex Steroids and Thyroid Cancer***
04.30 pm to 05.30 pm	***Oral Presentation Session –IV*** **Chairperson: Prof. M. Michael Aruldhas** **Co-chair person: Dr. Indranil Chattopadhyay**
Day 3, Feb 7, 2018 **Sivam Block, I Floor**	**Bharathi Hall**
SCIENTIFIC SESSION IV	
08.00 am to 1.00pm	**Trip to nearby place**
1.00-1.30 pm	**Lunch**
1.30 pm am to 2.30 am	***Oral Presentation Session V*** **Chairperson: Dr. K. Devaki** **Co-chair person: Dr. M. Sridhar Muthusami**
2.30 – 3.30 pm	**Speaker: Dr. Vaseeharan** Prof & Head , Department of Animal Health and Management, Alagappa University

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ABSTRACTS –

INVITED LECTURES

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LIST OF INVITED LECTURES

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InauguralLecture

Fused Toes Homolog (FTH), a Novel Oncoprotein Involved in the Progression of Cervical Cancer

Woo-Yoon Park[1], Sridhar Muthusami[2], Jae-Ran Yu[3]

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[2]Department of Biochemistry, Karpagam Academy of Higher Education, Eachanari, Coimbatore, 641 021 Tamilnadu, India.
[3]Department of Environmental and Tropical Medicine, Konkuk University College of Medicine, Chungju, South Korea 27478

The high incidence and fatality rate of uterine cervical cancer warrant effective diagnostic and therapeutic target identification for this disease. Fused Toes Homolog (FTS) is a member of a group of proteins termed as E2 variants and this group of proteins lacks an active cysteine residue that is required for ubiquitin transfer. Immnohistochemical analysis of human cervical tissues revealed that the expression of FTS is absent in normal cervical epithelium but progressively overexpressed in human cervical intra-epithelial neoplasia (CIN-I to CIN-III). Targeted stable knock down of FTS using FTS-specific small hairpin RNA in HeLa cells led to the growth inhibition, cell-cycle arrest, and apoptosis with concurrent increase in p21 protein. FTS effectively repressed the p21 mRNA expression in dual luciferase assay which indicates that p21 is transcriptionally regulated by this oncoprotein which in turn affect the regular cell-cycle process and its components. Consistent with this we found a reciprocal association between these proteins in early cervical neoplastic tissues. Epidermal growth factor (EGF) treatment in ME180 cells induced the change of induced epithelial-mesenchymal transition (EMT) markers, increased cell migration, and increased phosphorylated EGFR and ERK and nuclear level of ATF-2. The binding of ATF-2 to the promoter region of FTS was increased after EGF treatment. FTS-silencing reduced EMT and cell migration by EGF treatment. These data show FTS plays an important role in the progression of cervical cancer.

Keywords: FTS (Fused Toes Homolog), Cervical Cancer, p21, EMT.

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IL - 01

Regulation of Transforming Growth Factor-β1-stimulation of Activating Transcription Factor 3 in Human Breast Cancer Cells

N. Selvamurugan

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Transforming growth factor-β1 (TGF-β1) plays a significant role in inducing breast cancer osteolytic bone metastases. In metastatic human breast cancer cells (MDA-MB231), TGF-β1 stimulated a sustained and prolonged expression of activating transcription factor 3 (ATF3); whereas ATF3 expression was transient in normal human mammary epithelial cells (MCF-10A). The functional role and the underlying molecular mechanism of ATF3 action in breast cancer progression and bone metastasis are not yet completely understood. We first determined the functional role of ATF3 in breast cancer and bone metastasis by knocking down ATF3 expression in MDA-MB231 cells. When ATF3 expression was knocked down, there was decreased cell proliferation, invasion, and metastasis in MDA-MB231 cells. To further identify the molecular mechanisms responsible for the sustained and prolonged expression of ATF3 by TGF-β1 in these cells, we carried out the co-immunoprecipitation and chromatin immunoprecipitation experiments for determining ATF3-interacting proteins in MCF10-A and MDA-MB231 cells. Also, the study on posttranslational modifications of ATF3 by TGF-β1 was carried out, and the results showed that TGF-β1 stimulated ATF3 to undergo phosphorylation and sumoylation in MDA-MB231 cells. Based on our findings, we suggested that in response to TGF-β-treatment, ATF3 interacts with different partner proteins and it also undergoes posttranslational modifications which may provide stability to ATF3, resulting in activation of genes that participate in breast cancer progression and bone metastasis. Hence, these studies would possibly lead to either identification of potential targets for drug-based therapies or identification of new biomarkers for breast cancer.

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IL - 02

Glycogen Synthase Kinase-3β (GSK-3β): A Tumor Suppressor in Hormone-dependent Breast Cancer Cell Line (MCF-7)

Ravi Sankar B[1]*, SuganthiM[1],Sangeetha G[1], Sivakumar R[2]

[1]*Department of Endocrinology, Dr. ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Taramani Campus, Chennai - 600 113, India.*

[2]*Department of Obstetrics and Gynecology, David Geffen School of Medicine, University of California at Los Angeles (UCLA), 650 Charles E Young Dr. South, 22-115 CHS, Los Angeles, CA 90095, USA.*

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GSK-3 is a constitutively active multifunctional serine/threonine kinase, which was named for its ability to phosphorylate and thereby inactivate, glycogen synthase kinase, a key regulatory process in the synthesis of glycogen. However, increasing knowledge has changed the image of GSK-3 and it is now recognized as a key component of a large number of cellular processes and diseases. GSK-3 exists in two isoforms (α andβ)coded by distinct genes. Although these two proteins have structural similarity, they are functionally not similar. Dysregulation of GSK-3 activity has been implicated in several human diseases, including diabetes, Alzheimer's disease,and cancer; however, the role of GSK-3 in human cancer remainsenigmatic and controversial. In theory, inhibition of GSK-3 leadsto neoplastic transformation and tumor development based on itsrole in the Wnt signaling pathway, suggesting that GSK-3 functionsas a putative tumor suppressor. On the contrary, some findings proclaimedthat GSK-3β is a tumour promoter in certain tumour types. However, the role of GSK-3β in the pivotal signalingnetwork that allows for cell survival or apoptosis is not welldefined in breast cancer.

This lecture reveals the role and regulation of GSK-3β in hormone-dependent breast cancer cell line (MCF-7). Transfecting MCF-7 cell line with constitutively active or kinase dead GSK-3β showed that active GSK-3β induces apoptosis by activating intrinsic apoptotic pathway, while inactive GSK-3β induces cell proliferation by inhibiting intrinsic apoptotic pathway. We further studied mechanism of action of GSK-3β inhibition by physiological (IGF-1) and pharmacological (LiCl) inhibitors in MCF-7 cells and found that IGF-1 and LiCl differ in maintaining survival of MCF-7 cells.IGF-1 involves the PI3K/Akt pathway to inhibit GSK-3β, while LiCl is totally independent of these pathways in MCF-7 cells. These findings revealed that GSK-3β activation induces apoptosis, while its inactivation prevents apoptosis in MCF-7 cell line, thereby acting as a tumor suppressor.

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IL - 03

Strategies to Identify a Herbal Anticancer Agent Based on the Biochemistry of Cancer Initiation

P.R.Padma

Professor, Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore - 641 043
Email: padmapraghu@gmail.com

Cancer continues to be a killer disease in spite of several advances made in understanding the disease. It is a group of highly complex, distinctly different conditions, which are characterized and grouped together only based on two major properties. That is, (i) all cancers arise from the cells that were once normal in the same body, and (ii) cancers can spread from one site to another (metastasis). The process of the conversion of a normal cell into a cancerous one, is a highly complex, multistep process. At each step, the body puts up a serious fight against the conversion, and the cumulative failure of all such defensive steps leads to the formation of a cancerous cell. This process is called 'initiation'. Phytocomponents are emerging as promising candidates that can reverse the various steps of initiation, as well as the subsequent steps of promotion and progression. Identifying, analyzing and validating the herbal components as possible anticancer agents involve the study of the various biochemical steps involved in initiation. It is, therefore, imperative for the cancer researchers to understand the biochemical events involved in the initiation of cancer, and devise strategies to design anticancer agents from among the promising candidate compounds. Since cancer involves an ultimate genetic attack, and multiple genes are involved in the process, in recent years, the genomic and proteomic studies in cancer cells exposed to herbal components are becoming the vogue.

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IL - 04

Biology and Therapeutic Targeting of PAKs in Human Cancer

Rakesh Kumar

Distinguished Professor and National Chair in Cancer Research,
Rajiv Gandhi Centre for Biotechnology
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Thycaud Post, Poojapuram, Thiruvananthapuram 695014 Kerala, India.

Reorganization of cytoskeleton and formation of motile structures are fundamental to the ability of cancer cells to invade. At the cellular level, these changes are regulated by the p21-activated kinases (PAKs) and its downstream effectors and targets. Biochemically, PAKs are enzymes with kinase and scaffolding activities. In addition, PAKs also function as signaling nodules due to their ability to cross-talk with signaling cascades and phosphorylate downstream effector molecules. The spectrum of PAK's activities in cancer cells ranges from cell growth, invasion, gene expression and chromatin remodeling to DNA damage response and modifying therapeutic responsiveness of cancer cells. PAK family members are widely overexpressed in human cancers and the expression of PAK1 (as well as other family members) closely associates with an invasive phenotype. In addition, PAK's dysregulation also contributes to the development of therapeutic resistance to anti-cancer therapies. The last decade has witnessed a substantial progress in developing approaches to target PAKs by a wide-variety of promising therapeutic agents with alone or in-combination with pathway-centered inhibitors. The lecture will discuss how our broader understanding of the PAK biology in cancer cells has helped to target the PAK family in cancer, the progress made during the last decade, the nature of limitations faced by the field to develop PAK-inhibitors, and the next step to develop effective PAK-directed molecules for cancer.

