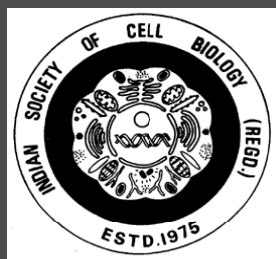
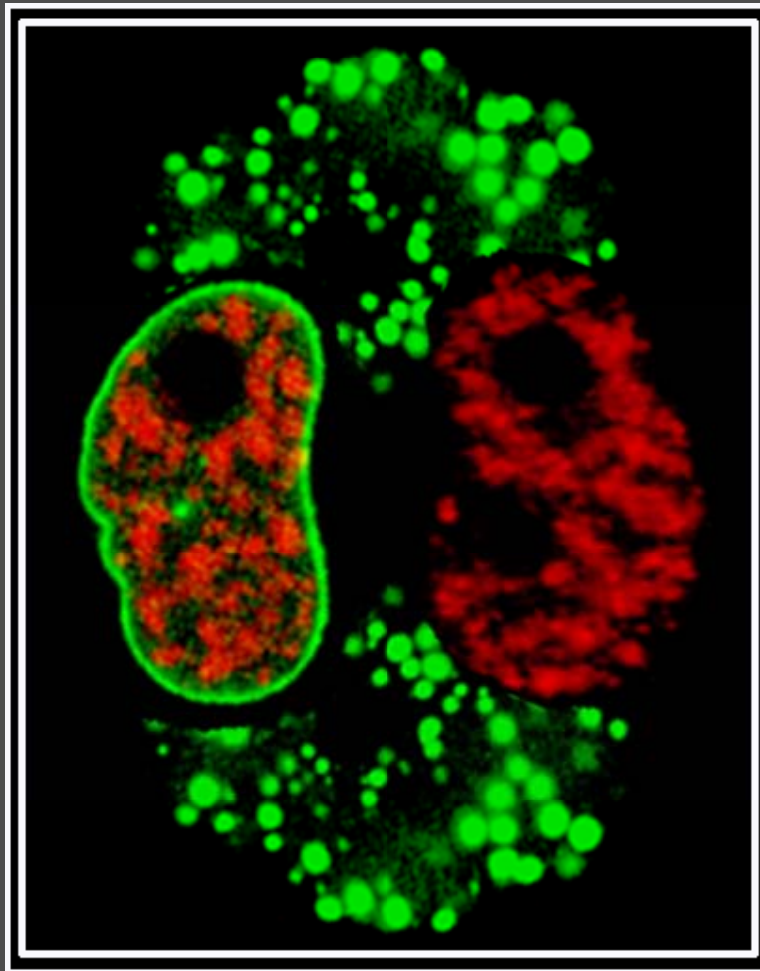


CELL BIOLOGY

NEWSLETTER



INDIAN SOCIETY OF CEL BIOLOGY

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Dear Members,

It gives us great pleasure in bringing out this edition of Cell Biology Newsletter which serves as a medium of communication between the Indian Cell Biologists and provides a platform for amalgamation of old and young minds. An article entitled '*Drosophila melanogaster* in understanding the genetics of complex human neurodegenerative disorders' by Ms Akanksha, a student member of the society, will impress the young minds towards the importance of the simple model systems in cell and molecular biology research.

Last Cell Biology meeting was held at Bose Institute, Kolkata, the Institute that Sir J C Bose made and dedicated to nation. A detailed report of the Conference can be seen in this Newsletter. A write-up entitled 'Novel Insights into Spatial and Functional Organization in the Nucleus' by Dr Veena K Parnaik, Centre for Cellular and Molecular Biology, Hyderabad, gives a glimpse of the Thirteenth Prof S P Ray Chaudhuri 75th Birthday Endowment Lecture delivered during the conference. The abstracts of award winning presentations by student members are also appended to give a glimpse of the research activities going on in the leading areas of cell biology.

The XXXV All India Cell Biology Conference will be hosted by National Institute of Science Education and Research, Bhubaneswar, from 16th to 18th December 2011. All the members will shortly have the first circular of the Conference from Dr Chandan Goswami (chandan@niser.ac.in), Institute of Physics Campus, Sainik School Post Office, Bhubaneswar 751 005.

Last year the society organized a three-day hands-on workshop on Cell Biology Experiments for School and College Teachers from various places of our country at Banaras Hindu University. A report of the same is presented in this Newsletter. For this year we invite proposals from the members to organize the workshop of the same kind for teachers and announcement is given on the inner back cover of this Newsletter.

Last year the society also conducted two lecture series by eminent Cell Biologists, one in SPVM Degree College in village Govantla, Anantapur and the second one in U P College, Varanasi. The proposals to organize such lectures in colleges of remote areas are invited.

Nominations for the Prof J Das Memorial Lecture for 2011 are invited in the format given in this edition. The prestigious lecture will be delivered in the XXXV All India Cell Biology Conference at Bhubaneswar in December 2011.

Election of the office bearers of the Society was held last year and the names of the new executive Committee is given in the inner front cover page.

In order to view the income-expenditures during the year 2010-11 and the financial status of the society, we request you to please see the audited statements in the last two pages of the newsletter.

Indian Society of Cell Biology has grown over the years and now has its own website (www.iscb.org.in) which includes the list of all the members. Last year an effort was made to correct the addresses and E-mail IDs of members, but still many addresses and E-mail IDs are incorrect. We request all the members to kindly go through the entire list and to please let us know if you can update any of them.

We look forward to meeting you all during the conference at Bhubaneswar.

With best regards,

Madhu G Tapadia
(Executive Secretary)

Yours sincerely,

J K Roy
(Secretary)

***Drosophila melanogaster* in understanding the genetics of complex human neurodegenerative disorders**

Akanksha

Cytogenetics Laboratory, Department of Zoology, Banaras Hindu University, Varanasi, 221005

Neurodegeneration, as the name implies, is associated with degenerating neurons and is one of the most devastating groups of disorders. Neurodegenerative diseases constitute a heterogeneous group of late onset disorders resulting in loss of specific brain function/s and thereby leading to declination of physiological activities of different body parts. Ataxia, absence of muscle coordination leading to movement defect and dementia, impairment of memory and reasoning abilities, are the common symptoms of neurodegeneration. Neurodegeneration may result from altered conformation and metabolism of certain protein/s as in Alzheimer's disease (AD), Tauopathies, Parkinson's disease (PD), amyotrophic lateral sclerosis (ALS) and poly-glutamine repeat expansion diseases (like Spinocerebellar ataxias (SCA) 1, 2, 3, 6, 7 and Huntington's chorea). In other cases, like the Spinobulbar muscular atrophy, SCA8, Fragile X associated tremor/ataxia syndrome, impaired RNA metabolism is found to be the causal factor for the neurodegeneration (see also Bilen and Bonini, 2005).

In order to find cure, etiology of the diseases must be understood in depth. Studying the mechanism of various human diseases and their therapeutics requires thorough genetic, cell biological and biochemical studies. *In vitro* cell culture studies provide preliminary indications which need *in vivo* validations. However, results of *in vitro* studies may not provide complete information about *in vivo* condition. Therefore, different other model systems viz. *Saccharomyces cerevisiae*, *Caenorhabditis elegans*, *Drosophila melanogaster* and rat/mouse have been developed to understand the bases of these disorders and to identify their genetic and therapeutic modifiers.

Why should *Drosophila melanogaster* be more advantageous over other eukaryotic models for studies relating to neurodegeneration in humans? Answer lies in the fact that even though the flies are invertebrates, more than 50% of the fly genes are homologous to human genes (Rubin et al., 2000) and approximately 75% of the known human genes involved in different genetic disorders have homologs in the fruit fly (Reiter et al., 2001; Chien et al. 2002). In spite of the significant evolutionary divergence between flies and humans, molecular mechanisms underlying organogenesis, patterning of body axes and cell proliferation etc remain highly conserved between them. Further, the availability of battery of genetic tools and ease of transgenesis in *Drosophila* makes it very convenient to undertake unbiased as well as candidate-gene based approaches for screening of genetic modifiers of the neurodegeneration..

The other advantage offered by the fly models is the ease of examining the neurodegeneration phenotype in a non-invasive manner. Fly models offer several assays to measure the degree of neurodegeneration. These include lethality, structural and functional organization of eyes and behavioral defects. The compound eyes of flies provide a very good model because they are made up of neuronal as well as non-neuronal cells and are dispensable for survival. Neurodegeneration in flies results in loss of photoreceptors that leads to different degree of roughening in the eyes, which can be easily identified in adult flies. The efficiency of motor functions is analyzed by a simple climbing assay (Marsh and Thompson 2004). A large number of studies using flies have indeed established that the nature and consequences of neurodegeneration in flies recapitulate many of the features of different human neurodegenerative disorders.

Studies employing flies involve analysis of either the endogenous fly homologues of the human disease gene or introduction of a normal/mutated form of the human disease gene in *Drosophila* genome. Among the various genetic tools, the UAS-GAL4 bipartite system adapted in *Drosophila* from yeast is widely used for generating the fly models of neurodegeneration. The GAL4-UAS system enables conditional ectopic gene expression in tissue- and time- specific manner (Brand and Perrimon, 1993). For generating disease models of flies, transgene carrying altered/pathological form of the disease gene is placed downstream of the UAS (upstream activator sequences) which permits its expression following binding of the GAL4 transcription factor to the UAS. Tissue specific expression of GAL4 is controlled by the promoter present upstream of the GAL4 coding sequences. Studying the neurodegeneration in flies requires expression of the mutated gene in the neuronal cells. Therefore, the *elav-GAL4*, expressed in all neuronal cells or the *GMR-GAL4*, which produces GAL4 in all differentiating cells in late larval eye imaginal discs, are most commonly used to drive expression of the target transgene.

