

complicate them manifold. One of the immediate and sure outcomes of such a move will be further alienating the best brains from teaching jobs, and bringing the standards further down.

Secondly, has the UGC formulated an action plan for implementing the new systems? What are the criteria for evaluation? Who will assess the candidates? As the very basis for contemplating a change is the non-performance of the present faculty, can they be entrusted with evaluating those who are appointed on contract basis? As Tripathi has pointed out², implementations of the UGC

initiatives to improve the system are very poor. NET/SET was introduced at least a decade ago. Strict implementation of a pass in NET/SET for appointment of a candidate as a college/university teacher has happened only recently. Many years ago, some universities introduced an ambitious programme of pre-Ph D course work. This was a good initiative with a view to improving the Ph D training. But most (if not all) universities dropped the course work because there was no proper planning and coordination.

The UGC must definitely do something to stem the rot in higher education.

But for that the UGC may have to do a lot of homework and also groundwork.

1. Balam, P., *Curr. Sci.*, 2003, **84**, 5.
2. Tripathi, Y. B., *Curr. Sci.*, 2003, **84**, 258.

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NEWS

MEETING REPORT

Celebrating the double helix

A 'World Science Festival-2003 and International Dialogue to Celebrate Golden Jubilee of DNA Double Helix Discovery' was held in New Delhi between 12 and 14 February 2003. Since the significant discovery of the double helix structure of deoxyribonucleic acid (DNA) in 1953, biological and medical sciences have made great leaps forward. India has also taken several initiatives and in the post-genomic era holds even further promise to take on several challenges. The first day at the Festival saw a somewhat odd mix of speakers in the theme summit 'What is life' with L. M. Singhvi, New Delhi on the 'The Indic vision of life' and Moulana Wahijuddin Khan also from New Delhi, on 'What is life with reference to Islam', to scientists among others. The Union Minister of Science and Technology, Murli Manohar Joshi felt that experiments and experiences needed to be viewed in totality for a clue towards life in a deeper and broader sense, for a better understanding of solving the riddle at the molecular level and ethical questions pertaining to cloning.

This was followed by technical sessions comprising speakers whom D. Balasubramanian, Hyderabad had aptly described to the delight of the audience as 'pre- and post-DNA children'. One such speaker in the first technical session 'DNA and Gene Structure' of the Festival, from the

pre-DNA group was M. Vijayan, Indian Institute of Science, (IISc), Bangalore on 'Structural genomics of microbial pathogens'. This endeavour is a consortium approach involving various groups with biochemical and structural biology background for probing three-dimensional structures of bacteria, viruses and parasites such as *Plasmodium falciparum* (causes malaria) and *Leishmania donovani* (causes Kala-azar). A task set out to achieve is to unravel the structure of single stranded DNA binding protein from *Mycobacterium tuberculosis*. One success has been in deciphering the structure of the *E. coli* enzyme, uracil DNA glycosylase solved in 1998. As part of the TB Genomics programme, the structure of the nucleotide binding site in *M. tuberculosis* and *M. smegmatis* has led to the understanding of lowered ATPase activity due to the P loop expansion in the case of mycobacterial proteins as when compared to *E. coli* RecA protein and also the significant involvement of L₁ and L₂ loops in DNA binding. Vijayan felt that at the heart of design and synthesis of drugs and pharmaceuticals was a due need for the basic understanding of both structure and function of biomolecules using X-ray crystallographic tools, which the structural genomics programme in the country has set out to do.

The themes of various technical sessions held at the National Institute of Immunology, New Delhi criss-crossed on the pattern that biosciences research in India was shaping up to providing a fascinating insight into a variety of research topics. This also lent an idea as to the possible weak links in spheres of research that require careful focus and nurturing, both in terms of funding and training, especially those directly linked to the health of the Indian society. The sessions ranged from Genomics, Genetics and Biology; DNA, Cells and Health; Diversity and Evolution; Bioinformatics and Future of Biology to Genes and Society.

Of recent interest are multistranded DNA helices and their site-specificity that are important in therapeutic applications by acting as repressors in infected cells (K. Muniyappa, Indian Institute of Science, Bangalore). Another interesting concept is the DNA as a 'molecular clock' that uses the ribosomal RNA gene to map a 'Universal Phylogenetic Tree' (Yogesh S. Shouche, National Centre for Cell Science, Pune). This has not only helped in revising taxonomic classifications but also in studying back in time, relationships with now-extinct species using the polymerase chain reaction for solving the puzzle of evolution.