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IL - 05

From Benign to Malignancy: Decoding the Mechanism of Tumor Progression

R. Ilangovan

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Wingless-type (Wnt)/β-catenin pathway hyperactivation can trigger tumor initiation in humans. We show for the first time that an inhibitor of the Wnt pathway, Wnt inhibitory factor 1 (WIF1), is downregulated in salivary gland carcinoma ex-pleomorphic adenoma (CaExPA). We found that the downregulation of WIF1 occurs in the CaExPA precursor lesion pleomorphic adenoma (PA), suggesting a higher risk of progression from benign to cancer. Diverse mechanisms namely promoter hypermethylation and loss of heterozygosity contribute to the downregulation of WIF1. Re-expression of WIF1 in salivary gland tumor cells reduced cell proliferation, enhanced more differentiated phenotype and induced cellular senescence by upregulating the expression of tumor suppressor genes. Importantly, WIF1 suppressed the anchorage-independent cell growth and the number of salivary gland cancer stem cells. Interestingly, WIF1 decreased the expression of pluripotency and stemness markers, adult stem cell self-renewal and multi-lineage differentiation markers. Furthermore, WIF1 upregulated the expression of microRNAs namely pri-let-7a and pri-miR-200c, the important negative regulators of stemness and cancer progression. Finally, we demonstrated that WIF1 is a positive regulator of miR-200c, which in turn downregulates ZEB1, ZEB2, BMI1, and upregulates E-cadherin expression. Our study uncovers a novel tumor-suppressive mechanism of WIF1 that may have major implications in the field of cancer biology. Taken together, our findings emphasize the prognostic significance of WIF1 in salivary gland cancer and thus could lead to the development of effective molecular therapies for human cancer.

Acknowledgement: This study was supported by the Oklahoma Center for the Advancement of Science and Technology (Dr. Lurdes Queimado). The pCI-blast plasmid was a kind gift from Dr. Eric W Howard, University of Oklahoma Health Sciences Center (OUHSC), USA.

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IL - 06

Hypericin-photodynamic Therapy Leads to Apoptosis of HepG2 cells via Induction of IL-6 and Cytotoxic ROS: Newer Mechanisms of Anti-tumor Immunity in Hepatocellular Carcinoma

E.M. Shankar

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Photodynamic therapy (PDT) is a therapeutic modality that leads to tumor cell apoptosis and/or necrosis via secretion of certain pro-inflammatory cytokines and expression of multiple apoptotic mediators in the tumor microenvironment. PDT also triggers oxidative stress that directs tumor cell killing and activation of inflammatory responses. The cellular and molecular mechanisms underlying the role of PDT in facilitating tumor cell apoptosis remain ambiguous. Here, we investigated the ability of PDT in association with hypericin (HY) to induce tumor cell apoptosis by facilitating the induction of reactive oxygen species (ROS) and secretion of cytokines in HepG2 cells. To discover if any apoptotic mediators were implicated in the enhancement of cell death of HY-PDT-treated tumor cells, selected gene profiling in response to HY-PDT treatment was implemented. Experimental result showed that interleukin (IL)-6 was significantly increased in all HY-PDT-treated cells, especially in 1 μg/ml HY-PDT, resulting in cell death. In addition, quantitative real-time PCR analysis revealed that the expression of apoptotic genes, such as BH3-interacting-domain death agonist (BID), cytochrome complex (CYT-C) and caspases (CASP3, 6, 7, 8 and 9) was remarkably higher in HY-PDT-treated HepG2 cells than the untreated HepG2 cells, entailing that tumor destruction of immune-mediated cell death occurs only in PDT-treated tumor cells. Hence, we showed that HY-PDT treatment induces apoptosis in HepG2 cells by facilitating cytotoxic ROS, and potentially recruits IL-6 and apoptosis mediators, providing additional hints for the existence of alternative mechanisms of anti-tumor immunity in hepatocellular carcinoma, which contribute to long-term suppression of tumor growth following PDT.

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IL - 07

Oral Squamous Cell Carcinoma andBone Destruction

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Oral squamous cell carcinoma (OSCC) is the sixth most common cancer with potent local bone invasion.We identified high-level expression of chemokine CXCL13 in primary human OSCC tumor specimens and cell lines (SCC1, SCC12 and SCC14a);nevertheless,the role of CXCL13 in tumor invasion of bone is not clear. In this study,conditioned media obtained from OSCC cell lines increased the RANKL (a critical cytokine for bone resorbing osteoclast formation) expression in human bone marrow-derived stromal (SAKA-T) and murine preosteoblast (MC3T3-E1) cells. Blockade of CXCL13 specific receptor CXCR5 markedly decreased RANKL expression in these cells. Additionally, CXCL13 increased hRANKL-Luc promoter activity in preosteoblast cells. PCRarray screening identified c-Myc and NFATc3 transcription factors upregulated in CXCL13-stimulated SAKA-T cells. OSCC tumor developed in mouse demonstrated that RANKL and NFATc3 expression in tumor and osteoblast cells.However,p-c-Myc expression specific to osteoblastic cells at the tumor-bone interface. Further, we identified NFATc3 expression, but not c-Myc activation in primary human OSCC tumor specimens compared with adjacent normal tissue. Interestingly, siRNA suppression of c-Myc expression markedly decreased CXCL13-induced RANKL and NFATc3 expression in preosteoblast cells. Chromatin-immunoprecipitation assay confirmed p-c-Myc binding to the hRANKL promoter region. These results suggest thatCXCL13-CXCR5 signaling axis stimulates RANKL expression by c-Mycexpression/activation in stromal/preosteoblast cells and could be a potential therapeutic target to prevent OSCC invasion of bone/osteolysis.

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IL - 08

Gene signatures that drive castration recurrent Prostate Cancer

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Much attention has been focused on the ability of Castration Recurrent Prostate Cancer (CRPC) lesions to continue to proliferate in the absence of serum androgen levels. The continued expression of wt-AR in CRPC and evidence of continued androgen-responsiveness to low, intracrine levels of androgens clearly underlines the concept that CRPC progression depends on an adaptive, obligatory role for AR. In the current study, we analyzed the AR transcriptome and cistrome that correlates with Src-driven androgen-independence in LNCaP cells, and then attempted to show that many of the same Src-regulated genes were also found in CRPC cell lines, such as C4-2, xenografts such as LuCaP35.1, or CRPC tumors. We first showed that the ability of activated Src to induce androgen-independent LNCaP proliferation correlated with increased AR^{poY534} levels. Src also induces the androgen-independent expression of well-characterized AR-regulated genes, such as *TMPRSS2* and *KLK3* (PSA), and in the case of PSA, induces high levels of AR binding to the enhancer ARE in the absence of androgens. Taken together with the inability of DHT to increase activation of these genes or the binding of AR to the PSA enhancer in LNCaP[Src527F] cells, these data strongly suggested that Src induces androgen-independent proliferation through the activation the AR-specific transcriptome/cistrome. Our AR cistrome analyses indicate that the major effect of Src in the absence of DHT is to decrease the total number of ARBS, yet to engage many of those genes normally induced by DHT that facilitate proliferation and survival. Indeed, in the absence of DHT, Src induces AR binding to a larger percentage of gene-associated sites, such as within promoter and enhancer regions.

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IL - 09

Sex Steroids and Thyroid Cancer

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Predominance of all thyroid diseases, including thyroid cancer in women is well known,whereas the underlying mechanism remains obscure. We hypothesized that sex steroids may underlie this sex bias in thyroid cancer incidence. A series of reports from our laboratory haveestablished that testosterone stimulates the proliferation and growth of normal thyroid gland in rats of either sex,whereas estradiol has a specific stimulatory effect in females and an inhibitory effect in males. Our studies performed in rat model also revealed that sex steroids promote thyroid tumorigenesis andtestosterone may specifically promote malignancy. We have also shown the stimulatory effect of testosteroneand estradiol in human thyroid cancer cell lines NPA871and WRO821.In a recent paper we reported apositive correlation between AR ligandbindingactivity and its protein expression level in human thyroid tumour tissues .There was an inconsistencybetween expression levels of AR mRNA and its protein.For the first time we demonstrated the existence of a micro RNA 124a,specific for *AR* gene. We have shown a negative correlation between western blot detection of AR protein level and *miR124a*expression level human papillary/follicular thyroid carcinoma and thyroid adenoma.Based on our *in vitro* experiments using a human PTC cell line (NPA871)transfectedwitheither *miR124a*or anti*miR124a*in the light of our findings from human thyroid tumour tissues, we reported for the first time that *miR124a*is a potent inhibitor of AR expression, and its expression pattern may determinethe mitogenic effect of testosterone on thyroid cancer.A recent finding on AR poly morphism revealed the predominance of short CAG (14CAG) and CGC(12GGC) repeats in thyroid cancer subjects. A novel finding wasthe combination ofshort CAG and CGC repeats in most of the thyroid carcinoma subjects with metastasis. Taken together, our findings from research performed during the last two decades in animal models *in vivo* and *in vitro*, and in human thyroid cancer tissues and celllines clearly point out that *AR*expression may be an important factor underlying the development and progression of thyroid cancer is a candidate gene to be reckoned with the diagnosis and treatment of the disease.