The first human neurodegenerative disorder to be modeled in *Drosophila* was for SCA3 (Warrick et al., 1998), followed by that for Huntington's disease (Jackson et al., 1998). Subsequently, many others have been modeled; some of these are listed in Table 1.

Even though it appears that flies provide a better system for disease related studies, what kind of contributions to the understanding of neurological disorders can be made using the flies? Candidate-gene based and unbiased genome wide genetic screenings in the fly models of neurodegeneration have identified many novel genetic modifiers (see Mallik and Lakhota, 2010). Such modifier screens have facilitated understanding of the network of molecular and cellular events underlying various disease processes. Parallely, *Drosophila* is also being exploited to validate hypotheses built upon the bases of studies carried out on other model organisms. Not only have these tiny organisms proven good for the genetic modifier screening, they also provide a good platform for large scale screens for possible therapeutic compound.

Though on the basis of structural similarities, the *Drosophila* genome seems to carry many human gene homologs, one has to establish their functional analogy and their involvement in common functional networks. Moreover, since flies may have a different set of metabolizing enzymes for a particular drug than that in mammalian system, the efficacy of such drugs on humans needs to be established in each case. The cellular milieu of *Drosophila* is certainly different from that of the vertebrate, thus the results obtained have to be carefully recapitulated in higher organisms. Despite such evolutionary differences, flies provide an easily tractable and rapid screening system that speeds up the process of identifying the causal as well as therapeutic factors for such diseases.

Table 1: Some examples of neurodegenerative disorders modeled in *Drosophila*

Disease	Fly models	Protein/RNA affected
Parkinson	Rotenone treatment; expression of Wt and mutant human α -synnuclein; disruption of <i>dParkin</i> , <i>Djl-a</i> , <i>Djl-b</i> and <i>dPink</i>	α -synuclein
Alzheimer	Expression of <i>dPresenilin</i> , human presenilin A β 40, A β 42, APP and γ -secretase	tau, β -amyloid, amyloid precursor protein, Presenilin
SCA-1	Expression of Wt (Q30) and mutant (Q82) versions of human <i>Atx1</i>	Ataxin1 (no. of expanded repeats required for pathogenicity: 40-83)
SCA-2	Disruption of <i>dAtx2</i>	Ataxin2 (no. of expanded repeats required for pathogenicity: 33-77)
SCA-3	Expression of Wt (Q27) and mutant (Q78) versions carboxy terminus of human <i>Atx3</i>	Ataxin3 (no. of expanded repeats required for pathogenicity: 55-86)
SCA-7	Expression of truncated Ataxin7 protein with Q10 (Wt) and Q100 (mutant)	Ataxin7 (no. of expanded repeats required for pathogenicity: 38-130)
SCA-8	Expression of Wt (CTG9) or mutant (CTG112) version of human SCA8 non-coding RNA	no. of expanded repeats required to convert the non coding RNA pathogenic: 100-155
Fragile X chromosome	Expression of human FMR1 with 90 CGG repeats	FMR1 protein no. of expanded repeats required for pathogenicity: >200)
Huntington	Expression of amino terminal of human huntingtin with Q75, Q93, Q120 and Q128 repeats	Huntingtin (no. of expanded repeats required for pathogenicity: 36-121)
Kennedy/SBMA	Expression of human mutant androgen receptor with 52 glutamine repeats	Androgen receptor (no. of expanded repeats required for pathogenicity: 38-62)

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XXXV ALL INDIA CELL BIOLOGY CONFERENCE

16th to 18th December 2011

will be hosted by

**National Institute of Science Education and Research,
Bhubaneswar 751 005.**

Convener : Dr Chandan Goswami (chandan@niser.ac.in)

XXXIV ALL INDIA CELL BIOLOGY CONFERENCE, KOLKATA

(December 4 to 6, 2010) : A REPORT

The annual meeting of the Indian Society of Cell Biology, the “XXXIV All India Cell Biology Conference & Symposium on Quantitative Biology: From Molecules to Cells” was organized by Bose Institute, Kolkata, from 4th to 6th of December, 2010. Dr Joyoti Basu and Dr Manikuntala Kundu were the Convenors of the conference.

The conference was inaugurated in the morning of the first day by Dr S Raha, the Director of Bose Institute along with Dr S C Lakhota, BHU, Dr S E Hasnain, University of Hyderabad and Dr Rita Mulherkar, President, Indian Society of Cell Biology. Dr S Raha welcomed the guests, Dr Rita Mulherkar gave the Presidential remarks while J K Roy, Secretary ISCB, presented a brief history of Indian Society of Cell Biology and Dr S E Hasnain delivered his inaugural lecture under the chair of Dr S C Lakhota. He lucidly talked about the survival strategies of Mycobacterium tuberculosis crippling host immune response by PE/PPE group of proteins. The conference included Prof S P Ray-Chaudhuri 75th Birthday Endowment Lecture by Dr Veena K Parnaik, Centre for Cellular & Molecular Biology, Hyderabad; 32 invited lectures, 12 proffered oral presentations by students competing for award, 1 proffered oral presentation in non-award category, 37 poster presentations in award category, 37 posters in non-award category and the meeting of Executive Committee and General Body of Indian Society of Cell Biology.

THIRTEENTH PROF S P RAY-CHAUDHURI 75TH BIRTHDAY ENDOWMENT LECTURE

The Prof S P Ray-Chaudhuri 75th Birthday Endowment Lecture, a prestigious award lecture, was delivered by the distinguished scientist, Dr Veena K Parnaik, CCMB, Hyderabad. The session was chaired by Dr Rita Mulherkar (President of ISCB,). In her talk, Dr Parnaik gave a lucid account on Nuclear lamins, their interaction with some of the cell cycle regulators in organizing the nucleus and emphasized on differentiation defects in myoblasts in laminopathies.

SESSION I : DEVELOPMENTAL BIOLOGY

The first session of the conference on Developmental Biology had three invited lectures, chaired by J K Roy, BHU. In the first lecture Dr L S Shashidhara, IISER-Pune, talked about the regulation of homeotic gene, *ultrabithorax*, during *Drosophila* pattern formation. Dr Shubha Tole, TIFR, Mumbai, discussed about the molecular switch for brain cerebral cortex development. Dr Madhu G Tapadia, BHU, Varanasi, showed the requirement of ecdysone for normal development of Malpighian tubule in *Drosophila*.

SESSION II : VIRUSES AND THEIR INTERACTION WITH THE HOST

The pre lunch session of the day was on Viruses and their interaction with the host, chaired by Dr D J Chattopadhyay, University of Calcutta, Kolkata, had two invited talks. Dr D P Sarkar, DU South Campus, New Delhi, elegantly showed how Akt and MAP kinase pathway is triggered which leads to fusion of virus with host cell. Dr R Varadarajan discussed how the envelope glycoproteins of HIV-1 remain non-exposed to the host immune system and how the outer domain of the glycoproteins can be used to design immunogens to trigger better antibody response of the host.

SESSION III : QUANTITATIVE BIOLOGY

The post-lunch session of the day was on Quantitative Biology, chaired by Dr Indrani Bose, Bose Institute, Kolkata. This session included three invited lectures. Dr A Narang, IIT-Delhi discussed about repression of *lac* operon in presence of glucose with the help of proposed minimal model, while Dr R Mallick, TIFR, Mumbai discussed elegantly the roles of kinesin and dynein, the + and – directed motors in carrying endosome on microtubule rail road and their help in fusion and fission of vesicles. Dr R Paul, IACS, Kolkata showed the role of microtubules in assembly of normal Golgi complex with the help of mathematical model.

SESSION IV : REGULATION OF GENE EXPRESSION

The evening session of the day on Regulation of gene expression, had three invited lectures chaired by Dr L S Shashidhara, IISER-Pune. Dr Rashna Bhandari, CDFD, Hyderabad, showed the roles of inositol pyrophosphates in rDNA transcription leading to biogenesis of ribosomes. Shikha Laloraya, IISc, Bangalore, demonstrated that a tRNA^{GLU} gene present in the boundary of rDNA serves as a barrier in spreading of gene silencing and thus keeping the rDNA locus selectively active. Dr K Sengupta, Chicago, demonstrated that the strachability defect in nuclear lamins in laminopathies disturb inner architecture of nucleus thereby modulating gene activities.

SESSION V : MEMBRANE FUSION AND TRAFFICKING

The morning session of the second day began with the session on Membrane fusion and trafficking, chaired by D P Sarkar, DU-South Campus, New Delhi. The session included three invited lectures. Dr A Mukhopadhyay, NII, New Delhi, demonstrated that a phagosome that has engulfed *Salmonella*, recruits LAMP-1 (a lysosomal marker) but does not fuse with a lysosome. This indicates alternate pathway/s of endosome trafficking. Dr S Gangisetty, IISc, Bangalore, discussed about the targeted fusion of endosomes in melanocytes regulated by Bloc proteins and also showed sorting/fusion defects seen in certain syndromes. Dr D Bhattacharya, ACTREC, Navi Mumbai, showed that organelle size and number control mechanisms operate in a cell.

