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From the Editor's Desk

Evolution is a natural process, a unifying force in biology, tying together diverse fields. It is happening all the time, in every sphere. An integral part of the process is change and adaptation. Likewise, it was time for a change at IWSA when the charge of various positions had to change hands. So we have a new -President, Secretaries, Treasurer, Executive committee and Conveners for the various Sub-committees. The task of putting together the IWSA Newsletter has been put on my shoulders and I hope I can do justice to it.

Despite these changes, the objectives and tasks at IWSA remain the same. With support from the senior, more experienced members we hope to carry the baton to the next stage of evolutionary timeline of two years when it will be time for the next change.

From this issue onwards, the IWSA Newsletter will be distributed as ebook. It was a unanimous decision of the Executive Committee that it is a more eco-friendly way of disbursing the IWSA news and the process of 'Publication' is shorter and more economical.

As stated in the previous issue, this year has been marked as the International Year of Chemistry, to commemorate the centenary of Nobel Prize in Chemistry won by Madam Curie. We wish to highlight articles on the topics, research findings and issues in the science of Chemistry. She coined the term 'radioactivity.' Today, radioactivity finds application in numerous spheres especially in biological sciences, therapeutics and diagnostics. An article written by Dr. Malini Gopalakrishna, currently holding the Gharda Chair at the Institute of Science, Mumbai, is featured in this issue which covers the benefits of radiations for cancer therapy and how the advantages of radiations outweigh the flaws.

We had organised two lectures by two women chemists in the last quarter, one by Prof. Martha Greenblatt, a Hungarian by birth, and the other was by Dr. Indira Priyadarsini. Prof. Martha's remarkable achievements came after a great struggle for survival at an early age. Her family was captured by the Nazis in World War II and the story of their miraculous escape and reunion with her father was dramatic enough to evoke goose bumps. Later at the age of 15, she along with her sister escaped from the Soviet occupied Hungary and landed in America eventually. She narrated her first impression on reaching the American shore very frankly. The challenge was not just the language but also the culture that existed there. She pursued science diligently and became an outstanding scientist in the field of solid-state chemistry.

The second talk by Dr. Indira Priyadarsini was on Reactive Oxygen Species, their role in causing oxidative stress on the physiology and the various compounds that can counter the oxidative damage. Very useful information about various food based antioxidants to combat this stress was conveyed to the college students who took keen interest and participated in active discussion.

The Forest Day program was held in a very interesting manner. The lecture by Prof. Almeida was highly informative; he described the hard work that goes in the cataloguing of various plant species, preparing and preserving of Herbaria, which help in identifying new species. Today the dearth of students specializing in Taxonomy

makes people like Prof. Almeida an endangered community. The ceremony of tree plantation followed. The trees that were planted in the IWSA garden were unique and we have put together their description and importance at the end of this issue.

A profile of Dr. Rohini Godbole, a Physicist, appears in the section 'Meet an Eminent scientist'. She is a professor at the Centre for High Energy Physics at IISc, Bangalore having a remarkable career with many 'Firsts' to her credit.

Madam Curie is the earliest eminent woman scientists, a role model for generations of keen scientific minds. The entire family has contributed so much to science. Her biography in brief has been included in the last column "Woman Scientist Who Made a Difference" along with her famous quotes. Hopefully her wisdom will encourage striving minds. We will try to feature women Chemists who have contributed significantly to the pursuit of Chemistry, but are not necessarily famous, in this column this year.

Anjali Bhagwat
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"Letter to the Editor"

"Many thanks for sending me the latest issue of your newsletter. I found it of great interest, focussing, as it does, on the contributions of women to science. I was especially happy to see the brief details of women who had been honoured by the Department of Atomic Energy. The activities of your various branches are also praise-worthy.

Your association is doing excellent work and I wish you more power to your elbows. If it is not too much trouble, could you, please, continue to send me future issues of your newsletter as .pdf files?"

Dr. Sunil K. Pandya
Neurosurgeon
Jaslok Hospital, Mumbai

President's Message

Dear Friends,



Dr. Susan Eapen
President
IWSA

I have recently taken over as President, Indian Women Scientists' Association – a prestigious organization with the objective of popularization of science and encouraging women in science. Science, more than any other discipline is in a constant state of flux. Developments in basic science will lead to major developments in technologies. In the coming two years, more programs for popularization of science are being planned by IWSA. Special emphasis will be given to encourage girl students in schools and colleges for taking up a career in science. New programs will be conducted to impart professional skills required for present day employment and also for fostering entrepreneurship.

This year is declared the Year of Chemistry being the 100th year of Madam Curie winning the Nobel Prize in chemistry. Madam Curie trained and encouraged her daughter to follow her foot steps and Irene Joliet Curie won the Nobel Prize too. We have to realize that our daughters receive nothing less. To increase the awareness this year, different programs in chemistry with the objective of reaching out to school and college students are planned.

Today, the number of women scientists has increased and women have learnt to adjust to the conflicting demands of family and career. Attitude of women in science have improved. I am really proud of many successful women scientists and engineers, who have won laurels to the profession they are engaged in. IWSA stands for women in science and will continue to encourage women to reach greater heights in frontier areas of science and engineering. It is also essential to provide a safe environment for women to help them live their lives with dignity and respect, while they are engaged in their profession. In Madam Curie's words "Nothing in life is to be feared, but only to be understood".

With a large number of women scientists in the network, I hope that each one of us will join hands to contribute/work together for sustainable development, poverty eradication and in realization of IWSA's goals. It is essential to increase the membership of IWSA, nurture our branches and initiate new branches to spread our wings. Let us all together look forward to taking IWSA to greater heights in the years to come.