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IL - 10

Control Effects of Nanoparticles towards Cancer Cell Lines

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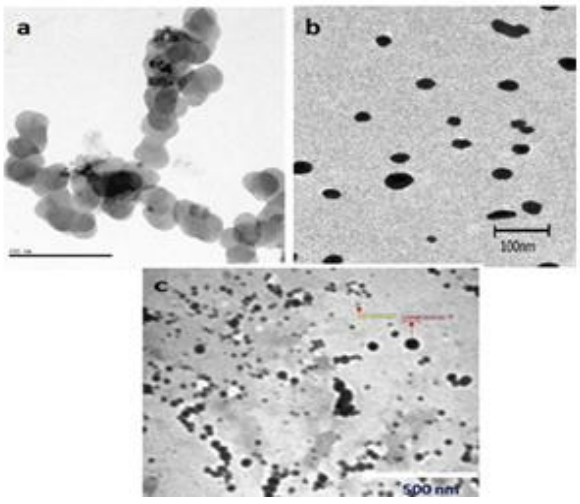
In recent decades, the efficacy of anticancer property of nanoparticles was refining the potential application in nano medicine. Nanoparticles such as zinc oxide nanoparticles (ZnO NPs), gold nanoparticles (Au NPs) and silver nanoparticles (Ag NPs) plays an efficient role in biomedical applications. Amongst, ZnO nanoparticles have been proved to be promising in cancer treatment, including the tumor cells devastatation with minimal damage to the healthy cells. Hence, the aim of the present study was to investigate the effect of ZnO NPs on HepG2 cancer cell line.The synthesized nanoparticles were characterized by UV-Vis spectroscopy which recorded the absorbance spectra at 375 nm. The XRD pattern shows peaks at 2θ values include 32.18°, 34.73°, 36.68°, 47.93°, 56.92°, 63.22°, 66.67°, 68.17°, 69.37°, 72.82° and 77.16° were corresponds to the crystal planes of (100), (002), (101), (102), (110), (103), (200), (112), (201), (004) and (202) of ZnO NPs respectively. FTIR spectrum was recorded in the range of 400–4000 cm^{-1} revealing the possible functional groups involved in biosynthesis of ZnO NPs. Moreover, the transmission electron microscopy (TEM) images showed the hexagonal shaped particles with size of approximately 20 nm. The cytotoxicity of nanoparticles was carried out on Hepatocarcinoma (HepG2) cancer cell line and revealed that, cell viability was inhibited at 100 µg/ml ZnO NPs. Our observation revealed that, ZnO NPs cause effective morphological changes, DNA damage, increase reactive oxygen species (ROS) and thereby reduce the viability of HepG2 cells.

Transmission electron microscopic (TEM) images of ZnO NPs, Au NPs and Ag NPs.



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Furthermore, the synthesized ZnO NPs was screened for their antibacterial and antibiofilm activity against Gram negative *Pseudomonas aeruginosa* and Gram positive*Enterococcus faecalis* at 100 µg/ml. In conclusion, the ZnO NPs was synthesized and physico-chemically characterized and showed effective antibacterial, antibiofilm and anticancer property.

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ABSTRACTS-

ORAL PRESENTATION

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LIST OF ORAL PRESENTATIONS

ISBN: 978-81-944855-6-8

	Cancer-mediated Bone Metastasis	Selvamurugan SRM Institute of Science and Technology, Chennai	
OP-10	Anticancer Potential of Zanthoxylum tetraspermum W.A. Stem Bark Extract on MNU Induced Mammary Carcinoma Mice	Narayanasamy K, B. Ragavan Sree Narayana Guru College, Coimbatore	32
OP-11	Anticancer Activity of Small Peptides Isolated from the Flowers of Tridaxprocumbens	Nirmala Devi N Sree Narayana Guru College, Coimbatore	33
OP-12	Prooxidants Isolated from *Symplocoscochinchinensis* (Lour) S Moore show an Alteration in Apoptotic Gene Regulations in HeLa Cell Line	Raman Rajeshkumar, S.P. Dhanapal JSS College of Pharmacy, Udhagamandalam	34
OP-13	Green Synthesis and Characterization of Silver Nanoparticles from *Alpinia purpurata*	Rathi M.A. Sree Narayana Guru College, Coimbatore	
OP-14	Evaluation of Anticancer Potential of PEG Coated β-galactosidase from *Aspergillus terreus* in Wistar Albino Rats	Vidya B, V.K. Gopalakrishnan Karpagam Academy of Higher Education, Coimbatore	
OP-15	Analysing the Publically Available Genomic Resources to Define the Role of CCNB2 in Urinary Bladder Cancer	Sathya M[1], K. Deveki[2] CMS College of Science and Commerce, Coimbatore	

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OP - 01

GC-MS Analysis and Biological Activities of Essential Oil from *Citrus sinensis* Peel

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The present study was aimed to evaluate the *in vitro* thrombolytic, anti-haemolytic and anti-inflammatory activities from essential oil of *C. sinensis* peel. *C. sinensis* collected and was subjected to hydrodistillstion by using Clevenger apparatus. The identification of compounds present in the oil of *C. sinensis* was carried out by gas chromatography and mass spectrometry (GC-MS). In vitro thrombolytic, hemolytic and anti-inflammatory activities were studied by standard protocols. From the GC-MS report it has been estimated that 10 major compounds present in the essential oil. The essential oil of *C. sinensis* shows potent thrombolytic activity and the percentage of inhibition were found to be 90±1.65% at 100 µL. In hemolytic activity, the percentage of inhibition of *C. sinensis* is about 68%. *In vitro* anti-inflammatory activity was evaluated using albumin denaturation assay. The results showed that essential oil of *C. sinensis* peel at a concentration range of 100 µl significantly protects the heat induced protein denaturation at 69%. The results obtained in the present study indicate that essential oil of *C. sinensis* peel can be a potential source of thrombolytic, anti-haemolytic andanti-inflammatory agents.

Keywords: *Citrus sinensis*; GC-MS; Thrombolytic activity; Hemolytic activity; Anti-inflammatory.

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OP – 02

Antioxidant and Anticancer Properties of *Artabotrys hexapetalus*

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Artabotrys hexapetalus is the angiosperm belongs to the family of annonaceae, a perennial plant native to Asia including India. And mainly used for the treatment of cholera and scrofula. To reveal the major secondary metabolites in different solvent extract, antioxidant potentials by using in vitro antioxidant models in different solvent extract, To isolate the active phytoconstituents from selected extract and cytotoxicity against breast cancer cell line (MCF-7) for isolated fractions from highly active extract of *A.hexapetalus* leaves. All successive extracts methanol, ethanol, ethyl acetate, chloroform, petroleum ether were obtained by soxlet method and subjected to phytochemical screening. Total phenolic and flavanoid contents were estimated. And DPPH radical scavenging assay, Ferrous reducing power, Hydrogen peroxide radical scavenging activity and Fe2+ chelating activity were used to determine in vitro anti oxidant activity of plant extract. Antibacterial activity determined by well diffusion method. Isolation and characterization and anticancer activity were done by various methods.Here we concluded that the methanol extract of *A.hexapetalus* leaves and their fractions highly potent against various free radicals and MCF-7 cell line. This is the primary lead to produce novel biological agent from *A.hexapetalus* leaves.

Keywords: *Artabotrys hexapetalus*, antioxidant activity, Anticancer, Phytochemical, Free radicals.

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OP – 03

Molecular Docking Studies of Some Novel Quinolinehydrazide Derivatives of Substituted Benzaldehydes Against BCR-ABL T315I Protein

Gayam Venkatareddy[1], Subban Ravi[1*], Jayagopal Dharani[1], G. M. V. N. A. R. Ravikumar[1], Arumugam Thangamani[1], Bhagat Raj Pipal[2], Sanjay Hirpara[3]

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A novel series of quinolinehydrazide bridged derivatives were designed and tested for anticancer activity. Molecular docking studies were carried out for all the compounds 1-6 against BCR-ABL T315I protein. Compound 5 and 6 showed very good interactions with the proteinlike other tyrosine kinase inhibitors by exhibiting docking scores of 8.4 and 8.9 K cal/mole. The above series of molecules may act as logical templates which can be used for further synthesis and evaluation by in - vitro and in - vivo methods.

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OP – 04

Analysis of the Modulation of the Cancer Genome by the Phytoflavonoids,Quercetin and Kaempferol, Provides Newer Insights into their Biochemical Mechanism of Action

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The high intake of flavonoids hasbeen associated with lower risk of several types of cancer. Significant anti-tumour effects of the plant flavonoids,quercetin and kaempferol, have been assessed widely both *in vivo* and *in vitro*, but the underlying mechanism of action of these compoundsis generally unknown.The present study wasundertaken to compare the genomic profile of the cancer-related genes that were up and down regulated byquercetin and kaempferolin oral carcinoma (KB) cells. The expression levels of 84 cancer related genes were studied in oral carcinoma (KB) cells after exposure to the flavonoids, which was quantitatively analyzed using qRTPCR, using a cancer pathway finder array.The gene expression pattern was used as an input to study the effects at the protein level. Protein interaction maps were constructed using STRING (ver.10.5) and the analysis revealed very strong interactions between proteins of different cancer-related pathways. The results showed that the flavonoids were able to impact the genes in all the six cancer associated pathways studied.The interaction maps unravelled the interactions between the protein products of multiple genes, which may play a role in the action of flavonoids, against oral carcinoma cells, and throw light on their mechanism of action.

Keywords: Cancer genome, cancer proteome, interaction map, phytoflavonoids, quercetin, kaempferol.

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OP – 05

Laser Scattering studies of Human Cancerous Tissues

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Cancer is one of the deadliest diseases in this time. Its early detection and subsequent prevention from proliferation in human body have been a challenging task for researchers in the field of medicine and science. Optical techniques have emerged as power full techniques for early detection of cancer. Two central benefits from tissue optics are the ability to gain molecular level information and submicroscopic structural information about tissue function. The aim of this study is to utilize the potential of Raman Spectroscopy to differentiate between Normal and Cancerous breast tissue. We use Micro Raman spectroscopy to find out the difference between normal human breast tissue and malignant human breast tissue based on chemical composition. In this study, 20 Raman spectra were acquired from *ex vivo* samples of human breast tissue (normal and ductal carcinoma) from 10 patients. Data analysis was performed using Principle component Analysis (PCA).

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OP – 06

Anti cancer Effect of Isolated Compounds from *Alpinia purpurata* (Vieill.) K. Schum against CXCR4 and PTEN on *Insilico* Approach

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Prostate cancer (PCa) is the second most common cause of cancer and the sixth leading cause of cancer death among men worldwide. The cancer projection data shows that the number of cases will become double by 2020. According to a study by International Agency for Research on Cancer, the worldwide PCa burden is expected to grow to 1.7 million new cases and 5,00,000 new deaths by 2030 simply due to the growth and aging of the global population. Bioactive compounds from medicinal plants with anticancer and anti-inflammatory effects have become key resources in drug discovery fields for the treatment of various malignancies and immunological disorders. *Alpinia purpurata* is the medicinal plant which belongs to the family of Zingiberaceae. Its constituents promote potential antioxidant and anticancer activity against cancer cell lines.Totally, three bioactive compounds were isolated from *Alpinia purpurata* using column and thin layer chromatography and spectrometric techniques such as UV-VIS, FTIR and NMR and the molecular weight resolute using mass spectroscopic technique. From the three compounds, Compound 1 had the best interaction with a good G-score when compared with standard drug Finasteride against CXCR4 and PTEN. Inhibition of PI3K is important in treatment of Human prostate cancer and thus the study, proposes that the compounds could be good candidates for development of a drug for prostate cancer.