SESSION VI : BACTERIAL PATHOGENS

The second session of the second day on Bacterial pathogens had two invited lectures. The session was chaired by Dr Parul Chakraborty, Bengal Tuberculosis Association, Kolkata. Dr K N Balaji, IISc, Bangalore, discussed about Notch 1 signalling following infection of macrophages with mycobacteria. Dr D K Mitra, AIIMS, New Delhi emphatically discussed about the important roles of T-regulatory cells in protective immune response and their disability in Tuberculosis.

SESSION VII : MOLECULAR MICROBIOLOGY

The pre-lunch session of the second day on Molecular Microbiology had three invited lectures and three short talks by GE healthcare, ABCAM and Centre for Molecular Platforms. The session was chaired by Dr A Mukhopadhyay, NII, New Delhi. Dr Sudha Bhattacharya, JNU, New Delhi evidenced active retrotranspositions in a cell line of *Entamoeba histolytica* which provides a model system to study impact of transpositions in pathogenesis. Saman Habib, CDRI, Lucknow, discussed about a nuclear- encoded DnaJ homologue that binds to *ori* site of the circular *Plasmodium falciperum* and may have important role in replication/repair and may serve as a potential target for drug intervention. Dr H S Misra, BARC discussed about DNA damage response in a radio-resistant prokaryote, *Deinococcus radiodurans*.

SESSION VIII A : PROFFERED ORAL PRESENTATIONS FOR AWARD

The post-lunch session of the second day had four presentations by enthusiastic student members under the chair of Dr S M Ghaskadbi, ARI, Pune. These lectures were evaluated by a panel of three judges. Mr B P D Purkayastha, BHU, Varanasi demonstrated the important role of BRN3a in HPV-induced cervical cancer, while Mr S Nath, IICB, Kolkata, assigned a new transcription regulatory function to the spindle assembly checkpoint protein, Cdc20. Ms Sweta Singh, IIT-Kanpur, discussed the role of defects in mRNA metabolism in Lafora disease and in other neurodegenerative disorders. Mr Sourav Sanyal, Bose Institute, Kolkata, described polyphosphate kinase-2 as a modulator of intracellular nucleotide pool in *Mycobacterium* while residing within macrophages.

SESSION IX : RNA BIOLOGY

The evening session of the second day on RNA Biology had three invited lectures chaired by Dr Sudha Bhattacharya, JNU, New Delhi. Dr S K Mukherjee, ICGEB, New Delhi, showed suppression of RNAi mediated mechanism of host defense by viral coded AC2 protein. Dr S N Bhattacharyya, IICB, Kolkata, demonstrated miRNA mediated gene repression process in processing bodies in a cell, while Dr D Palakodeti, InStem, Bangalore, discussed about Piwi-RNAs in planaria involved in transposition.

SESSION X : IMMUNE SIGNALLING AND SYSTEM LEVEL ANALYSIS

The morning session of the third day began with the session on Immune signaling and system level analyses, had two invited lectures. The session was chaired by Dr P Reddanna, University of Hyderabad. Dr Riitta Lahesmaa, University of Turku, Finland, discussed about human T-helper cell differentiation and analysis of its regulation by genome wide screening. On the other hand Dr P Malhotra, ICGEB, New Delhi, spoke on the identification of extracellular secretory proteins of *Plasmodium falciparum* from infected host cells which downregulate host immune system.

SESSION XI : PLANT BIOLOGY AND RESEARCH WITH TRANSLATIONAL POTENTIAL

The second session of the third day on Plant biology and research with translational potential, had four invited lectures. The session was chaired by Dr Sampa Das, Bose Institute, Kolkata. Dr S K Ape, BARC, Mumbai, demonstrated genetic manipulation of nitrogen fixing *Anabaena* strains using a new integrative expression vector, pFPN, for its potential application in the field. Dr S Chattopadhyay, NIT, Durgapur, discussed interaction of three gene products, MYC2, COP1 and SPA1, which are responsible for receiving light signal during the development of *Arabidopsis* seedling. Dr P Reddanna, University of Hyderabad, showed that the bioactive oxylipids, such as oxygenated linoleic acid and linolenic acid act as signaling molecules and regulate growth and development, ripening and cell death in plants. Dr Subhra Chakraborty, NIPGR, New Delhi, identified regulatory networks that are involved in species specific immune and nutrient response in crop plants.

SESSION XII : CANCER BIOLOGY AND NEUROBIOLOGY

The pre-lunch session of the third day had four invited lectures on the areas Cancer biology and Neurobiology. The session was chaired by Dr Rita Mulherkar, ACTREC, Navi Mumbai. Dr Pritha Ray demonstrated how molecular imaging technique is used to monitor the status of tumour growth in vivo in model animals. In an interesting talk Dr S Chatterjee, NCBS, Bangalore demonstrated that long-term stress can affect pyramidal neurons in hippocampus and cortex in an opposite manner. Also long-term stress has prolonged effect on emotional behaviour in rat model and this can be altered using certain psychiatric drug. On the other hand Dr Sukla Ghosh, Calcutta University vouched for Zebra fish as a good model system for studying spinal cord regeneration following injury, while Dr C Goswami, NISER, Bhubaneswar demonstrated the involvement of microtubule stabilization in the regulation of growth cone and filopodia formation.

SESSION VIII B : PROFFERED ORAL PRESENTATIONS

The post-lunch session of the third day also had eight presentations by enthusiastic student members competing for award and one presentation in non-award category under the chair of Dr H S Misra, BARC, Mumbai. As in session VIII A, these lectures were also evaluated by the same judges. Ms Padmaja Nipanikar, BARC (non-award category), talked about ORF 'alr3199' of *Anabena sp* as a novel Hemerythrin DNase, probably involved in stress response. On the other hand Mr A Sinha, CCMB, Hyderabad, demonstrated that the RecA independent RecBCD pathway for DNA repair is essential for cold adaptation of Antarctic *Pseudomonas syringae*. Mr D Tomar, IAR, Gandhinagar, demonstrated that TRIM13, an ubiquitin E3 ligase, has a role in induction of autophagy which may play important role in ERAD pathway and in ER stress related pathological conditions. Mr A K S Gautam, ACTREC, Navi Mumbai, discussed structural basis of protein degradation by the proteasomes in a hierarchical step wise manner, while Mr M P Ramteke, from the same group presented a new ATP binding site in 14-3-3 ζ , which is a highly conserved protein having regulatory role in cell signaling. Mr P K Singh, IIT-Kanpur, demonstrated that Laforin-malin complex regulate cellular glucose homeostasis with help of 5' adenosine monophosphate-activated protein kinase (AMPK). Ms Madhuvanti Chatterjee, Bose Institute, Kolkata, presented functional analysis of upstream elements of a differentially expressed gene of white mustard which is involved in defense response against the fungal pathogen, *Alternaria brassicicola*. Ms Arunita Chatterjee, IISc, Bangalore, discussed the importance of indirect flight muscles of *Drosophila* in life span and in optimal stress tolerance, while Mr Shikha Srivastava, BHU, Varanasi, demonstrated downregulation of WWOX gene in cervical cancers.

POSTER SESSIONS :

A total of seventy four posters were presented on the diverse areas of Cell Biology during the poster sessions on all the three days of the conference. A large number of posters were from student members. Thirty seven of them were competing for award and they were judged by a panel of four judges. Most of the posters, especially the students' posters, were of high quality. Since these sessions gave an opportunity to all the interested participants to search the posters of their interest and to discuss the work at length, good interactions between the presenting author and the participants were seen. As large number posters were presented, the highlights of them are not being presented here.

AWARDS TO STUDENT MEMBERS

On the whole the deliberations through platform and poster were stimulating and highly educating. Out of twelve oral presentations by student members, the paper entitled "Novel transcription regulatory function of spindle assembly checkpoint protein Cdc20" by Somsubhra Nath, Taraswi Banerjee, Tania Das, D Sen and S Roychoudhury, Indian Institute Chemical Biology, Kolkata, was selected for Prof A S Mukherjee Memorial Prize and the paper entitled "Importance of mRNA dysregulation in neurodegenerative disorders" by Sweta Singh and S Ganesh, Indian Institute Technology, Kanpur, received Prof S R V Rao Prize.

Out of 37 posters presented by student members, the poster entitled "Importance of P-body in differentiation of neurons" by Somi Patranobis and S Bhattacharyya, Indian Institute of Chemical Biology, Kolkata, was given Prof B R Seshachar Memorial Prize; the poster entitled "Discovery and characterization of novel regulators of HSF1 and their role in heat shock response" by Mamta Upadhyay, Ishima Badhwar, Sonali Sengupta, and S Ganesh, Indian Institute Technology, Kanpur, was adjudged Prof S R V Rao Prize; the poster entitled "Role of early defense responses in the fate of plant-microbe interaction" by Rumdeep Kaur Grewal, Bodhisattwa Saha, Moniya Chatterjee and Sampa Das, Bose Institute, Kolkata, received Dr Mansi Ram Memorial Prize; while the posters entitled "Developmental stage specific expression of Anti-microbial peptides (AMPs) in Malpighian tubules of *Drosophila melanogaster* by Puja Verma, and Madhu G Tapadia, Banaras Hindu University, Varanasi; *lethal(3) tumorous brain*, a novel tumour suppressor gene, is identified as an allele of *decapping protein 2* in *Drosophila melanogaster*" by Rakesh Mishra and J K Roy, Banaras Hindu University, Varanasi; "Antioxidant enzyme system during early chick embryonic development" by Kirithi Ghodke, Saroj Ghaskadbi and Surendra Ghaskadbi, Agharkar Research Institute, Pune, and "Temporal and spatial expression pattern of *dlin52* in *Drosophila*" by Pradeep Kumar Bhaskar and Mousumi Mutsuddi, Banaras Hindu University, Varanasi, received Conference Prizes.