Susan Eapen
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IWSA News

News from Head Quarters

Women in Science Series talk

Visiting scientist Dr. Martha Greenblatt

On 8th of March, 2011, a talk by Dr. Martha Greenblatt was held in the Training School Hostel, Anushaktinagar, Mumbai. Dr. Martha Greenblatt holds the Chair of Chemistry, Rutgers University, New Jersey, USA. She highlighted her experience of taking up Chemistry and how she pursued solid state inorganic chemistry to be one of the top-most scientists in the field.



She was born in Hungary in a Jewish family. During the Second World War, her family was taken as prisoners and were put on a train to be taken to a concentration camp. The family got separated as the mother along with her and her younger brother were put in a different group and her father in another. Due to some problem (miracle for them) the train was diverted and it moved in the opposite direction.

The family somehow escaped to Vienna and later was reunited with her father in Hungary. When Soviets occupied Hungary, she escaped to United States of America and came to New York. She had no knowledge of English language then, and the American culture was something of a shock. But she mastered the language soon and coped with the American ways. She loved chemistry and did her B.Sc. in Chemistry at Brooklyn College. She started her career as a chemist in a chewing gum manufacturing company in Long Island. She quickly got bored with the work and joined Chemistry department at Polytechnic Institute of Brooklyn, where the crystallography lab was highly rated. Introduction to polymer chemistry by Professor Herman Marks helped her in deciding her field of specialization. Rudy Marcus, her physical chemistry Professor later received the Nobel Prize in Chemistry. She worked in Rutgers University, New Jersey and had taken sabbatical leave to work in Weizmann Institute in Israel, which made her very confident in the field of solid state chemistry. She worked very hard, combining her family and career and was the recipient of the 2003 American Chemical Society's Garvan-Olins medal, an outstanding national award given to a woman

scientist. In 2004, she became the Professor of Chemistry and also a member of board of governors. She has more than 400 publications to her credit and has guided several post-doctoral and doctoral students. Her story is very motivating to all the women scientists.

Dr. Susan Eapen welcomed and introduced Dr. Greenblatt and Dr. Rita Mukhopadhyaya proposed the vote of thanks. About 25 women scientists participated in the session.

Talk by Dr. Indira Priyadarsini



A talk by Dr. K. Indira Priyadarsini, a senior scientist from the Radiation and Photochemistry Division, BARC was held on "Free radicals, antioxidants and radioprotectors " on 23rd July 2011 at K. B. Patil College, Vashi, Navi Mumbai. Dr. Priyadarsini spoke on reactive oxygen species (ROS), which is a by-product of aerobic metabolism. While such species are essential in normal life, different stresses induce their excessive production.

Excess of ROS react with crucial biological molecules causing functional changes and cellular malfunctions. Intake of antioxidant supplements such as dietary compounds can help in alleviation of oxidative stress. In her presentation, Dr. Priyadarsini highlighted the importance of plant secondary metabolites such as curcumin in alleviating oxidative stress.

Dr. Susan Eapen, President, IWSA spoke on the role of IWSA in popularization of science and how the 'Women in science' programme helps students in interaction with women scientists and get motivated. Dr. Shubhada Naik, Joint Secretary, IWSA proposed the vote of thanks. About 75 students attended the talk and actively participated in the interactive session.

Celebration of the World Environment day

The United Nations Environment Programme (UNEP) had selected India as the global host for this year's celebration of 'World Environment Day' on June 5 at New Delhi. United Nations has declared 2011 as "The Year of The Forests". Keeping with the theme of this year's celebration "Forests: Nature at Your Service", a lecture by Prof. Almeida on 'Heritage trees of Maharashtra' was arranged at 3 pm on June 25 at the ICICI Multipurpose hall, IWSA, Vashi. Newly elected president Dr. Susan Eapen welcomed all and introduced the speaker to the august gathering. Prof. Almeida narrated how he entered this profession as a young laboratory personnel and remained interested in this vast subject till today. The magnitude of his work and contributions to the society has been written down with assistance from his 2 very dedicated and able students who were present in the audience. He narrated stories and folk lore attached to a few heritage trees of the state, their scientific and geographical basis and present locations in Mumbai.



Dr. Shubhda Nayak proposed the vote of thanks and Dr. Nutan Khalap anchored the program.

Invocation of the five elements of nature - earth, water, light, wind and space to protect the saplings and usher them to grow into tall trees was enacted during reading from translations of Tagore's writing on the subject.

This program was followed by a colorful 'Vriksha ropan' (tree planting) ceremony managed by IWSA's administrative staff under the guidance of Dr. Rita Mukhopadhyaya.



Six saplings of forest trees like Arjuna, Krishna Vat, Laxmi taru, Neem, Sita Ashoka, and Pagal patta were planted in the premises of IWSA HQ that afternoon. The saplings were carried in a flower bedecked palanquin protected under the shade of a leafy umbrella. Senior members of trustee Drs, Sindhu Joshi, Niyati Bhattacharya, Bakhtavar Mahajan, guests and all the members joined the procession for plantation.

Compiled by
Dr. Rita Mukhopadhyaya

Independence Day function

Like every year the hostel committee of IWSA arranged the flag hoisting ceremony at 9.30 am. The national Tiranga was unfurled by Dr. Rita Mukhopadhyaya, newly elected secretary, IWSA executive committee 2011-13. After the national anthem, hostel residents introduced themselves and shared their views on issues they faced as part of life in Mumbai, to responsibilities as residents at the-Jitendra Mafatlal Working Women's Hostel. They shared the feelings of a home away from home. Senior members like Dr. Bakhtavar Mahajan spoke on citizen awareness and our views on cleanliness in developing and poorer countries she has visited. About 25 hostel occupants and members took a tour of the garden premises, looking at the newly planted saplings on environment day and the existing trees. The occupants expressed a desire to have a basket ball net and volley ball net for sports activity. Smt. Chhaya Kelkar from hostel committee presided over the days function.

Compiled by Dr. Rita Mukhopadhyaya

Report by Nursery School Education Committee

IWSA is proud to announce 100% results of TOT program for the year 2010-11. The result was declared on 21st June. Total 29 students had appeared for the exam, 18 trainees passed with Distinction, 10 trainees with 1st class and 1 with pass class.