Keywords: Prostate cancer,*Alpinia purpurata*, bioactive compound, Finasteride, PTEN.

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OP –07

Cytotoxicity &Transcriptome Study to Understand the Effect of Drug Molecules against Cancer Cell Lines to Detect Novel Therapeutic Target in Cancer Treatment

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Cancer genomics is most reliable to detect disease condition, gene expression, mutation discovery, DNA mapping, genetic screening, and population studies. It relies on the performance of the candidate gene association with cytotoxicity of chemotherapeutics in cell line models through Transcriptome sequencing, discovery of novel gene targets and their expressions.

Transcriptome analysis experiments can characterize transcriptional activity (coding and non-coding), focus on a subset of relevant target genes and transcripts or profile thousands of genes at once to create a global picture of cell function. Gene expression analysis studies can provide a snapshot of actively expressed genes and transcripts under various conditions.

Here a combined study of cytotoxicity response to 48 drug compounds and Transcriptome analysis from herbal *Calotropis Gigantea* leaf extracts in cancer cell lines was done. An Insilco Drug docking study to predict anti- apoptotic properties was conducted. We applied next generation Transcriptome sequencing technology to determine differentially expressed genes in cell lines as sensitive or resistant, and then, the subset of resistant vs. sensitive cell lines for each drug was compared. Gene expression signatures for all cell lines were obtained by bioinformatics analysis, we called for a total of 57,736 genes present in Homo sapiens GTF file. Out of which 20,314 are protein coding. Further differential gene expression analysis was carried out for commonly expressed genes reported between control and experimental samples respectively, shows 2,480 up-regulated and 1910, down-regulated genes from both HeLa and A549 test samples, and MCF7 has 3,048 up-regulated and 1842 down-

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regulated genes were identified. The results from this study are promising to demonstrate functional annotation and enrichment methods to screen the genes related to apoptotic pathways and predict as novel therapeutic target against the cancer treatment.

Keywords: Cytotoxicity, Transcriptome analysis, Cancer, Cell lines, Bioinformatics.

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OP – 08

A Small Molecule Inhibitor of the Wnt Pathway, iCRT14, Inhibits Breast Cancer Cell Growth and Stemness

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Breast cancer is the most common lethal disease in women both in developed and developing countries. It accounts for more than 5,08,000 deaths each year worldwide. Though significant advancements have been made in the breast cancer treatment, disease relapse and metastasis adversely affect the patient survival. Wnt/β-catenin signaling play a key role in cancer cell proliferation and metastasis, and aberrant activation of Wnt/β-catenin signaling has been reported in breast cancer. Therefore, in the present study, we have determined the effects of inhibitor of catenin responsive transcription 14 (iCRT14), a small molecule inhibitor of the Wnt pathway on breast cancer cells. We exposed the breast cancer cells (T47D) to different doses of iCRT14 (50, 100 and 200 µM) and determined the cell proliferation by MTT assay. Further, the cells were treated with either vehicle (0.01% DMSO) or iCRT14 (50 µM) and assessed for spheroid formation and cellular senescence by soft agar assay and senescence-associated β-galactosidase staining, respectively. We also studied the mRNA and protein expression of key regulators of stem cell self-renewal and pluripotency (Oct-3/4, Nanog and Sox2) by real-time RT-PCR and western blot analyses, respectively. Our results demonstrate that iCRT14 significantly decreased the proliferation of breast cancer cells. Interestingly, iCRT14 reduced the

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number and size of the spheroids. Importantly, iCRT14 enhanced senescence in the cancer cells. iCRT14 downregulated the gene expression of Sox2. While iCRT14 decreased the mRNA expression of Nanog, it reduced the Oct-3/4 protein expression. Moreover, it increased the mRNA expression of p53 in breast cancer cells. Our findings suggest that iCRT14 suppresses the breast cancer cell growth and cancer stemness highlighting the possible use of iCRT14 as an anticancer drug for the treatment of breast cancer.

Keywords: Breast cancer, Wnt/β-catenin, iCRT, proliferation, cancer stemness.

Acknowledgement: The financial assistance provided by DST-PURSE Phase II and UGC-SAP-DSA-I are gratefully acknowledged. This work was also supported by SERB (Dr.R.I.).

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OP – 09

A Functional Role of ATF-3 in Breast cancer-mediated Bone Metastasis

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Transforming growth factor-beta1 (TGF-β1) is the most potent known growth inhibitor for normal epithelial cells. However, in breastcancer cells, TGF-β1 is a crucial molecule for stimulation of invasion and formationof bone metastases. The molecular mechanisms of how TGF-β1 mediates these effects are yet to be completely determined. We found that the transcription factor, activating transcription factor-3 (ATF-3) was stimulated by TGF-β1 in both normal breast epithelial cells and breast cancer cells, but its expression was sustained and prolonged by TGF-β1 in highly invasive and metastatic human breast cancer cells (MDA-MB231 in contrast to its transient expression in normal mammary epithelial cells (MCF-10A). When MCF-10A cells were pretreated with lactacystin (proteasomal inhibitor), the expression of ATF-3 by TGF-β1 was found to be sustained and prolonged in contrast to its transient expression. Based on this, we hypothesized that the prolonged expression of ATF-3 in MDA-MB231(breast adenocarcinoma) cells was due to its protection from proteasomal degradation. Knockdown of ATF-3 expression in MDA-MB231 cells decreased cell proliferation, cell migration, mRNA expression of cell cycle genes and the expression levels of invasive and metastatic genes such as MMP-13, Runx2. Hence, this study suggested that ATF-3 could be used as a potential biomarker for breast cancer progression, and it could also be used for drug-based therapy to control breast cancer bone metastasis.

Keywords: ATF-3, TGF-β1, MMP13, Runx2.

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OP – 10

Anticancer Potential of *Zanthoxylum tetraspermum* W.A. stem Bark Extract on MNU Induced Mammary Carcinoma Mice

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Cancer is a complex disease involving multiple events including mutation, proliferation and aberrant cell growth. Medicinal plant preparations are frequently considered to be less toxic and free from side effects than synthetic drugs. Hence, numerous medicinal plant formulations are used for various disorders including cancer. Mammary Carcinoma is the most prevalent cancer in women worldwide and has overtaken cervical cancer to become the leading type of cancer in India. *Zanthoxylum tetraspermum* (Wight & Arn.) described in Ayurveda belongs to the family of *'Rutaceae'* is found in the Western Ghats. It is a potent unidentified medicinal plant vernacularly called as "Tooth ache tree" that is used as mouth fresh, tooth care and spice. This genus possesses several types of biological activities. Preliminary phytochemical analysis of the plant showed the presence of phytochemical constituents.The objective of this study was to evaluate the anticancer activity of *Z.tetraspermum* stem bark extract against N-methyl-N-nitrosourea (MNU) induced mammary carcinoma in mice by assessing the level of serum Oestrogen hormone (17β-estradiol) as the breast cancer marker. The serum Oestrogen activity was significantly decreased in breast carcinoma mice when compared with normal control mice. Oral administration of stem bark extract (300 and 600mg/kg body weight) for 30 days reverted the level of Oestrogen hormone to near normal in treated mice. It might be due to the synergistic action of phytochemicalspresent in the stem bark. Comparison of normal mice, mice administered only with plant stem bark extract and mice administered with 5-Fluoro Uracil (5-FU) as positive drug control showed no significant variations in the hormone level. The Cell viability (MTT) Assay on human breast cancer cell lines (MCF-7) have shown a concentration dependent growth inhibition of cancer cells after treating with *Z.tetraspermum* stem bark extract. The results of the study indicate the growth inhibitory and antiproliferative potential of 50% hydroethanolic stem bark extract of *Z. tetraspermum* against mammary carcinoma in mice.

Keywords:*Z. tetraspermum*, Mammary carcinoma, Oestrogen, Cytotoxicity, Breast cancer cell lines.

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OP – 11

Anticancer Activity of Small Peptides Isolated from the Flowers of Tridaxprocumbens

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Herbal drugs constitute a major part in traditional systems of medicine. In India many plant species are known to have medicinal properties that cure specific ailments. The uses of some plants have been worked out, but many of them remain unexplored to date. Therefore, there is a necessity to explore their uses and to conduct pharmacognostic and pharmacological studies to discover their medicinal properties. The aim of the present study was to study the anticancer activity of small alpha peptides isolated from the flowers of Tridaxprocumbens. Small peptides have a number of advantages over other chemical agents including their low molecular weight, fewer adverse actions, easy absorption, and a variety of routes of administration. A wide variety of small peptides with a remarkable range of biological activities is being uncovered by research from various fields. As this array of biological activities is unravelled, it is predicted that smaller peptides would have potential application as vaccines, drugs, enzyme inhibitors and nutrients in the pharmaceutical, agricultural and food industries. The results of the present study demonstrated the potent cytotoxic activity of 80% ethanolic extract of Tridaxprocumbensagainsthuman breast cancer cell line (MCF 7). Further research also need for proving with other cancer models and isolating the active principle.Proper exploration would help in future development of peptide drugs with higher therapeutic properties to eradicate diseases. The emerging peptide technologies will help in expanding the applicability of peptides as therapeutics.

Keywords: Tridaxprocumbens, Flowers, peptides, human breast cancer cell line.