Report prepared by

J K Roy

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FROM TREASURER'S DESK

All ordinary and student members of the society are requested to renew their membership, if it has not already been done. Demand drafts may be drawn in favour of "Indian Society of Cell Biology" payable at 'Lucknow' and may be sent to Dr Monisha Banerjee, Treasurer ISCB, Department of Zoology, Lucknow University, Lucknow 226 007.

Thirteenth Prof S P Ray-Chaudhuri 75th Birthday Endowment Lecture

on

Novel Insights into Spatial and Functional Organization in the Nucleus

delivered in XXXV All India Cell Biology Conference, Kolkata

by

Veena K Parnaik

Centre for Cellular and Molecular Biology, Hyderabad 500 007

In the eukaryotic nucleus, crucial functions are performed in a highly organized and efficient manner despite the tremendous complexity of the genome. Molecules involved in specific nuclear functions are localized in spatially distinct nuclear domains or compartments, such as nucleoli, splicing factor compartments, transcription sites, DNA replication centres and several others (1). The nucleus is segregated from the cytoplasm by a double-layer membrane termed the nuclear envelope. The outer nuclear membrane is contiguous with the endoplasmic reticulum, while the inner nuclear membrane is associated with a filamentous network of proteins called the nuclear lamina. The major components of the lamina are a group of nuclear proteins termed the lamins which belong to the Type V intermediate filament superfamily of proteins (2, 3). The lamina plays an essential role in maintaining the integrity of the nuclear envelope and provides anchoring sites for chromatin, and is hence considered to be an important determinant of interphase nuclear architecture. Two major kinds of lamins are present in higher eukaryotes. The B-type lamins are constitutively expressed in all somatic cell types whereas the expression of A-type lamins is restricted to differentiated cells of most lineages. Mutations in the human lamin A gene have been associated with at least 15 debilitating inherited diseases, collectively termed laminopathies, that affect specific tissues such as skeletal muscle, cardiac muscle, adipose tissue and bone, and also cause premature ageing or progeria syndromes.

It is becoming increasingly evident that the regulation of biological processes in the crowded environment of the nucleus is likely to be facilitated by structural elements such as lamins and actin. Lamins are essential for the spatial organization of DNA replication and transcription in mammalian nuclei (2, 3). We have demonstrated a structural role for lamins in supporting nuclear compartments containing RNA splicing factors (4), and these internal lamin domains have been proposed to mediate the spatial coordination of transcription and pre-mRNA splicing in the nucleus (5).

A long-standing question in the field is how do mutations in lamin A, which is expressed in nearly all differentiated tissue types, cause several diseases, many of which are tissue-specific. An emerging concept is that lamins influence specific signalling pathways by sequestration of key regulatory factors under normal conditions, and these interactions may be disrupted by lamin A mutations. As the majority of mutations in the lamin A gene cause Emery-Dreifuss muscular dystrophy (EMD), we have been investigating muscle-specific functions for lamin A. During the early stages of muscle differentiation, there is an upregulation of important regulatory factors such as myogenin, cyclin D3 and cyclin-dependent kinase inhibitors. Using cultured C2C12 myoblasts, we have shown that internal lamins are rearranged during muscle differentiation to a uniform, diffuse pattern in a process that is unique to muscle cells and is induced by cyclin D3 and the retinoblastoma protein (6, 7), and we have also demonstrated direct binding interactions between lamin A and cyclin D3 (8). Moreover, mutations in lamin A affect signalling pathways involved in muscle differentiation, leading to abrogation of differentiation and cell death (9).

A number of reports suggest that lamins are important for chromatin organisation, including *in vitro* binding data and studies on the association of lamins with chromatin-binding proteins (2, 3). This is further supported by evidence of abnormalities in heterochromatin organisation in cells from laminopathic cells. We have examined the expression of heterochromatin markers such as heterochromatin protein 1 (HP1) in HeLa cells expressing wild-type lamin A, the EMD mutants G232E, Q294P or R386K, or the mutant R482L which causes familial partial lipodystrophy. There are three isoforms of mammalian HP1, HP1 α , β and γ . HP1 α and β are enriched in heterochromatic regions and localize as distinct foci in pericentric heterochromatin, whereas HP1 γ has been detected in both euchromatin and heterochromatin. We have observed that the majority of cells expressing the aggregate-forming mutants G232E, Q294P or R386K showed reduction of HP1 α and nearly complete depletion of HP1 β though the expression of HP1 γ was not significantly affected. On the other hand, cells expressing wild-type lamin A or R482L, which assembled normally at the nuclear periphery, displayed normal patterns of expression of HP1 α , β and γ . Treatment with proteasomal inhibitors led to restoration of

levels of HP1 isoforms and also resulted in stable association of lamin mutants with the nuclear periphery, rim localization of the inner nuclear membrane lamin-binding protein emerin and partial improvement of nuclear morphology. A comparison of the stability of HP1 isoforms indicated that HP1 α and β displayed increased turnover and higher basal levels of ubiquitination than HP1 γ . We have examined whether specific components of the ubiquitin-proteasome system are activated by the mutants. This system is comprised of an E1 ubiquitin activating enzyme, an E2 ubiquitin conjugating enzyme and an E3 ubiquitin ligase. Substrate specificity is conferred by the large variety of E3 enzymes that can recognize distinct substrates through specific domains or modules. Importantly, transcript analysis of components of the ubiquitination pathway showed that a specific F-box protein, FBXW10 was induced several-fold in cells expressing lamin mutants and ectopic expression of FBXW10 in HeLa cells led to depletion of HP1 α and β without alteration of HP1 γ levels (10). Interestingly, depletion of HP1 proteins has also been observed in a *Drosophila* model of lamin misexpression (11).

Premature ageing diseases can result from defects in the cellular response to DNA damage. We have observed that the ability of HeLa cells expressing deleterious lamin mutants to form DNA repair foci in response to mild doses of cisplatin or UV irradiation was markedly diminished, unlike the normal response of cells expressing wild-type lamin A.

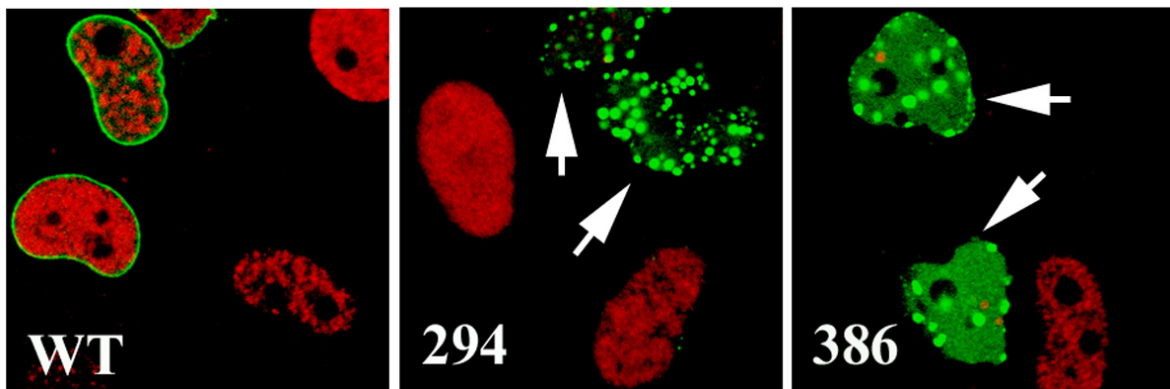


Figure: In response to the DNA damaging agent, cisplatin, HeLa cell nuclei expressing GFP-tagged wild-type lamin A (green) form DNA repair foci containing phosphorylated histone H2AX (red) whereas nuclei expressing the lamin mutants Q294P or R386K (green) are unable to do so (arrows).

Interestingly, mutants that impaired the formation of DNA repair foci caused the depletion of Ataxia-telangiectasia-mutated-and-Rad3-related (ATR) kinase, which is a key sensor in the response to DNA damage. The depletion of ATR kinase in cells expressing lamin mutants is likely to be due to proteasomal degradation (unpublished data). Our findings suggest that ubiquitin-mediated proteasomal degradation of essential nuclear proteins may afford a distinct mechanism for the deleterious effects of disease-causing lamin mutants, and abnormalities in nuclear morphology caused by these mutants may be alleviated by treatment with proteasomal inhibitors.