Ms. Smisha Anil
(83.33%) ranked
First in English



Ms. Suvarna Sawant
(81.20%) ranked First
in Marathi Medium

Inauguration of the 16th batch (2011–2012) of Diploma in Nursery/Crèche teachers Training Course was held on Friday, 17th June 2011 at IWSA's "ICICI" Multipurpose Hall. The inauguration and lighting of lamp was done by Mr. E.A. Patil, C.A. and Chairman, NMMC'S Education Committee. On his inaugural speech Mr. Patil commended IWSA on its various activities and emphasized on teachers role and its effect on society. This year, a total of 26 students have registered in the program. IWSA'S Mrs. Indirabai Padhye Nursery School started on 21st June, 2011 with the registration of 15 toddlers.

-Compiled by Dr. V. Sudha Rao



Web Gyan Workshop

IWSA Satish Haware Computer Education Centre together with SNAB Solutions had organized a two days workshop on "Web Gyan" on 30th April- 1st May, 2011 from 10.00 a.m-6.00 p.m. The topics of the lecture-demonstration included were:

- Fast Track Website Development using Drupal by Sheetal Nepte and her team,
- Prospective & Effective Business Presentation creation by Seema Gupta
- Hardware Concepts & Tips to Best Computer Buy by Rashmi Rastogi.

Twelve participants had enrolled for the workshop. Students took keen interest in all the sessions. Certificates were issued to the participants.

Fast track website development using drupal was an overview training course, designed to show you how to create your own Drupal site from start to finish, including installation, content management, site building , introduction to important and useful modules in Drupal and user management. It can help you with the information you need to decide if Drupal is right for you?

Lectures on Powerpoint Presentation and Hardware were conceptually designed keeping in mind the problems faced in the current times.

Compiled by Dr. Rashmi Rastogi

News from Delhi Branch

Report of activities during April and August 2011 for IWSA Newsletter

Three executive committee meetings and an emergent meeting of the Branch were held, to work on the various issues of the branch as well as planning the events. Besides, a General Body meeting of IWSA, Delhi Branch along with the elections for a new executive committee was held on 22nd July 2011. The chief members elected were

Convenor: Mrs. Santosh Mehtani
Secretary: Dr. Rina Sharma
Treasurer: Mrs Parvati Chopra

Under its Industry visit programme, the Branch planned a visit to the National Dairy Research Institute Karnal, on 4th June, 2011. The Institute is famous for its revolutionary work in the field of animal Husbandry and Dairy Products. We visited various sections, including the research wing of NDRI and the cattle farm which were our main areas of interest. Dr. (Ms.) Bimlesh Mann, Principal Scientist, Dairy Chemistry Division was deputed to coordinate our visit.

In addition, in keeping with our ongoing activity of organizing lectures for the benefit of our members, the following were held as per details given below:

1. Prof. S. Sampath, Chartered Accountant, authority on Corporate Tax Planning and Foreign Exchange Management Act enlightened the audience on 29th April 2011, on Planning for Investments

2. Prof/ E. S. Rajagopal, former Director, NPL on the occasion of our lecture series in memory of Mrs Veena Roonval (our ex-colleague in the Dimensional Metrology section of the Standards Division of National Physical Laboratory) spoke on Length measurement: Can it be incredibly hard even in the laboratory?, on 3rd August 2011.



Compiled by **Mrs Santosh Mehtani**
Convenor
IWSA Delhi Branch

IN FAVOUR OF RADIATION

Dr. Malini Krishna

In times of turmoil when the whole world is talking about nuclear disasters in Japan, our very own protests against the installation of nuclear power plant in Jaitapur, I would like to reiterate the Nehruvian philosophy of peaceful uses of atomic energy. Notwithstanding the ill effects of radiation on humans, the benefits outweigh the former. It is ironic that the rays that cause cancer are also needed to cure a human suffering from the same disease and until better or alternative modes of treatment are available, radio therapy remains one of the major modes of treatment of cancer. The death due to cancer is a reality. According to WHO, the number of global cancer deaths is projected to increase 45% from 2007 to 2030, influenced in part by the ageing global population. In most developed countries, cancer is the second largest cause of death after cardiovascular disease and epidemiological evidence points to this trend emerging in the developing world too. Already more than half of all cancer cases occur in developing countries. Lung cancer kills more people than any other cancer and the trend is expected to continue till 2030. A number of common risk factors have been linked to the development of cancer. An unhealthy lifestyle (including tobacco and alcohol use, inadequate diet, physical inactivity, exposure to occupational hazards: asbestos or environmental carcinogens and some infections: hepatitis B or human papilloma virus).

Cancer is a generic name for a large group of diseases that affect any part of the body. Other terms are malignant tumors and neoplasms. One defining feature of cancer is the rapid creation of abnormal cells that grow beyond their usual boundaries and which can then invade adjoining parts of the body and spread to other organs. This process is called metastasis. Metastases are the major cause of death from cancer.

Causes of cancer: Cancer arises from a single cell. The transformation from a normal cell to a malignant cell is a multi-staged process which progresses from a pre-cancerous lesion to malignant cancer. This is due to the interaction between the persons' genetic material (DNA) and three categories of external agents:

1. Physical carcinogens - UV light and ionizing radiation
2. Chemical carcinogens - Asbestos, tobacco smoke, exhaust fumes, aflatoxin-B₁, arsenic in drinking water
3. Biological carcinogens - Infections from various viruses

Ageing is one of the fundamental factors for the development of cancer. The incidence of cancer rises dramatically with age because of the accumulation of risk factors and the fact that the repair mechanisms are slowed down.

Treatment: The treatment of cancer is a series of interventions including surgery, radiotherapy and chemotherapy that is aimed at curing the disease of considerably prolonging the life while improving the quality of life.