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OP – 12

Prooxidants Isolated from *Symplocoscochinchinensis* (Lour) S Moore Show an Alteration in Apoptotic Gene Regulations in HeLa Cell Line

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Prooxidant refers to any endobiotic substance that induces oxidative stress by generation of reactive oxygen species. There is evidence that these substances are involved in an alteration in the gene expression that responsible for basic cellular functions. In our study, we demonstrated the above hypothesis by isolating the prooxidant from plant source and screened against HeLa. Three plants were selected for the study such as, fruits of *Elaeagnuslatifolia* Linn, bark of *Rhododendron nilagiricum*, andbark of *Symplocoscochinchinensis* (Lour) S Moore. Extraction was done using nonpolar to polar solvents such as n-hexane, chloroform, ethyl acetate and 50% methanol. Bio assay guided fractionation was carried out for the selection of extracts based on their prominence in various *in vitro* assays. First, preliminary assay (antioxidant, cytotoxicity, and prooxidant activity) was done with all the extracts. Based on the results, two extracts (SC3 and SC4) were selected for isolation of active components. FTIR, ^{13}CNMR, ^{1}HNMR and LC-MS analysis of all 5 compounds led to the identification of three known compounds such as Ellagic acid, Odoroside, Dammaranediol and two new compounds RD1, RD2. Then cytotoxicity was carried out for RD1 and RD2. Based on the potent cytotoxicity RD2 was selected for in vitro studies on the induction of apoptosis and DNA fragmentation, changes in mitochondrial membrane potential, and profiles of gene and protein expression in response to treatment of HeLa cells. RD2 exhibited potential apoptotic effects on HeLa cells, and induced apoptosis by up regulation of caspase 3, downregulation of bcl-2 genes. The results suggest the possible use of RD2 as anticancer drugs especially against cervical cancer.

Keywords: Cancer biology, Apoptosis, Phytoconstituents, Gene Expression study.

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OP – 13

Green Synthesis and Characterization of Silver Nanoparticles from *Alpinia purpurata*

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Nanotechnology is a broad interdisciplinary area of research, development and industrial activity which has grown very rapidly all over the World for the past decade. The development of an eco-friendly process for the synthesis of nanoparticles is an important and emerging area in the field of nanotechnology. In the present study, silver nanoparticles (AgNPs) were synthesized by using aqueous leaf extract of the medicinal plant *Alpinia purpurata* (Vieill). The synthesized AgNPs were initially noticed through visual color change from yellow to reddish brown. This is confirmed by UV–visible spectroscopy. The spectra of the reaction medium containing silver nanoparticles showed maximum absorbance at 437 nm. Morphology and size of AgNPs were determined by transmission electron microscopy (TEM). The prolonged stability of AgNPs was due to capping of oxidized polyphenols and carboxyl protein which was established by fourier transform infrared spectroscopy (FTIR) study. The silver nanoparticles have shown anticancer activity against PA 1 ovarian cancer cell lines. The synthesized AgNPs show good cytotoxic activity. The outcome of this study indicates that these nanoparticles could be effectively utilized in pharmaceutical, biotechnological, and biomedical applications.

Keywords*: Alpinia purpurata,* MTT, TEM, SEM, Silver nanoparticles, Cytotoxic activity.

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OP – 14

Evaluation of Anticancer Potential of PEG Coated β-galactosidase from*Aspergillus terreus* in Wistar Albino Rats

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Aim: Breast cancer is the most frequently diagnosed cancer among females worldwide. The global burden of breast cancer exceeds all other cancers and the incidence rates of breast cancer are increasing. β-galactosidase is one of the most important commercial enzymes having numerous applications in food and pharmaceutical industry.

Objective: The present study was evaluating anticancer potential of β-galactosidase from *Aspergillusterreus*in Wistar albino rats.

Methodology: The animals were divided into six groups with six rats each. Group 1 served as control, group 2 served as single oral administration of 7, 12-dimethylbenz(α)anthracene by gastric incubation and kept without any treatment for 120 days, group 3 and group 4 contains rats treated with PEG coated ß-galactosidase and standard drug tamoxifen orally for the experimental period of 30 days in 7, 12 dimethylbenz (α) anthracene induced rats and group 5 and group 6 represents PEG coated ß-galactosidase and PEG alone treated rats for 30 days.

Results: The oral administrations of PEG coated ß-galactosidase to mammary cancer bearing rats for 30 days demonstrated increased in protein content, enzymatic and non-enzymatic levels. Those levels were brought back to near normal upon treatment with PEG coated ß-galactosidase and tamoxifen. No significant changes were observed on treatment with enzyme and PEG alone group.

Conclusion: Therefore, it can be concluded that the PEG coated β-galactosidase possessed remarkably effective anticancer potential against DMBA induced mammary cancer in Wistar albino rats.

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OP – 15

Analysing the Publically Available Genomic Resources to Define the Role of CCNB2 in Urinary Bladder Cancer

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Bladder cancer is a disease receiving growing attention within the cancer biology community. It is the second most common genitourinary malignancy and fifth most common malignancy, responsible for significant mortality and morbidity worldwide. Bladder cancer is a genetic disorder driven by progressive accumulation of multiple genetic and epigenetic changes. These genetic changes result in decreasing of the cell death, uncontrolled cell proliferation, invasion and metastasis. Bladder cancer is hard to diagnose because the symptoms are unspecific: such as irritative voiding and painless heamaturia. Early diagnosis of the bladder cancer is one of the most determining factors for patient survival, the frequency of recurrence and tumor progression depends to a great extent on tumour grade and stage at the time of diagnosis. Currently conventional clinical and pathological parameters are widely used to grade and stage tumors and to predict clinical outcome of transitional cell carcinoma, but the predictive ability of these parameters are limited and there is a lack of indices that could allow prospective assessment of risk for individual patients. The development of highly reliable non-invasive tools for bladder cancer diagnosis would facilitate early detection and help to define the role of molecular markers in prognostic evaluation at the time of initial diagnosis.

Parallel gene expression monitoring is a powerful tool analysis is powerful tool to reveal the interactions in the heterogeneity of cancers. Microarray analysis has been applied to examine the differentially expressed genes in bladder cancer. In this context we downloaded the four publically available microarray datasets from GEO and subjected to meta- analysis to find out the levels of expression on CCNB2 gene. The results of meta analysis been validated with qRT-PCR.

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The CCNB2 gene is a member of the B-type cyclin family, including cyclin B1 and B2, specifically the B-type cyclins. Cyclin B2 also binds to transforming growth factor beta RII and thus cyclin B2/cdc2 may play a key role in transforming growth factor beta-mediated cell cycle control. It is involved in the G2- M transition in eukaryotes by activating CDC2 kinase and its inhibition induces cell cycle arrest. Further analysis provides us as CCNB2 is an independent prognostic marker in urinary bladder cancer.

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ABSTRACTS–

POSTER PRESENTATION

ISBN: 978-81-944855-6-8

LIST OF POSTER PRESENTATIONS

S. No.	Title	Author/Affiliation	Page No.
PP-01	Biphasic Effects of Testosterone on the Protein Expression of Sex Steroid Receptors and RANKL/OPG in Osteosarcoma Cells	Sriharikrishna S, C. Manju Mohan, C. Gautham, S. Yuvaraj, R. Sivakumar, L. Queimado, M.M. Aruldhas, N. Srinivasan, R.I. Kumaran,B. Ravi Sankar, R. Ilangovan University of Madras, Chennai	37
PP-02	Free Radical Scavenging Activity of *Barleria noctiflora*- Leaves, Root and Barlerinoside Suggest Possible Anticancer Activity	Sangilimuthu Alagar yadav, Vasanth Raj Perumal, Ajeeth Kumar Ganesan, Jebastin Anthoniswamy Karpagam Academy of Higher Education, Coimbatore	39
PP-03	Synthesis, Antibacterialand Anticancer Activity of Novel 3-a-carboxy ethyl-5-benzylidene Rhodanine Derivatives	Sundaram K. Karpagam Academy of Higher Education, Coimbatore	41
PP-04	Cellular Responses of Biological Silver Nanoparticles against Skin Cancer	Sunita P, M. Palaniswamy, P. Rajiv Karpagam Academy of Higher Education, Coimbatore	42
PP-05	Carvacrol Induces Apoptosis via Caspase Activation in HL-60 Human Leukemia Cells	Hansa R, E. Bhakkiyalakshmi, N. Suganya, D. Sireesh, R. Venugopal, K.M. Ramkumar SRM Institute of Science and Technology, Chennai	43
PP-06	Green Synthesis of Iron Oxide Nanoparticle in *Plectranthusamboinicus* Plant and Cytotoxic Potential of *Plectranthus amboinicus* Leaf Extract in MCF-7 Cell Lines	Jessy D, M. Kalaiselvi Kongunadu Arts and Science College, Coimbatore	45
PP-07	*Sargassum wightii*-mediated Green Synthesis of Silver Nanoparticles with Excellent Biocompatibility and Enhanced Radiation Effects on Cancer Cells	Muthukumar Krishnan, Chandrasekaran Rajkuberan, Hans-Uwe Dahms, Arthur James Rathinam, Ashok Mahalingam National Institute of Technology (NIT), Tiruchirappalli	
PP-08	Comparative Proteomic Analysis of Anti-Cancer Mechanism by pterostilbene Treatment in HepG2 cells	Kaushikk R, N. Suganya, E. Bhakkiyalakshmi, D. Sireesh, R. Venugopal, K.M. Ramkumar SRM Institute of Science and Technology, Chennai	48
PP-09	*Ormocarpum cochinchinese* Leaf Extract Reduces Human Ovarian Cancer Cell	Manju Mohan, B. K. Vidya, C. Gautham, K. Senthilkumar, S.	49

ISBN: 978-81-944855-6-8

	Proliferation and Induces Apoptosis by Regulating Wnt/β-catenin Signaling	Balaji, R. Sivakumar,L. Queimado, M.M. Aruldhas, N. Srinivasan, R.I. Kumaran, B. Ravi Sankar, R. Ilangovan University of Madras, Chennai	
PP-10	A Computational Investigation on Understanding Structural Interface of hBcl-B – hBaxBH3 Heterodimer Playing Essential Roles in Apoptosis	Silambarasan S, R. Manikandan and T. Sivaraman Karpagam Academy of Higher Education, Coimbatore	
PP-11	Green Synthesis of ZnO Nanoparticles and Evaluation of Antioxidant and Antidiabetic Activities using *C. amada*Extracts	Subha G, M. Kalaiselvi Kongunadu Arts and Science College, Coimbatore	
PP-12	GC-MS Analysis and *in vitro* Assessments of Essential Oil from *Citrus limetta*Peel	Vinodhini M, M. Kalaiselvi, V. Bhuvaneshwari, R. Amsaveni Kongunadu Arts and Science College, Coimbatore	
PP-13	A Review on Nanobiotechnologyfor Cancer Imaging and Treatment	PoornaChandran G, T. Priyadharshini T, D. Selvakumar	
PP-14	Fabrication of Anticancer Nanoparticles (Iron Oxide) from Aqueous Latex Extract of *Euphorbia antiquorum* L	Rajkuberan C	
PP-15	Biochemical Markers To Assess Chemopreventive Effect Of Emodin In Dmba Induced Oral Carcinogenesis	Hemalatha S, Yogeswari S, Manimaran A and Manoharan S Karpagam Academy of Higher Education, Coimbatore	
PP-16	Histological Markers To Assess Chemopreventive Effect Of Emodin In Dmba Induced Oral Carcinogenesis	Sneha K, , Amsa Samreen, Manimaran A and Manoharan S Karpagam Academy of Higher Education, Coimbatore	