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ABSTRACTS OF AWARD WINNING STUDENT PRESENTATIONS
during XXXV All India Cell Biology Conference, Kolkata

PROF A S MUKHERJEE MEMORIAL AWARD FOR ORAL PRESENTATION

Novel transcription regulatory function of spindle assembly checkpoint protein Cdc20

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Progression through mitosis requires precisely timed ubiquitin-dependent degradation of specific substrates. UbcH10, an ubiquitin-conjugating enzyme, plays a crucial role in the anaphase promoting complex / cyclosome (APC/C) during progression of and exit from mitosis. Similarly, spindle assembly checkpoint (SAC) protein Cdc20 plays an important role in transition from metaphase to anaphase by activating APC/C. Cdc20 itself gets ubiquitinated by UbcH10 and thus is activated to bind with APC/C. Any defect in chromosome alignment activates SAC by blocking Cdc20 and such anaphase transition is arrested. Earlier our lab reported that Cdc20 overexpression in head and neck tumors led to defective SAC resulting in aneuploidy. This prompted us to examine the regulation of UbcH10 expression in Cdc20 upregulated condition.

Initially, we observed a correlation in the expression of both Cdc20 and UbcH10 in different primary tumors and cancer cell lines. Next, a dose-dependent increase in endogenous UbcH10 levels was found upon ectopic expression of Cdc20. Alternatively, *CDC20* knockdown by siRNA led to downregulation of endogenous UbcH10. Activation of *UBCH10* promoter-luciferase activity by Cdc20 indicated the regulation at transcriptional level. ChIP assay showed the presence of Cdc20 on *UBCH10* promoter leading to chromatin remodeling by interacting with CBP/p300. APC/C-CBP / p300 complex is reported to be involved in transcription regulation. Here, we validated the presence of APC/C in the *UBCH10* promoter. Further from ChIP and Co-IP assay we established that Cdc20 regulates APC/C and CBP / p300 association and thus modulates APC/C-CBP / p300 mediated transcriptional regulation of *UBCH10*. Also, we found cell cycle specific regulation of expression UbcH10 by Cdc20.

PROF S R V RAO AWARD FOR ORAL PRESENTATION

Importance of mRNA dysregulation in neurodegenerative disorders

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An emerging theme in understanding of various neurodegenerative disorders is the malfunction of common molecular pathways underlying the diverse symptoms seen due to defects in proteins of different functional classes. For example, defects of protein quality control mechanism and stress responsive pathways have been implicated in disease like Parkinson's, Huntington's, Alzheimer's and amyotrophic lateral sclerosis. Similarly defects in mRNA metabolism is now thought to be important component of several neurological disorders like Huntington, amyotrophic lateral sclerosis, spinocerebellar ataxias, spinal muscular atrophy and fragile X syndrome. In the present study, we investigated the role of laforin phosphates and malin E3 ubiquitin ligase- the two proteins defective in Lafora disease, in mRNA processing. Lafora disease is one the fatal forms of progressive myoclonus epilepsy, and is characterized by the presence of glycogen like inclusion in neurons. Our results show that laforin and malin get recruited to the processing bodies (the mRNA silencing/degrading foci in the cell), in stress granules (mRNA silencing foci formed only under stress) and the polysomes. We show that malin is an important regulator of several components of mRNA degradation machinery and therefore it is essential for maintaining the delicate balance between translation and mRNA degradation. We will discuss the role of defects in mRNA metabolism in Lafora disease and contrast it with other neurodegenerative disorder.

PROF B R SHESHACHAR MEMORIAL AWARD FOR POSTER PRESENTATION

Importance of P-body in differentiation of neurons

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In eukaryotic cells, processing bodies (P bodies) control post transcriptional regulation as they consist of proteins involved in mRNA turnover. From previous studies, it has been observed that the cellular distribution and functionality of these proteins is somewhat different between non-polar and polar cells. PC12 cell line, a cell line derived from pheochromocytoma of the rat adrenal medulla, stops dividing and terminally differentiates to cells with neurite outgrowth when treated with nerve growth factor (NGF), which makes PC12 cells useful as a model system for neuronal differentiation. Intracellular mRNA transport and local translation in association with different P body components, is known to play an important role in neuronal physiology. Differences have been observed in the quantitative and qualitative status between the P bodies of naïve and differentiated PC12 cells. The proteins associated with P bodies have a general trend to increase with NGF induced differentiation. Hence, it was relevant to test whether the components of P body have a role in the differentiation process. This was done by over-expressing the components of P body and observing their effect on PC12 cells. Observations indicate that PC12 cells do differentiate in absence of NGF when P body components are over-expressed. The effect of down-regulation of these components would also be interesting to observe. Thus, our study involves understanding the importance of the components of P body in differentiation of PC12 cells and to confirm the observation in primary culture of rat sympathetic neurons to validate the results obtained with PC12 cells.

PROF S R V RAO AWARD FOR POSTER PRESENTATION

Discovery and characterization of novel regulators of HSF1 and their role in heat shock response

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Exposure of cells to conditions of environmental stress such as heat shock, oxidative stress, heavy metals, or pathologic conditions, such as ischemia, inflammation, tissue damage, infection, and mutant proteins associated with genetic diseases, -results in the inducible expression of heat shock proteins (Hsps) that function as molecular chaperones. Chaperone system also provides protection against stress induced apoptosis. Inducible expression of Hsps at the transcriptional level primarily done by heat shock factor1 (HSF1). HSF1 is negatively regulated by molecular chaperones Hsp70 and Hsp90 under normal physiological conditions. Besides chaperones, several other regulators of HSF1 are known- one of them is dual function co-chaperone/ubiquitin ligase CHIP (C-terminus of Hsp70 interacting protein). Previous studies have found that CHIP plays a central role in maintaining protein quality control and coordinating the response to stress through transcriptional activation of HSF1. Since, HSF1 is critical component in stress response pathway and confers protection against stress mediated apoptosis, we screened candidate interacting proteins that interact with and regulate the transcriptional activity of HSF1. We identified two proteins that interact with HSF1 and regulate its activation under thermal stress. In this presentation we will show that these two proteins are essential for the cell to mount stress response and that they are critical for transcriptional activation of HSF1 under physiological stress.

DR MANASI RAM MEMORIAL AWARD FOR POSTER PRESENTATION

Role of early defense responses in the fate of plant-microbe interaction

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Plants are constantly exposed to microbes and they have evolved effective immune system that make them to able resist potential attack by most pathogenic microbes, but for disease to occur the microbes must breach plant defense system. Plants, unlike mammals lack mobile defender cells and somatic adaptive immune system. Instead they rely on innate immunity of each cell and signals emanating from infection sites. Perception of microbe attack leads to a number of rapid physiological, biochemical and molecular changes including generation of reactive oxygen species, antimicrobial chemicals, hydrolytic enzymes, ionic fluxes which are detectable in the cells; these are collectively termed as early defense responses. Preformed infection barriers, receptors and components of signaling pathways play a critical role in perception and defense while de novo transcription of plant defense related genes is an early determinative event. In the present study both mRNA and protein expression were analyzed to study the response of *Oryza sativa* in case of compatible and incompatible reactions with the pathogenic bacterium *Xanthomonas oryzae* pv *oryzae* using proteomic and transcriptomic approaches. It was found that plants are able to mount a complex and strong defense response with great rapidity in case of incompatible reaction as compared to compatible reaction. The defense response of the plants detectable as early events even before establishment of the bacterium will be described. Perhaps the failure of such responses allows the establishment of the pathogen in the host system.

CONFERENCE AWARDS FOR POSTER PRESENTATIONS

lethal(3) tumorous brain*, a novel tumour suppressor gene, is identified as an allele of Decapping Protein 2 in *Drosophila melanogaster

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Many of the tumour suppressor genes play important roles during development and differentiation and in the homozygously mutated state, induce malignant or benign neoplastic transformation of specific cell types. In *Drosophila* they act early in development and by this, set the stage for cell specific differentiation of imaginal discs, adult optic neuroblasts, blood and gonial cells. ***lethal(3) tumorous brain*, *l(3)tb***, is a *loss-of-function* mutation causing extended larval life upto 13 days at 24°C and malignant tumour in brain lobes during the extended larval life. For mapping the mutation, recombination events were scored with 'rucuca' and 'ruPrica' chromosomal markers and the mutation has been mapped to 42.3 cM units to the left arm of 3rd chromosome. Various deletion lines belonging to this region has been checked for their complementation with the *l(3)tb*. The complementation status has put the mutation to 71F4-F5 cytogenetic position. This complete region of 27.3 kb was saturated by designing overlapping primers and PCR was performed. Different lethal insertion lines of upstream and downstream genes were checked for their phenotypes in *trans* to the *l(3)tb* mutation. Lethal insertion alleles of *Dcp2* (decapping protein 2) showed phenotypes with *l(3)tb*. *Dcp2* along with *Dcp1* forms a complex which is involved in mRNA turnover in a cell. Decay of messenger RNA is paramount for eukaryotic life and is integral to development, proliferation of cells, environmental response, and the quality control of gene expression. *Dcp2* forms a complex with *Dcp1* for removal of the 5' terminal *N7-methyl guanosine* cap followed by 5'-3' exonucleolysis by *Xrn1*. Characterization of *l(3)tb* as an allele of *Dcp2* would be discussed and possible new role of decapping protein as tumour suppressor would be elaborated.