Treatment of early detectable cancers: Some of the most common types of cancers such as breast, cervical, oral and colo-rectal have high cure rates if detected early and treated according to best practice.

Treatment of other cancers with a potential for cure: Some of the cancer types, even though disseminated, such as leukemia and lymphomas in children have a high cure rate if appropriate treatment is provided.

Radiation Therapy:

Ionizing radiation has been an important part of cancer treatment for almost a century, being used in external-beam radiotherapy, brachytherapy, and targeted radionuclide therapy. Radiotherapy is based on the idea that exposure to a sufficient quantity (dose) of ionizing radiation kills. The goal is to deliver a measured dose of radiation to a defined volume with minimal damage to surrounding normal tissue, resulting in eradication of the tumor. The first clinical use of radiation for the treatment of tumors was recorded in 1897, and during the past 50 years radiation biology has led to the development of ideas that form a mechanistic framework of the predicted pathways between energy deposition in a tumor cell and probability of cell survival [1]. Ionizing radiation deposits energy that injures or destroys cells in the area being treated (the "target tissue") by damaging their genetic material, making it impossible for these cells to continue to grow. Although radiation damages both cancer cells and normal cells, proliferating cells are more radiosensitive and have a greater cell loss/turnover rate. Tumors are rapidly proliferating and are more likely to be irradiated at the radiosensitive phase of the cell cycle. Cells are most sensitive to ionizing radiation during M (mitosis) and G2 phases of the cell cycle and most resistant in late S phase (DNA synthesis).

Radiotherapy may be used to treat localized solid tumors, such as cancers of the skin, tongue, larynx, brain, breast, or uterine cervix [2]. It can also be used to treat leukemia and lymphoma (cancers of the blood-forming cells and lymphatic system, respectively) [3, 4].

Though use of radiation therapy is one of the major and widely used modality in treatment of cancer, there are several limiting factors that hamper the success of radiotherapy. These limiting factors are as follows:

1. Limitation to use high radiation dose to maximize tumor regression.
2. Detrimental effects of radiation doses on the normal tissues/organ falling within radiation field and surrounding the tumor region.
3. Radioresistance of hypoxic cells in tumor tissues.
4. Radioresistance of cell population in S-phase in tumor tissue
5. Induced radioresistance in the tumor cells.

To overcome some of the above, radiotherapy is given as fractionated doses ranging from 2-4 Gy, per fraction. This is done primarily to enhance tumor cell killing over normal tissues. This is achieved because of hypoxic cell reoxygenation which renders them sensitive to radiation. The redistribution or reassortment of cells in the cell cycle is another reason behind fractionation of the radiotherapy dose. Dividing the radiation dose into multiple fractions allows cells to reassort to more sensitive phases of the cell cycle before the next treatment. The total dose and hence the period of treatment may vary depending on the type of tumor and radiation used [5]. Further in order to optimize the tumor cell killing, clinicians use hyper-fractionation and hypo-fractionation regimens, depending on the type and radioresistance of the tumors and the nature of the surrounding normal tissues. However, as a result of the repeated doses of radiation delivered to the tumor cells, it results in an adaptive response in

them, leading to the development of induced radioresistance, rendering the tumor refractory to subsequent doses of radiation.

Several new approaches to radiation therapy are being evaluated to determine their effectiveness in treating cancer. One such investigational approach is particle beam radiation therapy. This type of therapy differs from photon radiotherapy in that it involves the use of fast-moving charged particles to treat localized cancers. This mode has two major advantages over conventional radiotherapy. First, because of the high LET, the damage produced is much more and hence the tumor cell eradication is greatly enhanced. The second advantage is that the energy deposition by the charged particles is highly localized in a particular depth in the tissue. This is called the Bragg Peak, which confers that advantage of selective, localized irradiation of the tumor tissue and the surrounding normal cells are spared.

Though radiotherapy is a prime modality of cancer treatment, a major obstacle in its successful execution is the development of radioresistance in tumor cells following treatment. One of the factors contributing to the development of radioresistance is the activation of the signaling molecules following irradiation. Modulation of these activated signaling molecules with a view to overcome radioresistance could perhaps be an effective approach.

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Nature never goes out of style. ~Author Unknown

INSA Young Scientist Awards – 2011

INSA MEDAL FOR YOUNG SCIENTISTS (2011)

The following Women Scientists were awarded the INSA medal for young scientists based on their work carried out in India.

Dr. Sharmistha Dutta Choudhury, (Bhabha Atomic Research Centre, Mumbai),
Dr. Lekha Divya , (University of Kerala, Thiruvananthapuram).
Dr. Nishad Nishad Fathima (Central Leather Research Institute, Chennai).
Dr. Moumita Chaki (University of Michigan, USA)
Dr. Gitanjali Yadav (National Institute of Plant Genome Research, New Delhi.

We congratulate all of them for this remarkable achievement. Their success will not only make a mark in their own carrier, but also be a source of inspiration for other budding young women scientists in India. The research profiles of two of these winners are given below.

Dr N Nishad Fathima CLRI, Chennai



Dr. N. Nishad Fathima is a Scientist at Central Leather Research Institute. She is a gold medallist in both the B Tech and M Tech degree programs of leather technology from Anna University. She obtained her PhD in technology from Anna University in 2010. She visited RWTH Aachen, Germany under DAAD fellowship to carry out experiments on hydration of crosslinked collagen using NMR.

Dr. Nishad Fathima has made some important contributions to the understanding of principles involved in the dimensional stabilization of collagen through externally induced crosslinks during the conversion of skin into leather. One of the long standing and unresolved issues in theory of tanning is gaining insights into the changes in water structure in collagen and hydration during crosslinking phenomena. She has made an attempt using modern tools and techniques to unravel some hitherto ill-defined aspect of hydration and role of water and dimensional stability of collagenous material. She had been instrumental in the development of various chrome free tanning technologies contributing to a greener leather processing. Her work has made an impact in better understanding of tanning and shrinkage phenomena as well as in development of cleaner tanning technologies and better management of solid waste. In recognition of her contributions to Engineering Sciences, Dr Nishad Fathima has been awarded INSA Medal for Young Scientists in 2011.