ISBN: 978-81-944855-6-8

PP - 01

Biphasic Effects of Testosterone on the Protein Expression of Sex Steroid Receptors and RANKL/OPG in Osteosarcoma Cells

Sriharikrishna S[1], Manju Mohan[1], C. Gautham[1], S. Yuvaraj[1], R. Sivakumar[2], L. Queimado[3], M.M. Aruldhas[1], N. Srinivasan[4], R.I. Kumaran[5,6],B. Ravi Sankar[1], R. Ilangovan[1]

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Background: Osteosarcoma is the most common high-grade primary bone malignancy in children and young adults, and it has a strong tendency to metastasize early. Although the overall incidence is low, the prognosis of osteosarcoma is very poor. Despite advances in surgery and multiagent chemotherapy, the 5-year survival rate is only 20–30% for patients with metastasis. Available literature suggests that sex steroids and RANKL/RANK/OPG triad play key roles in osteosarcoma. However, the molecular mechanisms by which testosterone regulate the sex steroids and RANKL/OPG in osteosarcoma cells are not understood. Objectives: 1) To determine the effect of testosterone on osteosarcoma cell proliferation. 2) To study the effect of testosterone on protein expression of sex steroid receptors and RANKL/OPG in osteosarcoma cells. Methods: MG-63 osteosarcoma cell line was treated with different doses of testosterone (0.01 nM - 10 μM) and the cell proliferation was determined by MTT assay. For protein expression studies, MG-63 cells were exposed to 1, 10 and 100 nM of testosterone for 48 h.Results: Testosterone did not cause any significant change in the proliferation of osteosarcoma cells. Interestingly, low dose of testosterone (1 nM) increased the protein expression of AR, ER-

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β, RANKL and OPG when compared with control. However, high dose of testosterone (100 nM) decreased the expression of these proteins in osteosarcoma cells. Conclusion: Our findings demonstrate that testosterone has biphasic effects on the expression of AR, ER-β and RANKL/OPG proteins, which may play a critical role in regulation of osteosarcoma cells.

Keywords*:* Osteosarcoma, proliferation, sex steroid receptors, RANKL, OPG.

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PP – 02

Free Radical Scavenging Activity of *Barleria noctiflora*- Leaves, Root and Barlerinoside Suggest Possible Anticancer Activity

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The free radicals are major causative agent for oxidative stress, which leads to cause cancer. The antioxidant activity of defatted methanol extract of *Barleria noctiflora* L.f. leaf and root using *in vitro* models such as $DPPH^{\bullet}$ radical scavenging activity, ferrous reducing power, nitric oxide radical scavenging activity, $ABTS^{\cdot+}$ radical cation decolourisation assay and hydrogen peroxide radical scavenging activities were studied. Results showed that, the extracts possess good antioxidant capacity in DPPH radical scavenging assay, when compared to other *in vitro* models and the IC_{50} value were found to be 150±5.45 µg/mL in leaf extract, 140±4.65 µg/mL in root extract and in the isolated barlerinoside from the leaves were found to be 50.45±2.52 µg/mL. The total phenolic content using Folin's-Ciocalteu reagent indicated that 1 mg of leaf and root extracts contained 368±7.75 µg and 481±9.25 µg with gallic acid equivalent respectively and also the total flavonoid content found to be 240±4.25 µg and 410±6.55 µg respectively with quercetin equivalence. The results also showed that the antioxidant potential of the extracts was high in root extract, when compared to the leaf extract and also the isolated barlerinoside possessed significant free radical scavenging activity. This is the lead to generate anticancer agent from natural source with less adverse effect.

Keywords: *Barleria noctiflora*, free radical scavenging.

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PP – 03

Synthesis, Antibacterial and Anticancer Activity of Novel 3-a-carboxy ethyl-5-benzylidene Rhodanine Derivatives

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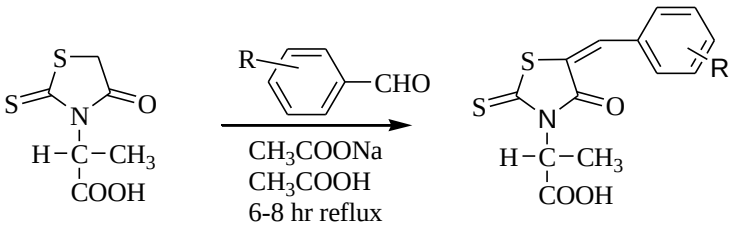
A series of novel 3-a-carboxy ethyl-5-benzylidene rhodanines, **3a–h**, has been accomplished by Knoevenagel condensation with 3-a-carboxy ethyl rhodanine and various substituted aromatic aldehydes. All the synthesized compounds **3a–h** was confirmed by spectroscopic techniques. The cytotoxic studies of compounds **3a–h** were performed against human cervical cancer cell line (HeLa) by MTT assay. Further, the compounds **3a–h**was also screened for their antibacterial activity against methicillin-resistant *Staphylococcus aureus* (MRSA). SAR study was carried out for the in vitro cytotoxic studies against HeLa cell lines and antibacterial activity against MRSA. The results suggested that this series of compounds could serve as the basis for the development of novel anticancer and antimicrobial agents.



3a-h

Keywords: 3-α-Carboxyethylrhodanine, MTT assays, MRSA, Antibacterial activity.

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PP – 04

Cellular Responses of Biological Silver Nanoparticles against Skin Cancer

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Biological nanoparticles have unique physiochemical properties, among them silver nanoparticles are of particular interest for application in medical devices and health care products. Recently silver nanoparticles are investigated for its enhanced potential towards diagnosis and therapeutic efficacy in cancer treatment. The skin cancer is one of the most common form of cancer among them 20% of peoples suffers from squamous skin cancer. In this study *Aegle marmelos* leaf extract mediated silver nanoparticles was used against A-431 squamous skin cancer cell line. The cellular responses were observed by conducting MTT assay, DNA fragmentation, cell cycle analysis, ROS, glutathione and caspase level determination, measuring mitochondrial potential and gene expression study. The synthesized silver nanoparticles have shown cytotoxic activity against A-431 cell lines at IC_{50} 47.5 µg/mL. The cancer cells get arrested in G-1 phase of cell cycle by decreasing glutathione level and increasing free radical generation, mitochondrial depolarization, DNA fragmentation and P53 and Bax gene expression. Further *in-vivo* study is to be done for applying it therapeutically.

Keywords: silver nanoparticles, *Aegle marmelos*, squamous skin cancer,A-431 cell line, cytotoxicity.

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PP – 05

Carvacrol Induces Apoptosis via Caspase Activation in HL-60 Human Leukemia Cells

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Objectives: The aim of the present study was to investigate the effect of carvacrol, a phenolic monoterpenoid on the induction of apoptosis in HL-60 (Human acute promyelocytic leukemia cells)

Materials and methods: HL-60 cells were treated with different concentrations of carvacrol and cytotoxicity was assessed by MTT assay. Levels of lipid peroxidation, antioxidants, mitochondrial membrane potential and caspase-3 were measured. Further, apoptosis was studied using annexin-V staining by flow cytometry and TUNEL assay by fluorescence microscope.

Results: Carvacrol had a potent cytotoxic effect on HL-60 cells and IC-50was found as 100µM. Exposure of the cultured cells to carvacrol led to dose dependent increase in the level of malonyldialdehyde (MDA) which is an indicator for free radical formation, and reduction in the level of different antioxidants such as reduced glutathione (GSH), glutathione peroxidase (GPX), catalase (CAT) and superoxide dismutase (SOD) ($P< 0.05$). The major cytotoxic effect appears to be intervened by the induction of apoptotic cell death as evaluated by TUNEL assay. Further studies revealed that the dissipation of mitochondrial membrane potential of intact cells was accompanied by the activation of caspase-3.

Conclusions: Our results found that the potential mechanism of cellular apoptosis induced by carvacrol is mediated by caspase-3 and is associated with the collapse of mitochondrial

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membrane potential, generation of free radicals, and depletion of the intracellular antioxidant pool.

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PP – 06

Green Synthesis of Iron Oxide Nanoparticle in *Plectranthusamboinicus* Plant and Cytotoxic Potential of *Plectranthus amboinicus* Leaf Extract in MCF-7 Cell Lines

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Breast cancer is the most common malignancy in United States women, accounting for >40,000 deaths each year. These breast tumors are comprised of phenotypically diverse populations of breast cancer cells. Several classes of drugs are available to treat different types of cancer. Currently, researchers are paying significant attention to the development of drugs at the nanoscale level to increase their target specificity and to reduce their concentrations. Nanomedicine is an important field involving the use of various types of nanoparticles to treat cancer and cancerous cells. The aim of the present study was to analyze the anti-cancer effect of *Plectranthus amboinicus* leaf extract on MCF-7 cells. Iron oxide nanoparticles were biologically synthesized using the leaf extract of *Plectranthus amboinicus* (Pam-IO NPs). Aqueous extract of the plant was eluted and the fractions were tested for Cytotoxicity. This herb has therapeutic and nutritional properties attributed to its natural phytochemical compounds which are highly valued in the pharmaceutical industry. The synthesized Pam-IO NPs were characterized by UV-Vis spectrophotometer, FTIR, TEM and XRD analysis. TEM analysis of Pam-IO NPs showed the average size of about 20-50 nm. Nanotechnology is emerging as an important area of research with its tremendous applications in all fields of science, engineering, medicine, pharmacy, etc.