Developmental stage specific expression of anti-microbial peptides (AMPs) in Malpighian tubules of *Drosophila melanogaster*

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Innate immunity is the sole mechanism of defense against microbial attack in insects. *Drosophila* combat infection via humoral and cellular immune response. Humoral immune response generates circulating anti-microbial peptides. Systemic production of anti-microbial peptides (AMPs) is mediated via the activation of two specific immune signalling pathways – Toll (specific for gram positive bacteria and fungal infection) and Imd (specific for gram negative bacterial infection). Malpighian tubules primarily function in secretion of isotonic fluids. However they also play a novel role in immune sensing and response. Excised tubules are capable of autonomously detecting an immune insult. We have studied the production of different AMPs in Malpighian tubules in different developmental stages before and after immune challenge. We show that in general, production of AMPs in MTs are developmentally regulated. The developmental expression commences from 3rd instar larval stage onwards. However, the various AMPs exhibited varied expression pattern. Survival assay after feeding wild type and immune pathway mutants on different pathogens showed correlation with the expression of AMPs during development.

Antioxidant enzyme system during early chick embryonic development

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Reactive oxygen species (ROS), which are formed by incomplete electron reduction of oxygen, include superoxide ion (O₂⁻), hydroxyl ions (OH⁻) and hydrogen peroxide (H₂O₂). ROS participate in any important cellular processes such as regulation of gene expression, protection from pathogens, etc. Whether they also play any role in controlling embryonic development is not well understood. We have initiated studies in the developing chick embryo to address this issue. Activities of four major enzymes involved in antioxidant defence, namely, catalase, superoxide dismutase (SOD), glutathione reductase (GR) and glutathione peroxidase (GPx) was estimated by spectrophotometric assays at different developmental stages of chick embryo. We find that catalase, GR and GPx are present in measurable amounts from an early embryonic stage i.e., Hamburger Hamilton (HH) stage 4 (18 hrs post-laying) while SOD activity is detectable only after HH stage 20 (72 hrs). High activity of all enzymes is detected at later stages of development when digit formation is at its peak. Examination of the transcripts for these enzymes does not reveal a correlation between mRNA level and activity of the antioxidant enzyme. Treatment of developing chick embryos with a strong oxidizing agent such as H₂O₂ leads to abnormal development with alterations specifically in heart morphogenesis. More than half of the H₂O₂ (2 mM)-treated embryos showed various types of heart abnormalities, such as , an enlarged heart, a looped heart, situs inversus, etc. Experiments are in progress to understand the molecular basis underlying these abnormalities.

Temporal and spatial expression pattern of *dlin52* in *Drosophila*

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In a genetic screen for modulators of *Drosophila* lifespan, a number of mutants were identified. One of the mutant lines's had a P-element insertion in the *CG15929* gene. Bioinformatics analysis revealed that it encodes a *Drosophila lin52* homologue. Strong conservation of this gene was seen across various species, from worms to human. This gene has not yet been characterized, except that it was isolated from a large protein complex containing important regulators of cell proliferation and cell death like dE2F1, dMyb and dRbf. We have cloned *dlin52* cDNA from an imaginal disc library into a transcription vector for generation of ribo-probes. Temporal and spatial pattern of expression of this gene during development has been studied by RT-PCR, RNA *in situ* and immuno-staining. Strong expression of *dlin52* was seen in larval eye discs, brain, fat body, wing discs, antennal disc and salivary gland. Interestingly, strong nuclear localization of the protein was seen in salivary gland and developing photoreceptor cells. Expression of this gene was also seen in the proliferative zone of the larval optic lobe, indicating that this gene may have an important role to play in cell cycle regulation. The spatial and temporal pattern of expression of this gene will help us in better understanding of the function of this protein during various developmental processes.

**SECOND WORKSHOP ON
CELL BIOLOGY EXPERIMENTS FOR SCHOOL AND COLLEGE TEACHERS
(October 22 to 24, 2010) : A REPORT**

The three days hands-on workshop on Cell Biology Experiments for School and College Teachers was organized under the auspices of Indian Society of Cell Biology in Cytogenetics Laboratory, Department of Zoology, Banaras Hindu University, Varanasi from 22nd to 24th October, 2010. Following the announcement, the Principals and several teachers of schools and colleges of various places responded and sent applications. Fifteen of them were selected to participate in the workshop. The workshop included one lecture of 1.5 hours daily followed by the experiments on Cell Biology which can be easily done in class rooms and also some of the experiments to give a flavour of modern cell biology.

Day 1

The workshop began with the lecture of Prof S C Lakhotia, BHU on 'Cell Biology – bridging molecular and organismic biology'. Through his lucid talk he introduced the present day Cell Biology before the teachers and how it developed over the years with the advent of newer technologies. He also emphasized how to make the subject interesting to the beginners. After the lecture, in the pre-lunch session the following experiments were conducted : Staining and observation of cheek epithelial cells, staining and observing Mitochondria in the cheek epithelial cells and differential staining for DNA and RNA in the same cell type. In the post-lunch session the teachers learned quick isolation of DNA from rat liver cells, polytene chromosome preparation from *Drosophila* larvae and carrying out polymerase chain reaction.

Day 2

The second day started with the lecture on 'Cellular Response to DNA Damage, Disease and Cancer' by Dr Mercy J Raman, BHU. She emphasized on mutations caused by chemicals and radiations that result in the deadly diseases, like cancer. The experiments conducted in the pre-lunch session were : study of different stages of mitosis in onion root tip cells, observation of bacterial cells and their plating technique. In the post lunch session the teachers learned different stages of meiosis from grasshopper testis cells, identified different cell types in their blood and did agarose gel electrophoresis for DNA prepared by them on the previous day.

Day 3

The last day had a very informative lecture on 'Genes and diseases' by Prof R Raman, BHU. He narrated about those genes which when mutated cause diseases. He also emphasized on the tests available for the diagnosis, their treatments and prevention. In the pre-lunch practical session the participants observed bacterial plates prepared by them and also observed various mutants of *Drosophila*. In the post lunch session they were given an exposure on Confocal Microscopy and then they had a general discussion with the teachers and students of the laboratory. The workshop ended with the note from the hosts that the participants are always welcome to the Cytogenetics Laboratory, Zoology, BHU, in case any of them need any help in training or conducting experiments in their schools or colleges. Encouraging enthusiasm was seen in the participants.

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LECTURES ORGANIZED IN COLLEGES : A REPORT

Lecture series at SPVM Degree College, Govantla, Anantapur

An one day lecture series having three lectures was organized at SPVM Degree College, Govantla, Anantapur on 18th November 2010. The teachers and all the science students of the college participated in the programme. Prof S Krupanidhi from Sri Satya Sai Prasanti Nilayam delivered a lucid talk mixing English and local Telugu language on the cellular basis of immunity. Dr Madhu G Tapadia from BHU also delivered a lucid talk on Genes, chromosomes, genetic diseases and various model systems to study cell biology and genetics. J K Roy from BHU talked about Cell division and cancer. Participation of students in discussion and their enthusiasm testified that the lectures were understood by them.

Workshop on Cell and Molecular Biology at Udai Pratap Autonomous College, Varanasi

A two days lecture series cum laboratory demonstrations were conducted at Udai Pratap College, Varanasi on 27th and 28th December 2010. A large number of B Sc and M Sc students and teachers participated in the workshop. On the first day 3 lectures were organized in the forenoon session Dr S C Lakhota, BHU delivered a thought provoking lecture on Nature, scope and future of Cell and Molecular Biology, while Dr R Raman, BHU, discussed on a fascinating topic, Use of DNA as Nanotools and Dr Chandana Haldar, BHU, illustrated Cell morphology and functions of pineal.

In the afternoon session of the day the participants carried out the following experiments individually :

Visualization of mitochondria in cheek epithelial cells under a light microscope after Janus Green staining, Differential staining to demonstrate presence of DNA and RNA in the nucleus/cytoplasm of cheek epithelial cells by methyl green-pyronin Y staining and preparation of metaphase chromosomes from bone marrow of rat.

The second day started with the talk of Dr B N Singh on an important topic of evolutionary genetics, 'Maintenance, algebraic proof and demonstration of Hardy-Weinberg Equilibrium' while Dr Madhu G Tapadia lucidly demonstrated various Model Systems for Cell Biological studies.

In the afternoon session participants performed isolation of DNA from rat liver and agarose gel electrophoresis to visualize pre-dissolved undigested and restriction endonuclease digested DNA.

On the whole these were the successful venture of the Indian Society of Cell Biology to provide exposure to the students and teachers of Colleges.

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A REPORT ON
6th APOCB Congress on “Challenges in Cell Biology, Health, Agriculture,
Industry and Education” from 25th to 28th February 2011
at Manila, Philippines

The four days congress organized by Dr Filipinas F Natividad, St Luke’s Medical Centre, Quezon City, Philippines, held at EDSA Shangri-Lam Manila, Philippines, started with the Registration, a workshop on “Teaching biology with limited resources” and “Scientific writing and publishing” on 25th February 2011 followed by the welcome reception and dinner. All Asian countries participated in the congress having nearly 250 delegates. We had the wonderful opportunity of representing our country and our society in scientific sessions as well as in the executive committee meeting of APOCB.