Dr. Sharmistha Dutta Choudhury
BARC, Mumbai



Dr. Sharmistha Dutta Choudhury, a Scientific Officer in Radiation and Photochemistry Division of Bhabha Atomic Research Centre, Mumbai, has been selected for the INSA Medal for Young Scientists (2011), in recognition of her outstanding work on "Supramolecular Interactions in Controlling Molecular Properties" that is novel and significant to the field.

Dr. Dutta Choudhury received her B. Sc. Degree in Chemistry with Gold medal from Utkal University, Bhubaneswar in 1998 and M. Sc. degree with Gold medal from Jadavpur University, Kolkata in 2000. She carried out her Ph.D. work at Saha Institute of Nuclear Physics, Kolkata, in the subject area of magnetic field effects on photoinduced electron transfer reactions. Her current research interests include photoinduced electron and proton transfer reactions in homogeneous and heterogeneous media and photophysical studies in supramolecular systems. She is also the recipient of the Dr. P. K. Bhattacharyya Memorial Young Scientist Award for the year 2007 and the NASI Young Scientist Award in Chemical Sciences for 2009.

Science news

The Science behind 'An Apple A Day'

Recently when Steve Jobs, the founder and CEO of the computer giant company 'Apple' retired, sighting Health reasons, somebody remarked "Looks like an Apple a day does not keep the doctor away"

On a serious note however, we all know we should eat more fruit and particularly apples. But we don't necessarily know exactly why and which are the specific benefits of this good practice.

To find an answer to this question a team comprising Drs. Sheau C. Chai, Shirin Hooshmand, Raz L. Saadat, and Bahram Arjmandi, Florida State University did a study. They randomly assigned 160 women between ages 45-65 to one of two dietary intervention groups: one received dried apples daily (75g/day for 1 year) and the other group ate dried prunes every day for a year. Blood samples were taken at 3, 6 and 12-months. The results surprised Dr. Arjmandi. He found that incredible changes in the apple-eating women happened by 6 months- they experienced a 23% decrease in LDL cholesterol, which is known as the "bad cholesterol". The daily apple consumption also led to a lowering of lipid hydroperoxide levels and C-reactive protein in those women.

According to these scientists from the Department of Nutrition, Food and Exercise Sciences at The Florida State University, apples are truly a "miracle fruit" that convey benefits beyond fibre content. Animal studies have shown that the pectin and polyphenols in apples improve lipid metabolism and lower the production of pro-inflammatory molecules. Arjmandi's most recent research is the first to evaluate the

long-term cardioprotective effects of daily consumption of apple in postmenopausal women.

They were surprised to find reduction of bad cholesterol to such significant extent and increasing HDL cholesterol or good cholesterol by about 4%, just by apple consumption. Yet another advantage they found was that the extra 240 calories per day consumed from the dried apple did not lead to weight gain in the women; in fact, they lost on average 3.3 lbs. Reducing body weight is an added benefit to daily apple intake. Part of the reason for the weight loss could be the fruit's pectin, which is known to have a satiety effect. Next step will be confirming the results of this study in a multi-investigator nationwide study.

Thanks to these scientists we know that nutrition science backs up the truth behind the common expression and an apple a day really can keep the doctor away.

Source: Journal Menopause, April 2011

Cisgenic crops could soon be allowed on the market

Biotech crops face a great burden of regulatory hurdles making the process of Biotech crop improvement time consuming.

Cisgenic plants are formed by transferring genetic material between sexually compatible plant species e.g. from one crop variety to another, using molecular biology tools. Environment Protection Agency (EPA) and United States Department of Agriculture (USDA) have prepared a draft to allow cisgenic crops on the market, giving total clearance to these crops as safe for consumption.

Reported by Emily Waltz
in Nature Biotechnology, Vol.29 (8), page 677, 2011.

Potato genome

Potato (*Solanum tuberosum*) is the world's fourth most important food crop and a close relative of tomato, peppers and eggplant. India is currently the world's third largest producers of potato. Potato Genome Sequencing Consortium (PGSC) comprising of International team of scientists comprising 97 experts from 14 nations including Indian researchers from Central Potato Research Institute, Shimla has decoded the complex genome of the potato for the first time, published in Nature (July 2011). One of the most significant finding of the analysis is the identification of more than 800 disease-resistance genes, each of which has potential for use in fighting diseases such as the potato blight pathogen *Phytophthora infestans*, famous for causing the Irish potato famine of the 1840s. Given the pivotal role of potato in world food production and security, the potato genome will enable scientists to create new varieties of potato that are high in yield and quality and more resistant to diseases.

Compiled by Dr. Sonia Chadha

Carcinogen patrolling

Good food-Bad Food: The transition line is not only thin it keeps wavering either way. Similar controversies are reported about things that can be termed 'carcinogenic'. In a recent report this issue and challenges facing cancer prevention and care is put forth very well. A proven cancer causing substance –formaldehyde-is finally labelled as carcinogenic, 30 years after the study. And 'cell phones' are termed 'possibly carcinogenic' (coffee and pickles also fall in this category) even though there is no conclusive evidence to prove it. The tobacco experiments done 40 years ago, were completely sidelined. Only now, the advertisements displaying ill effects of tobacco usage by graphic details of oral cancer have been approved.

The challenges according to Siddhartha Mukherjee are at three stages:

- **Scientific**– The criteria of identifying new carcinogens has to be standardised critically before a substance can be termed carcinogenic. Today, discrepancies in the standards for classifying carcinogens have led to confusion and turmoil in the minds of public.
- **Political**-The cancer-control agencies need to bolster political support, and neutralize lobbying interests (what happened in case of formaldehyde and tobacco), before a culprit carcinogen can be revealed to the public.
- **Social**-cancer-control agencies need to invent and reinvent strategies continuously. Old warning labels generate habitual responses, so new, more disturbing labels are needed to invigorate attention.