Keywords: Breast cancer, Nanomedicine, *Plectranthus amboinicus*, UV-Vis spectrophotometer, FTIR.

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PP – 07

Sargassum wightii-mediated Green Synthesis of Silver Nanoparticles with Excellent Biocompatibility and Enhanced Radiation Effects on Cancer Cells

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Recent years have seen tremendous progress in the design and study of green nanoparticles (NPs) geared towards biological and biomedical applications, most notable among these being the noble metal nanoparticles. Eco-friendly synthesis of silver nanoparticles (Ag-NPs) prepared by *Sargassum wightii* (SW) were evaluated for antibacterial efficacies and enhanced radiation effects on cancer cells. The SWAg-NPs were characterized by UV-visible spectroscopy, transmission electron microscopy, Fourier transform infrared spectrometry, and dynamic light scattering. These results indicated that SWAg-NPs are predominantly spherical in shape with an average size of 20 nm. *S. wightii* mediated NPs have different functional groups, played important roles in reducing Ag+ and maintaining product attributes such as stability and dispersity. Antibacterial efficacies of SWAg-NPs, maximum growth of inhibition 18 mm were observed in Ampicillin-resistant Escherichia coli and minimum 12 mm in Methicillin-resistant *Staphylococcus aureus* were observed. In-vitro cytotoxicity assays showed that these SWAg-NPsshowed good biocompatibility with mouse fibroblast cell lines 3T3. Furthermore, X-ray irradiation tests on 231 tumor cells suggested that the biocompatible SWAg-NPs enhanced the efficacy of irradiation, and thus may be promising candidates for use during cancer radiation therapy.

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Keywords: green chemistry, biosynthesis, *Sargassum wightii*, antibacterial efficacies, cancer therapy, Ag nanoparticles.

PP – 08

Comparative Proteomic Analysis of Anti-Cancer Mechanism by pterostilbene Treatment in HepG2 cells

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Objectives: Pterostilbene (PTS), a stilbene group of polyphenol, has been proved to have cytotoxic effect in a number of cancer cells *in vitro* and *in vivo*. Here we attempt to study the molecular mechanism of anticancer activity of PTS in HepG2, hepatocarcinoma cells through proteomic approach.

Materials and methods: Two-dimensional gel electrophoresis (2-DE) was used to identify the differentially expressed proteins. Quantitative cell cycle analysis and q-RT-PCR analysis of pro- and anti-apoptotic genes were carried out to confirm the anti-cancer activity of PTS.

Results: Cell viability assay showed dose and time-dependent inhibition of cell growth by PTS in HepG2 cells. Further it showed significant level increase in apoptosis as evidenced by G2/M phase cell cycle arrest and expression of BCl_2, Bax and caspase-3. A total of 72 differentially regulated proteins in 2-DE map were observed ($P < 0.05$) between the control and PTS treated HepG2 cells, of which 8 spots with >2 fold up- or down- regulated level were further identified by MALDI-TOF analysis. The results identified, significant up regulation of VDAC1, NQO2, DHRS2 and down regulation of HSP10, PGAM-B, RPS12, PSME-3 and TPT1. Most of the identified proteins found to play a significant role in tumor cell apoptosis. The mRNA expression levels of these differentially regulated proteins were further confirmed by q-RT-PCR.

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Conclusion: The findings from this study for the first time offer valuable insights into the mechanism of anti-tumor effect of PTS treatment in HepG2 cells.

PP – 09

Ormocarpum cochinchinese Leaf Extract Reduces Human Ovarian Cancer Cell Proliferation and Induces Apoptosis by Regulating Wnt/β-catenin Signaling

Manju Mohan[1],B.K. Vidya[1], C. Gautham[1], K. Senthilkumar[1], S. Balaji[1], R. Sivakumar[2], L. Queimado[3], M.M. Aruldhas[1], N. Srinivasan[4], R.I. Kumaran[5,6],B. Ravi Sankar[1] and R. Ilangovan[1]

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Ovarian cancer is one of the leading cause of mortality worldwide among women. It accounts for about 2,39,000 new cases and 1,52,000 deaths annually worldwide.The relative five-year survival rate for ovarian cancer is only 46%. Currently available therapies are associated with significant side effects. Recently, phytotherapy has received significant attention for the treatment of various diseases including cancer. In this study, we have determined the effects of ethanolic leaf extract of *Ormocarpum cochinchinese*(OC) on ovarian cancer cells. PA-1 cells were treated with different concentrations of ethanolic leaf extract of OC and assessed for cell proliferation. Then, the cells were treated with either vehicle (0.01% DMSO) or OC extract

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(1, 10 and 100 µg/ml) and studied for protein expression of estrogen receptor (ER)-β, caspase-9 and Wnt signaling molecules by western blot analysis. Our results suggest that OC significantly inhibited the ovarian cancer cell proliferation. Further, OC treatment increased the protein expression of ER-β and caspase-9. While OC did not change the protein expression of Wnt ligand (Wnt3a), interestingly, it decreased the expression of β-catenin, the key signaling component. Importantly, OC increased the protein expression of Wnt inhibitory factor 1 (WIF1), which is an important Wnt antagonist and a tumor suppressor protein. Taken together, our findings demonstrate that OC inhibits ovarian cancer cell proliferation and induces apoptosis by modulating the Wnt signaling molecules emphasizing the potential application of this phytotherapy for the ovarian cancer.

Keywords: Ovarian cancer, phytotherapy, Wnt/β-catenin, proliferation, apoptosis.

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PP – 10

A Computational Investigation on Understanding Structural Interface ofhBcl-B – hBaxBH3 Heterodimer Playing Essential Roles in Apoptosis

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A delicate balance of structural interactions among the apoptotic proteins is crucial for cell homeostasis. Of the six anti-apoptotic proteins known in human to date, the human Bcl-B (hBcl-B) interacts with human Bax (hBax) but does not interact with human Bak (hBak), while other anti-apoptotic proteins are capable of constituting hetero complexes with both the pro-apoptotic proteins, hBax and hBak. In this background, we have herein reported crucial residues of hBax and hBcl-B for specific hetero dimerization of the polypeptides and as well validated structural determinants of the polypeptides through variety of virtual 'alanine mutants' and 'switch mutants' by using an array of computations methods. Moreover, 'pharmacophoric residues' of the hBax have also been figured-out and systematically rationalized. Implications of the studies on designing prototype anti-cancer compounds have also been brought into fore and discussion on the part would be addressed in detail in the poster presentation.

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PP – 11

Green Synthesis of ZnO Nanoparticles and Evaluation of Antioxidant and Antidiabetic Activities using *C. amada*Extracts

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In the recent era zinc oxide nanoparticles attracted the researchers due to their unique properties and applications in optoelectronic devices.Among other metal nanoparticles, zinc oxide nanoparticles are very much important due to their utilization in gas sensors, biosensors, cosmetics, drug-delivery systems, and so forth. Zinc oxide nanoparticles (ZnO NPs) also have remarkable optical, physical, and antimicrobial properties and therefore have great potential to enhance agriculture. Formation of NPs were confirmed by UV-Visible (UV-VIS) spectroscopy, Fourier transformed infrared (FTIR) spectroscopy and X-ray diffraction (XRD). Electron microscopy has been used to study the morphology and size distribution of the synthesized particles. The antioxidant behavior of ZnO nanoparticles was assessed by scavenging free radicals of 2,2–diphenyl–1–picrylhydrazyl hydrate (DPPH),ABTS time interval individually. Another study has indicated that small sized ZnO NPs, stabilized by sample had better anti-diabetic effect on streptozotocin (STZ) induced diabetic rat than that of large sized ZnO particles. It has also been observed by enzyme linked immunosorbent assay (ELISA) and real time polymerase chain reaction (RTPCR) that, ZnO can induce the function of Th1, Th2 cells and expressions of insulin receptors and other genes of pancreas associated with diabetes.

Keywords: Antidiabetic activity; Antioxidant activity; Green synthesis; Zinc oxide nanoparticles.

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PP – 12

GC-MS Analysis and *in vitro* Assessments of Essential Oil from *Citrus limetta* Peel

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Essential oils are oily liquids, extracted from the plant materials which act against various degenerative disorders. The secondary metabolites present in the oil are responsible for the aroma fragrance and different biological activities. In the present study, the fresh peel of *Citrus limetta* Risso were collected and was subjected to hydrodistillation by using Clevenger apparatus. The identification of compounds present in the oil of *C. limetta* was carried out by Gas Chromatography and Mass Spectrometry (GC-MS). From the GC-MS report it has been identified as 61 compounds were present in the essential oil. Out of these constituents, terpenoids are the major secondary metabolites present in the oil sample. Hence, essential oil of *C. limetta* was assessed for its *in vitro* thrombolytic, anti-haemolytic and anti-inflammatory activities. In thrombolytic activity using clot lysis method, the essential oil was found to have significant thrombolytic effect showed a maximum effect of 95±1.17% at 100 µg/mL concentration. Concordantly, in anti-hemolytic activity the percentage of inhibition of *C. limetta* is found to be 87%. Anti-inflammatory activity was evaluated using albumin denaturation. The essential oil showed mean inhibition of protein denaturation as 90%. The present exploration revealed that the essential oil of *C. limetta* possesses significant thrombolytic properties as well as anti-haemolytic and anti-inflammatory effects.

Keywords: GC-MS; Thrombolytic activity; Hemolytic activity; Anti-inflammatory.

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PP – 13

A Review on Nanobiotechnologyfor Cancer Imaging and Treatment

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Nanobiotechnology is the insertion of nanotechnology in biological fields. Nanotechnology is a multidisciplinary field that currently recruits approach, technology and facility available in conventional as well as advanced avenues of engineering, physics, chemistry and biology.Nanoparticles can be used to detect/monitor (by utilizing or adding optic, magnetic, and fluorescent properties) and to treat Cancer (by Heat ablation, chemotherapy, gene therapy).Nanoparticles which could be used as carriers for delivering anti-cancer drugs and also for diagnosing the disease.The nanoparticle was bio-compatible, easy to synthesis and multiple cancer drugs could be loaded. It could reduce the toxicity of the anti-cancer drug, increase its efficacy and ensure better retention of the drug in the blood system.The whole world is practicing herbal medicine to avoid maximum side effects and for better treatment. The science of Ayurveda is supposed to add a step on to curative aspects of cancers.