The second day had the opening ceremonies, 3 plenary lectures on diverse areas of cell biology, 44 invited talks in 12 symposia, viz., Protein quality control and cellular homeostasis, Nucleus and gene expression, Cancer signaling and metastasis, cell differentiation, Bioclips, Protistology, Developmental Biology, Organelles, Viral-cell interactions, Biosafety, Cytoskeleton and cell motility, and Biobanking; a Poster session with 71 posters and the meeting of APOCB Executive Committee.

The third day had 4 plenary lectures and an Education session with the emphasis of how the standards of teaching and research can be improved.

The fourth day had 4 plenary lectures, the continuation of poster session and 18 invited talks in 3 symposia, namely, Infectious diseases, Drug discovery & emerging technologies, free papers; and an young investigators session having 9 students’ presentations.

Many scientific presentations were of high standard and gave a chance of interacting with the leaders in different areas of Cell Biology. A list of the Plenary and invited talks appended below to obtain an insight into the congress:

Plenary lectures :

Building immunotherapy platform for cancer autoimmune diseases – Genomic and personalized medicine in health and disease -*by Dr Ken-ichi Arai (Japan)* [Chair: Dr Kenneth K Y Wu]

Engineered tissues and stem cells for treatment of cardiovascular diseases -*by Dr Keith A Webster (USA)* [Chair: Dr Nobutaka Hirokawa]

Generation of neural primordial in vertebrate embryos by mechanisms that challenge the classical models -*by Dr Histato Kondoh (Japan)* [Chair: Dr Cynthia P Saloma]

Synergies between molecular biology and cell biology -*by Dr Ajay Kohli (Philippines)* [Chair: Jagat K Roy]

Global trend and development pathway of biosimilar products -*by Dr Brian Kim (Korea)* [Chair: Dr Joobae Park]

Control of vascular cell survival and phenotypes via distinct PPAR/14-3-3 pathways -*by Dr Kenneth K Y Wu (Taiwan)* [Chair: Dr ChungMing Chang]

Approaches to conductance of research : lesions from primary cilia and other projects through a lifetime in cell biology -*by Dr Denys N Wheatley (UK)* [Chair : Dr Cynthia Jensen]

Reprogramming and biomarkers of pluripotent stem cells -*by Dr Qi Zhou (China)* [Chair: Xiaoyan Ding]

Cancer photothermal therapy using nanotubes conjugated with anti-cancer antibody -*by Dr Cynthia Saloma (Philippines)* [Chair: Dr Gabriel O Romero]

Algorithmic cell biology : Translating biological ‘cartoons’ into computer programs -*by Dr Eduardo Mendoza (Germany)* [Chair: Dr Sonia D Jacinto]

Invited lectures :

Symposium 1 : Protein quality control & cellular homeostasis [Chair : Dr Kasuhiro Nagata]

Two distinct ERAD pathways for misfolded glycoproteins and nonglycoproteins -*by Dr Kasuhiro Nagata (Japan)*

Protein quality control by the unfolded protein response -*by Dr Kazutoshi Mori (Japan)*

PCAF interacts with XBP-1S and mediates XBP-1S dependent transcription -by *Dr Sheng Hao Chao (Singapore)*

Role of Galectin-3 in apical protein trafficking -by *Dr Ralf Jacob (Germany)*

Symposium 2 : Nucleus and gene expression [Chair: Dr Yoshihiro Yoneda]

Nuclear transport machineries and cell function -by *Dr Yoshihiro Yoneda (Japan)*

The contribution of importin alpha mediated nuclear transport to paraspeckle formation -by *Dr Kate Loveland (Australia)*

A novel role for nuclear transport -by *Dr Yoichi Miyamoto (Australia)*

An EGFR ligand, amphiregulin, is translocated from the plasma membrane to the nuclear envelope and regulates cell migration -by *Dr Miki Hieda (Japan)*

Symposium 3 : Cancer signaling and metastasis [Chair: Dr Lu-Hai Wang]

EphA2-Vav3-Rac1 signalling mediates migratory and invasive behaviour of prostate cancer cells and correlates with the disease progression -by *Dr Lu-Hai Wang (Taiwan)*

Bmi1 is essential in Twist1 induced epithelial-mesenchymal transition -by *Dr Kou-Juey Wu (Taiwan)*

14-3-3 proteins and cancer metastasis in hepatocellular carcinoma -by *Dr Bor-Sheng Ko (Taiwan)*

A small molecule targeting thymidylate kinase induces DNA repair toxicity -by *Dr Zee-Fen Chang (Taiwan)*

The small GTPase hRAB37 involves in the exocytic pathway and acts as a metastatic suppressor in lung cancer -by *Dr Yi-Ching Wang (Taiwan)*

Symposium 4 : Cell differentiation [Chair: Dr Hua-Lin Wu]

Downregulation of thrombomodulin induces tumorigenesis -by *Dr Hua Lin-Wu (Taiwan)*

Mechanism of cardiomyocyte regeneration by stem cells using inducible Cre-Lox transgenic mice -by *Dr Ching-Ho Hsieh (Taiwan)*

The Cullin3-KLHL20 ligase mediates PDZ-RhoGEF ubiquitination to control neutrophin induced neuronal differentiation -by *Dr Ruey-Hwa Chen (Taiwan)*

Endothelial derived cells contributesignificantly to murine vein graft neointima through TGF-beta mediated endothelial to mesenchymal transition -by *Dr Jose Nevado Jr (Phillipines)*

Symposium 5 : Bioclips [Chair: Dr Akihiro Nakano]

Mechanistic insights into the membrane trafficking through and around the Golgi apparatus -by *Dr Akihiro Nakano (Japan)*

Paramecium in action -by *Dr Masahiro Fujishima (Japan)*

Mechanism of entry of a flavivirus cell penetrating peptide -by *Dr Mah-Lee Mary Ng (Singapore)*

A visual demonstration of potential bioactivity of selected plants -by *Dr Ronald R Matias (Phillipines)*

Spotlight on chromosome painting and fluorescence in situ hybridization technology: Strengthening the routine cytogenetic tools -by *Dr Ma Luisa D Enriquez (Phillipines)*

Symposium 6 : Protistology [Chair: Dr Masahiro Fujishima]

Infection of endonuclear symbiotic bacterium *Holospora* is controlled by 89 kDa periplasmic protein -by *Dr Masahiro Fujishima (Japan)*

Infection process of symbiotic *Chlorella sp* to the algal-free *Paramecium bursaria* -by *Dr Yoki Kodama (Japan)*

Fate of 63 kDa periplasmic protein of the infectious form of the endonuclear symbiotic bacterium *Holospora obtusa* during the infection process -by *Dr Fema M Abamo (Phillipines)*

A macronuclear envelope specific antigen of the ciliate *Paramecium caudatum* -by *Dr Kenya Tanaka, (Japan)*

Symposium 7 : Developmental biology [Chair: Dr Gen Yamada]

Essence of urogenital/reproductive organ formation: mutant mouse analysis in the field of molecular developmental biology -by *Dr Gen Yamada (Japan)*

Vascular niches direct human CD34⁺ CD31⁺ progenitor cell fate: Roles of beta-2 integrin and Notch -*by Dr Jeng-Jiann Chiu (Taiwan)*

Role of Rab11 in *Drosophila* development -*by Jagat K Roy (India)*

Analysis of sperm surface molecule which is involved in the sperm-egg envelope binding in *Xenopus laevis* -*by Dr Hideo Kubu (Japan)*

Symposium 8 : Organelles [Chair: Dr Kate Loveland]

ARL4A interacts with GC185 to modulate Golgi apparatus and endosome to Golgi transport -*by Dr Fang-Jen Lee (Taiwan)*

Processing and turnover of the hedgehog protein in the endoplasmic reticulum -*by Dr Xin Chen (Taiwan)*

Symposium 9 : Viral-Cell interaction [Chair: Dr ChungMing Chang]

Transforming growth factor-beta 1 suppresses hepatitis B virus replication through the reduction of hepatocyte nuclear factor-4-alpha -*by Dr ChungMing Chang (Taiwan)*

Strategies and solutions against viral diseases for sustainable aquaculture -*by Dr Huan Eng Ung (Malaysia)*

The role of CLEC5A in dengue virus infection -*by Dr Shie-Liang Hsieh (Taiwan)*

Symposium 10 : Biosafety [Chair: Dr Cecelia V Williams]

Laboratory biorisk management -*by Dr Cecelia V Williams (USA)*

Biosecurity standard operating procedures in a laboratory animal facility -*by Dr Ranilo G Resuelo (Philippines)*

The Philippine biosafety & Biosecurity Association, Inc -*by Dr Miguel Martin N Moreno (Philippines)*

Symposium 11 : Cytoskeleton and cell motility [Chair: Dr Kazuo Inaba]

Proteomics, cell biology and physiology for sperm flagellar motility -*by Dr Kazuo Inaba (Japan)*

Cytosolic glutaredoxin 2 induces a reorganization of the cytoskeleton enhances cell motility and functions in neuronal differentiation -*by Dr Christopher Lillig (Germany)*

Role of Ca⁺⁺ in chemotactic behaviour of ascidian sperm -*by Dr Manabu Yoshida (Japan)*

Symposium 12 : Biobanking [Chair: Dr Ralf Jacob]

Therapeutic potential on non-embryonic autologous stem cells and the justification for stem cell banking -*by Dr George Koliakos (Greece)*

Latest gamete preservation of rodents for bio-resource banking -*by Dr Kaneko Takehito (Japan)*