Based on an article by Siddhartha Mukherjee
July 17, 2011, on page SR8 of the New York Times
edition with the headline: 'Patrolling Cancer's Borderlands'.

Meet an eminent scientist



Rohini Madhusudan Godbole

was born on 12 November 1952 in Pune. She did her BSc degree in 1972 from the University of Pune and an MSc in Physics from the Indian Institute of Technology, Mumbai in 1974. She joined the State university of New York at Buffalo for a PhD and was awarded the same in 1979.

Rohini returned to India and was at the Tata Institute of Fundamental Research, Mumbai from 1979-1982. She spent the next decade or so in Mumbai initially at the Bombay Institute of Science and then at the University of Bombay. She joined the Indian Institute of Science (IISc), Bangalore in 1995 and is currently a professor at the Centre for High Energy Physics at IISc, Bangalore.

Professor Godbole specializes in elementary particle physics, field theory and phenomenology. She has made very important and significant research contributions in

the area of theoretical particle physics which have had an impact at the International level, including impacting the design considerations of the next generation of e+e- colliders and affecting search strategies for new particles at the high energy Colliders.

Her research, which includes a very large list of publications in reputed international journals, has been recognized with many awards and distinctions. A few from a long list are:

- The INSA Satyendranath Bose Medal (2009),
- The Asiatic Society of Kolkatta's Meghnad Saha Memorial gold medal (2008)
- The IISc Rustom Choksi award for research in 2006.

At the National level she has played very important leadership role, in the community of particle physicists. She is currently a member of the Scientific Advisory Committee to the Cabinet, SAC(C). To begin with she has been one of the architects of the series of workshops on high energy physics phenomenology, WHEPP, which are held every two years since 1990, creating a forum where theoretical and experimental particle physicists in India, students and practicing scientists come together along with International experts and actually start off common projects over a period of two weeks, which have resulted in significant and important research publications and contributions. She was responsible for formation of ILC-India forum and the Indian Linear Collider Working Group, which has provided a focus for various activities to increase India's participation in this International Exercise.

She has been a big part of the Schools in Theoretical High Energy Physics, supported by the Scientific Educational and Research Council (SERC), funded by the Department of Science and Technology (DST), which have been now held over 25 years without a break and a very large fraction of the theoretical high energy physics community in India has participated in these schools one way or the other. She began by being a young lecturer at the first of these schools held in 1984, lectured various times in them and for the last 15 years has been a member of the planning committee of these schools, the last five years being the chair of the same.

She has been involved in making *Pramana*, the Indian Journal of Physics, the first web based journal of the Indian Academy of Sciences, first as its associate editor and now the chief editor, over the period of last 15 years.

She contributes very actively in the various educational programs that the Joint Educational Panel of the three Indian Academies conducts, organising workshops programs for college lecturers etc. She is currently a member of the DST committee for Human Resource Development in High Energy Physics.

She has been involved in the formation of a panel of the Indian Academy of Sciences to look at the issues of Women in Science and has been chairing it for the last five years, initiating various activities to evaluate the situation and to mainstream gender issues in Science, including a pioneering effort in bringing out a book, "Lilavati's Daughters: Women Scientists of India", containing stories of about 100 of the women scientists working in modern India, one of the illustrious contributor being Prof. Rajeshwari Chatterjee. Prof. Godbole is currently a member of the Standing Committee of the Government of India for Women in Science.

Know the trees planted at IWSA

1. Ashoka Tree

Botanical Name: *Saraka asoka*

Family : Caesalpiniaceae

Synonyms: Sita Ashok, Anganpriya, Gandhapuspa, Sorrowless tree of India

Distribution: India, Sri Lanka, Malaysia



Ashoka is one of the sacred trees for both Hindus and Budhists and is worshipped on the 13th day of Chaitra (usually 27th April). It is believed to have a certain charm in presenting chastity: thus Sita, the wife of Lord Rama, when abducted by Ravana, was placed in the grove of Ashoka (*Ashokvan*) hence, the name **Sita-Ashoka**.

Revered as one of the most beautiful flowering tree in the Tropical region, the Ashoka is recognized as a symbol of love and dedicated to 'Kama' the Indian God of Love. There is a myth that Ashoka blooms only when a beautiful young woman touches its trunk by her left foot. The word Ashoka signifies "absence of grief". Hence the mother has assigned to it "*The contemplation that takes you above suffering*".

2. Krishna Vad

Botanical Name: *Ficus bengalensis* L. var. *Krishnae* (C.DC.) Corner

Family: Moraceae

Synonyms: Makhan Katori, Krishna's cup, Krishna bor

Distribution- India

For sheer uniqueness, perhaps no tree can produce leaves as astonishing as those of Krishna Vad. The Krishna Vad is a small, interesting form of the common Banyan tree. Each leaf is 18-20 cm long and is doubled back on itself at the base so that it forms a cup, which can hold half a pint of liquid.



The leaf looks like a cow's ear. As with most things in India, there is a mythological story of Krishna related to the leaves of this tree.

According to a legend Krishna as a child was very fond of butter and would

even steal it from the Gopis. Once, when he was caught by his mother Yashoda, he tried to hide the butter by rolling it up in a leaf of this tree. Since then the leaves of this tree have retained the shape. Scientifically the

phenomenon is attributed to the presence of 1-2 small achromatic accessory chromosomes. The tree is propagated vegetatively through cutting or air-layering with great difficulties.