Keywords: Nanobiotechnology,Nanoparticles, Anti-Cancer, Nanoshells, chemotherapy.

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PP – 14

Fabrication of Anticancer Nanoparticles (Iron oxide) from Aqueous Latex Extract of *Euphorbia antiquorum* L.

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The present study aimed to synthesis iron oxide nanoparticles (Fe_3O_4NPs) in a greener route using aqueous latex extract of *Euphorbia antiquorum*. Initially, synthesis of Fe_3O_4NPs was confirmed through UV–Vis spectroscopy which shows the surface plasmonic resonance peak (SPR) at 276nm. Fourier transform infrared spectroscopy (FTIR) analysis provides clear evidence that protein fractions present in the latex extract act as reducing and stabilizing bio agents. Energy dispersive X-ray (EDAX) spectroscopy confirms the presence of iron oxide as a major constituent element. Electron microscopic studies such as Field emission scanning electron microscopic (Fe-SEM) and Transmission electron microscope (TEM) reveals that synthesized Fe_3O_4NPs are spherical in shape with the size range between 5 and 30 nm. Toxicity study manifests the cytotoxicity value of synthesized Fe_3O_4NPs against tested MCF 7 cells. The output of this study clearly suggesting that biosynthesized Fe_3O_4NPs using aqueous latex extract of *Euphorbia antiquorum* can be used as promising nanomaterials for therapeutic application in context with nanodrug formulation for cancer treatment.

Keywords:*Euphorbia antiquorum;* iron,MCF 7.

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PP – 15

BIOCHEMICAL MARKERS TO ASSESS CHEMOPREVENTIVE EFFECT OF EMODIN IN DMBA INDUCED ORAL CARCINOGENESIS

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The aim is to explore the chemopreventive effect of Emodin in DMBA induced oral carcinogenesis. The chemopreventive effect of the Emodin was substantiated by analysing the status of biochemical markers such as lipid peroxidation by-products, antioxidants and phase I and II detoxification agents in DMBA induced hamster buccal pouch carcinogenesis. Fifty golden Syrian hamsters were subdivided into five groups of 10 hamsters in each. Group I hamsters served as control. Group II hamsters were treated with 0.5% DMBA in liquid paraffin three times a week, for 14 weeks. Group III hamsters received the oral administration of Emodin (50 mg/kg bw) on alternative days of DMBA treatment for 14 weeks. Group IV hamsters received oral administration of Emodin alone throughout the experimental period. Well differentiated squamous cell carcinoma was noticed in the buccal pouches of hamsters treated with DMBA. Emodin completely prevented the tumor formation and restored the status of biochemical markers in the pre-initiation phase. The present results thus implicate the antioxidant efficacy of Emodin in DMBA induced hamster buccal pouch carcinogenesis. The present study also found the regulation of Emodin on various biochemical parameters in DMBA induced oral carcinogenesis. The findings would be discussed in the light of available literature.

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PP – 16

HISTOPATHOLOGICAL STUDY TO ASSESS ANTICANCER POTENTIAL OF EMODIN IN DMBA INDUCED HAMSTER BUCCAL POUCH CARCINOGENESIS

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[1]***Department of Biochemistry, Karpagam Academy of Higher Education, Coimbatore***

[2]***Department of Biochemistry and Biotechnology, Faculty of Science, Annamalai University, Annamalainagar.***

ABSTARCT

Aim of the current study is to focus anticancer potential of Emodin in DMBA induced hamster buccal pouch carcinogenesis. Fifty golden Syrian hamsters were subdivided into five groups of 10 hamsters in each. Group I hamsters served as control. Group II hamsters were treated with 0.5% DMBA in liquid paraffin three times a week, for 14 weeks. Group III hamsters received the oral administration of Emodin (50 mg/kg bw) on alternative days of DMBA treatment for 14 weeks. Group IV hamsters received oral administration of Emodin alone throughout the experimental period. Well differentiated squamous cell carcinoma was noticed in the buccal pouches of hamsters treated with DMBA.Tumors were developed in the buccal pouches of golden Syrian hamsters by painting with 0.5% DMBA thrice a week for 14 weeks. Histopathological studies were performed to substantiate the anticancer potential of Emodin.Hamsters treated with DMBA + Emodin revealed mild precancerous lesions such as hyperplasia and dysplasia whereas 100% tumor formation was noticed in hamsters treated with DMBA alone. The anticancer potential of Emodin relies on its efficacy during DMBA induced hamster buccal pouch carcinogenesis. The changes in these lesions are also associated with other markers which indicate the potential anticancer effect of Emodin. The results will be discussed in the light of available literature.

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ABOUT THE UNIVERSITY

Karpagam Charity Trust was founded in the year 1989 with the aim of providing excellent educational facilities by imparting practical knowledge and skills to the youth and also catering the needs of the society in general through charitable deeds.

Karpagam Academy of Higher Education has evolved in the year 2008 for the purpose of conferment of Deemed to be University status by Ministry of Human Resource Development, Vide No. F.9.24/2004.U.3 (A) dated 25.08.08.

The University Education, in today's scenario, is witnessing a huge paradigm shift and at Karpagam, we are geared to be a part of that transformation. We ensure that our education epitomizes excellence in every sphere.

Steered by the dynamic spirit of our Chancellor, Dr.R.Vasanthakumar, an eminent industrialist and Philanthropist, Shri.K.Murugaiah, CEO, Dr.S.Sudalaimuthu, Vice Chancellor and Dr. R. Sundararajan,Registrar, work together to initiate the emergence of excellence.

Our University has been ranked under Elite category for the quality of research (Current Science, 107:3-389-396 2014) in India.

NIRF Ranking: We are ranked 90th among all government (state& central)/deemed/private universities in India.

Our Institutions

- Karpagam College of Engineering
- Karpagam Institute of Technology
- Karpagam Polytechnic College
- Karpagam College of Pharmacy

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- Karpagam College of Nursing
- Karpagam Faculty of Medical Sciences & Research

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Associate Professor & Head

Therapeutic applications of Medicinal Plants

Dr. K. Poornima
Associate Professor

Medicinal Plants; Renal carcinoma

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Dr. S. Priyanga
Assistant Professor

Medicinal plants research

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Upcoming Activities of our Department

1. Animal handling workshop – 11th& 12th August, 2017.

5. **Dr. L. Hariprasath**
Assistant Professor
Karpagam University

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11th & 12th August, 2017

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Category :
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11th & 12th August, 2017

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KARPAGAM UNIVERSITY

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DEPARTMENT OF BIOCHEMISTRY

Established in the year 1995 with UG and extended with PG in 1999. The research was seeded in the year 2003. We have major and minor projects funded by ICMR, UGC, DST and Ministry of Forest and Environment. The thrust area of research includes Cancer biology, Diabetes, Bone Health, Natural Products and Nanobiotechnology. The department has more than 200 publications in high impact journals. Some of the research findings were also patented and a **confidential disclosure agreement with Nuray Chemicals, Pvt. Ltd., Chennai was signed for the discovery of drug for diabetes.**

The Department of Biochemistry has well equipped laboratories with sophisticated equipments, well established Animal house and a separate lab for Animal and Plant Tissue culture Research.

ABOUT THE WORKSHOP

Animal experimental data in preclinical research is vital for conducting human trials. The initial efficacy and safety of the drug/lead candidate is determined in the preclinical phase of the drug development cycle. Animal ethics is an important objective of the Committee for the Purpose of Control and Supervision on Animals (CPCSEA), a statutory committee in India which approves animal house facilities and the conduct of animal experiments in educational and research institutions. Understanding and learning of animal handling and care is essential for any individual working on experimental animals.

Animal house facility at Karpagam University is recognized by CPCSEA for the conduct of animal experiments. We strictly adhere to the guidelines for animal handling and care. This two-day workshop targets to train young students (graduate and post-graduate level) and researchers on handling of small experimental animals such as mice, rats in a humane manner. Participants would be exposed to procedures such as handling and restraint, sex differentiation, various routes of drug administration, collection of blood sample, euthanasia, endocrine surgeries and post-operative care. Apart from the above procedures, the workshop also prepares the participants on the selection of appropriate animal models to study diseases and writing a protocol, animal ethics, and structure of animal ethical committees. All individuals would get relevant expert demo and hands-on training prior to designing their own animal-based work. The workshop would also provide hands-on training on the dissection of various organs, and basic molecular techniques such as isolation of nucleic acids and proteins, assessing the concentration and purity of nucleic acids and proteins, electrophoresis of isolated ribonucleic acids to assess the integrity and RT-PCR analysis.

SCIENTIFIC SESSION

The following topics would be covered in the workshop:

- Introduction to experimental animals
- Handling and restraint
- Routes of drug administration in mice and rats
- Collection of blood sample
- Necropsy and removal of vital organs
- Anesthesia and Euthanasia
- Designing an animal study protocol
- Institutional animal ethics committee
- Basic molecular techniques

LEVEL OF PARTICIPANTS

Research Scholars, Students from Indian Universities, Colleges, Research Institutes, Medical Colleges, Cancer Research Foundations, Hospitals etc., could attend the conference by sending the registration form along with Demand draft in favor of **"Karpagam University"** payable at Coimbatore to the Convener on or before 31st July, 2017. Registration fee includes working lunch and refreshments.

REGISTRATION FEES

Students	Rs. 2000
Research Scholars	Rs. 2000
Academicians, Scientists	Rs. 3000

(Lodging will be provided to participants in guest house and hotels of their own expense)

RESOURCE PERSONS

1. **Dr. G. Nagaraja Perumal**
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Coimbatore
2. **Dr. V. Gopalakrishnan**
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4. **Dr. M. Sridhar Muthusami**
Assistant Professor
Karpagam University

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2. International Seminar on "Biochemical understanding of cancer progression" – 2nd Week of February, 2017. The brochure and program schedule will be made available in our web page soon.

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