Biobanking initiatives for genomic research on major diseases in the Philippines -*by Dr Maria Luisa dG Daroy (Philippines)*

Symposium 13 : Infectious diseases [Chair: Dr Mah-Lee Mary Ng]

Biomarker discovery to differentiate dengue fever and dengue hemorrhagic fever/dengue shock syndrome -*by Dr Mah-Lee Mary Ng (Singapore)*

Adoption of molecular technique for the detection and typing of foot and mouth disease virus circulating in naturally infected cattle in Bangladesh -*by Munmun Pervin (Bangladesh)*

The use of recombinant dengue virus non-structural protein 1(NS1) for detection of dengue infection -*by Dr Mark Anthony Luz (Philippines)*

Molecular cloning and expression of recombinant *Mycobacterium tuberculosis* specific antigen for serodiagnosis of TB infection -*by Dr Frederick Dela Cruz (Philippines)*

Symposium 14 : Drug discovery and emerging technologies [Chair: Dr Ronald R Matias]

RetroMAD1 – A broad spectrum oral delivery of anti-viral agent with activity in insect, human, crustacean, dog and cat viruses -*by Dr Huan Eng Ung (Malaysia)*

Pharmacogenomics in drug discovery and development: added cost or business opportunity? -*by Dr Reynaldo Garcia (Philippines)*

Symposium 15 : Free papers [Chair: Dr Shyamal Majumdar]

In vitro and in vivo response of mouse breast cancer cells to anti breast cancer drugs –by *Dr Shyamal Majumdar (USA)*

Intratumoral heterogeneity of *K-RAS* and *p53* mutations in Colorectal cancer –by *Dr Ma Luisa D Enriquez (Philippines)*

Expression of Ras-related protein Rab-1B in lead treated neuronal PC-12 cells –by *Dr Cesar Ortinero (Japan)*

Biological effects of ultrasound: Potential therapeutic applications and their implications on the safety of diagnostic ultrasound –by *Loreto Feril (Japan)*

Detection and subtype identification of Blastocystis isolates from waste water samples in the Philippines –by *Dr Jan Ervin G Banaticla (Philippines)*

Genotypic characterization of phenotypically identified extended-spectrum beta-lactamase *E coli* and *K pneumoniae* clinical isolates in metro Manila –by *Dr Mark Noe Ritumalta (Philippines)*

The role of ecdysone in the development of Malpighian tubules in *Drosophila melanogaster* –by *Dr Madhu G Tapadia (India)*

Marine mollusk associated microorganisms induce intracellular calcium changes in the dorsal root ganglion primary neurons –by *Dr Rowena Antemano (Philippines)*

Quantitative genotoxic analysis of two dentin bonding agents on human pulp cells in vitro –by *Dr Glenn Oyong (Philippines)*

Report prepared by
J K Roy and Madhu G Tapadia
Cytogenetics Laboratory, Department of Zoology
Banaras Hindu University, Varanasi 221 005

**NOMINATIONS INVITED FOR
PROFESSOR JYOTIRMOY DAS MEMORIAL LECTURES**

The Indian Society of Cell Biology has instituted the Prof J Das Memorial Lecture as a mark of its respect to Prof J Das and in recognition of his immense contributions to Cell Biology. Nominations for the lecture are invited from Life and Ordinary members of at least three years standing.

The person to be nominated need not be a member of the Society when nominated but may be requested to become a member in due course of time. The person to be nominated will ordinarily be an Indian citizen at the time of nomination/selection and should be an eminent scientist who would have made outstanding original contributions to Cell Biology or contributed substantially to growth of the subject in India.

The following is the list of the past Prof J Das memorial Lecturers :

Number	Lecture delivered by	Year	Conference
First	Dr P Balram (IISc)	2001	XXV All India Cell Biology Conference, Bangalore
Second	Dr M R S Rao (IISc)	2003	XXVII All India Cell Biology Conference, Pune
Third	Dr P P Majumder	2006	XXIX All India Cell Biology Conference, Lucknow
Fourth	Dr V Nagaraja	2007	XXXI All India Cell Biology Conference, Varanasi
Fifth	Dr A Surolia	2009	XXXIII All India Cell Biology Conference, Hyderabad

The nominations in prescribed format (see the following page) along with the biodata of nominee should reach latest by 30th June 2011 to :

Dr D Kar Chowdhuri
Secretary ISCB
Embryotoxicology Laboratory
Indian Institute of Toxicological Research
Post Box 80, M G Marg
Lucknow 226 001
E-mail : dkarchowdhuri@gmail.com

NOMINATION FORM FOR THE PROF J DAS MEMORIAL LECTURE

Name & Address of the member making the nomination:

Nomination:

I wish to nominate (address
.....) for the PROF JYOTIRMOY
DAS MEMORIAL LECTURE. I have obtained consent of the nominee for the purpose. The
biodata of the nominee is enclosed herewith.

Date

Signature of the nominating member

INDIAN SOCIETY OF CELL BIOLOGY

Receipts & Payment A/c for the period 01.04.2010 to 31.03.2011

RECEIPTS	AMOUNT	PAYMENT	AMOUNT
To Opening Balances:		By 34th AICBC, Kolkata	25,000.00
Cash in Hand	2,362.50	By Workshop Exp.	20,000.00
SBI, Varanasi	82,515.78	By Organising Lectures	10,000.00
BOB, Varanasi	45,546.00	By Printing & Stationery	3,381.00
	130,424.28	By Prof. J. Das Memorial Lecture	28,368.00
To Membership Fees :		By Registration of Teacher in Conf.	3,500.00
Student & Ordinary	12,660.00	By Website Maintenance	1,500.00
Life	84,550.00	By Newsletter Printing	32,000.00
	97,210.00	By Award Exps.	5,000.00
To Interest on GOI	38,000.00	By Attending APOCB Congress	10,000.00
To Interest from IDBI	355.56	By Bank Charges	100.00
To Interest on SB A/c	4,030.00	By Postage Exps.	13,173.50
To Interest From HDFC	232,392.00	By Audit Fees	2,500.00
To HDFC Matured	100,000.00	By Investment in FDR (HDFC)	300,000.00
		By Closing Balances:	
		SBI, Varanasi	146,856.34
		Bank of Baroda, Vns	1,033.00
			147,889.34
Total	602,411.84	Total	602,411.84

For INDIAN SOCIETY OF CELL BIOLOGY

As Per Audit Report of Even Date

For MOHIT K SAIGAL & CO.

PLACE : VARANASI
DATE :

Mohit K. Saigal
FCA



MOHIT K. SAIGAL & CO.
CHARTERED ACCOUNTANTS

"SAIGAL HOUSE"
B 37/122, MAHMOORGANJ
VARANASI - 221010

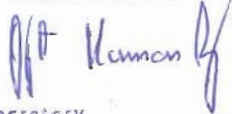
INDIAN SOCIETY OF CELL BIOLOGY

BALANCE SHEET AS ON 31 MARCH,2011

LIABILITIES	AMOUNT	AMOUNT	ASSETS	AMOUNT	AMOUNT
CAPITAL FUND ACCOUNT:			INVESTMENTS		
Opening Balance	1,704,606.45		As per Annexure 'A'		2,059,962.17
Add: Excess of Income over Expenditure	132,915.06	1,837,521.51	CURRENT ASSETS & LOANS & ADVANCES :		
LIFE MEMBERSHIP FEES:			<u>CASH & BANK BALANCES:</u>		
Opening Balance	285,780.00		SBI, Varanasi	146,856.34	
Add: during the year	84,550.00	370,330.00	Bank of Baroda, Vns	1,033.00	147,889.34
TOTAL		2,207,851.51	TOTAL		2,207,851.51

For **INDIAN SOCIETY OF CELL BIOLOGY**

As Per Audit Report of Even Date


 Secretary Treasurer
Indian Society of Cell Biology

For **MOHIT K SAIGAL & CO.**
 (Chartered Accountants)



PLACE : VARANASI
 DATE :

INDIAN SOCIETY OF CELL BIOLOGY INVITES PROPOSALS
from Life and Ordinary Members having adequate in house expertise

TO HOLD A 3-4 DAYS HANDS-ON-WORKSHOP
on

Modern Cell Biological Techniques
for School and College Teachers

The Society will contribute Rs 20,000/- for the workshop.

Participation should not be restricted only to society members.

The proposals may be sent by 31st July 2011 to :

Dr D Kar Chowdhuri

Secretary ISCB

Embryotoxicology Laboratory

Indian Institute of Toxicological Research

Post Box 80, M G Marg

Lucknow 226 001

E-mail : dkarchowdhuri@gmail.com

INDIAN SOCIETY OF CELL BIOLOGY INVITES PROPOSALS
from Life and Ordinary Members

TO ORGANIZE LECTURES/EXPERIMENTAL DEMONSTRATIONS
in colleges

By eminent Teachers/Scientists
in the area of Cell Biology

**The society will contribute Rs 10,000/- for one place
and can sponsor two such lectures at different places**

The proposals may be sent by 31st July 2011 to :

Dr D Kar Chowdhuri

Secretary ISCB

Embryotoxicology Laboratory

Indian Institute of Toxicological Research

Post Box 80, M G Marg

Lucknow 226 001

E-mail : dkarchowdhuri@gmail.com