3. Mad Tree

Botanical Name: *Pterigota alata* (Roxb.) R. Br. Var. *diversifolia*

Family: Sterculiaceae

Synonyms: Pagal patta

Distribution: India, Bangladesh, Myanmar



This is a tall, deciduous tree reaching about 20 meters in height and has large leaves measuring 10-30 cm. in length clustered near the end of the leaves, the tree looks very similar to *Pterigota alata*, commonly known as Buddha's coconut, a good, erect, shady avenue tree.

Nature's love for variety gets elaborated in this one plant and is aptly called '*Pagalpatta*'. It is characterized by a variety of shapes of leaves where none of the leaves are identical to each other, defying all the laws of nature's geometry.



I love to think of nature as an unlimited broadcasting station, through which God speaks to us every hour, if we will only tune in. ~George Washington Carver

4. Arjun tree

Botanical name: *Terminalia arjuna*

Family : Combretaceae

Other names : Arjuna, Koha, Kahu, Arjan, White Marudah, White Murdh, Arjuna Myrobalan, Orjun, Yerra maddi, Sadada, Sadaru and many more.

Description: Arjuna is a large size deciduous tree. The height of the tree reaches upto 60 -85 feet. It is a evergreen tree with the yellow flowers and conical leaves. It has a smooth gray bark. Fruit is 2.5 -3.5 cm long, fibrous woody, glabrous with 5 hard wings, striated with numerous curved veins. It has a buttressed trunk and a vast spreading crown from which the branches drop downwards. Its leaves are dull green above and pale brown beneath. Arjuna flowers between March to June and fruits between September to November.

Location: Grows throughout India especially in the sub Himalayan tracts and Eastern India. Also widely grown in Bandhavgarh National Park, Pench Tiger Reserve and Kanha National Park in India. It mainly grows on the banks of the rivers and streams.



Arjun Tree



Medicinal uses : The Bark of the Arjuna tree contains calcium salts, magnesium salts, and glucosides and has been used in traditional Ayurvedic herbal medicines. Juice of its leaf is used to cure dysentery and earache. Arjuna helps in maintaining the cholesterol level, as it contains antioxidant properties similar to the Vitamin E. It also improves functioning of cardiac muscle. Arjuna is used for the treatment of coronary artery disease, heart failure, oedema, angina and hypercholesterolemia. Its bark has diuretic, prostaglandin enhancing and coronary risk factor modulating properties. It is also considered as beneficial in the treatment of Asthma.

Other uses : The wood made from the bark is used in boat and house building, and making agricultural implements and weapons, since it is very hard.

Cultural Importance: Arjuna is one of the sacred trees of India. It has acquired the social and religious sanctity with the passage of time. It is said that Arjuna was born of the two sons of Kuber after saint Narada cursed him. The leaves and flowers of this tree are offered to the Lord Vishnu and Lord Ganpati on several religious occasions. It has been used in Ayurvedic formation since ancient times.

5. Lakshmi Taru

Botanical name: *Simarouba glauca*
DC

Common name: Paradise tree

It has got a lot of media attention due to the fact that its seeds contain more than 60% of edible oil. This tree needs very little water to grow, so it can be cultivated in waste lands without much effort. It consumes a large amount of CO₂ thus purifying the environment. Planting one sapling can contribute significantly towards reducing global warming. The oil can also be used as biofuel. All parts of this tree can be used.



6. Putranjeeva tree

Botanical name *Drypetes roxburghii* syn. *Putranjiva roxburghii*

Common name: Officinal Drypetes

Description: Trees up to 15 m tall; twigs rhomboid in cross-section, sulcate, pubescent

Leaves: Stipules small, Petioles 2.5 - 7 mm long; leaves distichous, obliquely ovate or ovate-lanceolate

Flowers: Small, yellow, dioecious. Male ones 6- to 12-flowers grouped into axillary, dense glomerules; pedicels short; calyx 4- to 5-partite, ca. 1 mm high; stamens 2 - 3, rarely 4, ca. 1.5 mm long; anthers semiglobose, sparsely hairy. Female- solitary or in pairs; pedicels 1.5 - 2.5 cm long, pubescent; calyx 5-partite; lobes erect, very unequal, 1 - 2.5 mm long; ovary ovoid, densely pubescent, ca. 2 mm long, contracted into the conical styles, 2- to 3-lobed; ovules 2 in each cell; stigmas 2 - 3

Fruits: Drupes indehiscent, rhombic-ellipsoid, white-tomentose, long-pedicellate endosperm fleshy.

Flowering: From May to July

Fruiting: From August to October

Distribution: Cultivated in Hong Kong Zoological and Botanical Gardens. India, Sri Lanka, Myanmar, Cambodia, Laos, Indonesia, New Guinea.

Uses: Leaves and fruits used as medicine for rheumatism.



Woman scientist who made a difference



Marie Curie has many 'firsts'. She pioneered radioactivity research. She was the first woman to win a Nobel Prize, was the first female professor at the Sorbonne, she was the first two-time Nobel laureate and the only person to win the award in two different sciences (Physics and Chemistry).

Invention: Study of radioactivity,
Discoverer of polonium and radium

Radium is a rare, brilliant white, luminescent, highly radioactive metallic element found in very small amounts in uranium ores. It is used in cancer radiotherapy, as a neutron source for research purposes, and as a constituent of luminescent paints.

Polonium atomic number 84 and Radium atomic number 88

Her Story:

Madame Marie Curie is the world's most famous woman scientist. With her husband, Pierre Curie, and the French physicist Henri Becquerel, and later on her own, Curie pioneered the study of radioactivity (a word she coined).

Marie Sklodowska, as she was called before marriage, was born in Warsaw in 1867. Both her parents were teachers who believed deeply in the importance of education. Marie had her first lessons in physics and chemistry from her father. She had a brilliant aptitude for study and a great thirst for knowledge; however, advanced study was not possible for women in Poland. Marie dreamed of being able to study at the Sorbonne in Paris, but this was beyond the means of her family. To solve the problem, Marie and her elder sister, Bronya, came to an arrangement: Marie should go to work as a governess and help her sister with the money she managed to save so that Bronya could study medicine at the Sorbonne. When Bronya had taken her degree she, in her turn, would contribute to the cost of Marie's studies.

She was 24 when Marie came to Paris to study mathematics and physics. Bronya was now married to a doctor of Polish origin, and it was at Bronya's urgent invitation to come and live with them that Marie took the step of leaving for Paris. By then she had been away from her studies for six years, nor had she had any training in understanding rapidly spoken French. But her keen interest in studying and her joy at being at the Sorbonne with all its opportunities helped her surmount all difficulties. To save herself a two-hour journey, she rented a little attic in the Quartier Latin. There the cold was so intense that at night she had to pile on everything she had in the way of clothing so as to be able to sleep.

But as compensation for all her privations she had total freedom to be able to devote herself wholly to her studies. "It was like a new world opened to me, the world of science, which I was at last permitted to know in all liberty", she writes. And it was France's leading mathematicians and physicists whom she was able to go to hear,

people with names we now encounter in the history of science: Marcel Brillouin, Paul Painlevé, Gabriel Lippmann, and Paul Appell. After two years, when she took her degree in physics in 1893, she headed the list of candidates and, in the following year, she came second in a degree in mathematics. After three years she had brilliantly passed examinations in physics and mathematics. Her goal was to take a teacher's diploma and then to return to Poland.

She met Pierre Curie in 1894, and they married in 1895. Marie Curie was interested in the recent discoveries of radiation. Wilhelm Conrad Roentgen had discovered X rays in 1895, and in 1896 Antoine Henri Becquerel had discovered that the element uranium gives off similar invisible radiations. Curie thus began studying uranium radiations, and, using piezoelectric techniques devised by her husband, carefully measured the radiations in pitchblende, an ore containing uranium. When she found that the radiations from the ore were more intense than those from uranium itself, she realized that unknown elements, even more radioactive than uranium, must be present. Marie Curie was the first to use the term radioactive to describe elements that give off radiations as their nuclei break down. Pierre Curie ended his own work on magnetism to join his wife's research, and in 1898 the Curies announced their discovery of two new elements: radium and polonium (named by Marie in honor of Poland).

During the next four years the Curies, working in a leaky wooden shed, processed a ton of pitchblende, laboriously isolating from it a fraction of a gram of radium. They shared the 1903 Nobel Prize in physics with Becquerel for the discovery of radioactive elements. Marie Curie was the first female recipient of a Nobel Prize, it was the first time a woman had ever won a Nobel.

Pierre's life ended on April 19, 1906, when he was run over by a horse-drawn cart. His wife took over his classes and continued her own research. In 1911 she received an unprecedented second Nobel Prize, this time in chemistry, for her work on radium and radium compounds. She became head of the Paris Institute of Radium in 1914 and helped found the Curie Institute. Marie Curie's final illness was diagnosed as pernicious anaemia, caused by overexposure to radiation. She died in Haute Savoie on July 4, 1934.

Source-<http://www.ideafinder.com/history/inventors/curie.htm>

Some of her famous quotes:

❖ One never notices what has been done; one can only see what remains to be done.

❖ After all, science is essentially international, and it is only through lack of the historical sense that national qualities have been attributed to it.

❖ All my life through, the new sights of Nature made me rejoice like a child.

❖ Be less curious about people and more curious about ideas.

❖ I am one of those who think like Nobel, that humanity will draw more good than evil from new discoveries.

❖ A scientist in his laboratory is not a mere technician: he is also a child confronting natural phenomena that impress him as though they were fairy tales.

❖ In science, we must be interested in things, not in persons.

❖ I was taught that the way of progress was neither swift nor easy.

❖ I have frequently been questioned, especially by women, of how I could reconcile family life with a scientific career. Well, it has not been easy.

❖ There are sadistic scientists who hurry to hunt down errors instead of establishing the truth.

❖ Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less.

❖ I have no dress except the one I wear every day. If you are going to be kind enough to give me one, please let it be practical and dark so that I can put it on afterwards to go to the laboratory.

❖ Life is not easy for any of us. But what of that? We must have perseverance and above all confidence in ourselves. We must believe that we are gifted for something and that this thing must be attained.

Obituary

Padmashri Dr. (Ms.) K. Dinshaw



The renowned Ex-Director, Tata Memorial Centre and Board member of Atomic Energy Regulatory Board, died on Friday, 26th August 2011 at 0650 hrs.

She is believed to have said “If I have to live my life again, I will adopt the same profession with increased vigour.”

That zest, say those who knew Dr Dinshaw, perfectly describes one of the country’s best known radiation oncologists who lost her own battle with cancer. She was 67. We, at IWSA deeply mourn the demise of our esteemed life member.

Dr. Miss Dhangauri Vaghani (4.2.1932 to -10.6.2011)

A senior scientist who retired as the Officer-in-Charge, Labelled Compounds Operation, Board of Radiation and Isotope Technology, DAE, Navi Mumbai passed away recently.

She graduated with Chemistry (1953) and later specialised in Organic Chemistry (M.Sc. 1957, Ph.D. 1961) from Mumbai University. After her first job at UDCT (1961-1963) she joined BARC as as a Senior Scientific Officer. She got trained at the Commissariat a l’ Energie Atomique, Saclay, France, in the synthesis and production of Carbon-14 labelled natural products during 1965-66.

A conscientious scientist and a hard working life member of IWSA, Dr. Vaghani had conducted the school adoption program of IWSA at Nariyalwadi Municipal School in Vakola, with Dr. Urmila Vakil from 1998 to 2003. Dr. Vaghani was the Co-Convener of the conference 'IX All India Meeting of Women in Science' (November 2004, IWSA Navi Mumbai)-Expanding Frontiers of Science with Information Technology. She will be missed by the IWSA community and IWSA pays sincere homage to her.



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