In the areas of plant genomics, genetics and biology reports of work related

to using a seed albumin gene from spinach *Amaranthus hypochondriacus* for developing potatoes with greater nutritive value and another by getting assistance from oxalate decarboxylase found in edible mushroom *Flammulina velutipes* to create a more nutritive tomato were discussed. A gene that determines the regulation and prolongation of shelf-life has been identified and used to delay ripening and softening in fruits (Asis Datta, National Centre for Plant Genome Research, New Delhi). The current status of the International Rice Genome Sequencing Project of which India is a part, is moving according to plan (Akhilesh K. Tyagi, University of Delhi, South Campus, New Delhi).

Transgenic fruitflies have been generated from *Drosophila melanogaster* with an aim to study the growth-promoting factors that could be compared to the biochemical role in humans especially with respect to cancer. This has also led to research in using the fruitfly as a versatile genetic system for screening and validation of anti-cancer drugs, reducing costs as a result of its short life cycle of less than one month, ease of laboratory maintenance and study over several generations in a shorter time period when compared to using the mouse model (L. S. Shasidhara, Centre for Cellular and Molecular Biology, Hyderabad). J. Gowrishankar, Centre for DNA Fingerprinting and Diagnostics, Hyderabad has identified a novel viable point mutation *nusG* gene that is responsible for transcription termination in *E. coli* and found a connection to DNA replication.

The Centre for Drug Research Institute (CDRI), Lucknow mainly concentrates on structure-based combinatorial chemistry due to its mandate with new drug discovery such as Arteether and Aablaquin (both antimalarials), Centpropazine (antidepressant) and Centbutindole (antipsychotic) (C. M. Gupta, CDRI, Lucknow). Missing from the country was biopharmaceutical research in monoclonal antibodies and immunotoxins, although according to Gupta, the area of therapeutic r-proteins was being addressed at the Institute for Microbial Technology, Chandigarh by Girish Sahnii. Deepika Mohanty, Institute of Immunohaemato-

logy, Mumbai spoke on coronary artery disease triggers in young Indians with particular emphasis on folic acid deficiency (vitamin B₁₂) and its malabsorption which have been studied through gene polymorphisms. Using microarray technology, M. R. S. Rao, IISc, Bangalore in collaboration with the Manipal Hospital, Bangalore is profiling gene expression in cancer such as glioma that could lead in a few years time to molecular signatures and markers for therapeutic intervention of different grades of tumours. A very new gene 'X' that codes for a secretory protein and modifies fucose residues on a receptor in the plasma membrane and alters signal transduction pathway in the brain has been discovered in the research group of Rao. Genetic counselling and prenatal diagnosis are facilitated using DNA technology, etc. in the detection of diseases such as beta thalassaemia, Duchenne muscular dystrophy and spinal muscle atrophy (I. C. Verma, Ganga Ram Hospital, New Delhi). Mamman Chandy, Christian Medical College and Hospital, Vellore has demonstrated DNA diagnostics, as a powerful tool in haematology whereby early intervention has helped patients with haemophilia, beta thalassaemia and other blood diseases.

The implementation of the new Biological Diversity Act 2002, has necessitated the formation of a 'Biodiversity Information System'. This will constitute a three-tiered management structure of National Biodiversity Authority, State Level Biodiversity Boards and local level Biodiversity Management Committees for 'devising strategies, plans and programmes for conservation, sustainable use and equitable sharing of benefits of India's biodiversity resources namely habitats, crop cultivars, animal breeds, microorganisms, etc.' The challenges according to Madhav Gadgil of the Indian Institute of Science, Bangalore include making inventories of several lakhs of genetic variations, paucity of existing information and gleaning data from people who were largely non-scientists but possessed relevant information handed down by oral traditions. Partha Majumder, Indian Statistical Institute, Kolkata has done genomic structuring of at least forty-four types of ethnic people in India and has charted their

genetic lineages. Ajay Parida, M.S. Swaminathan Research Foundation, Chennai showed how mangroves growing in the coastal ecosystem provide a possibility to act as donors to breeding crops which would be adapted to coastal salinity and which in turn, would raise agricultural opportunities in the coastal belt, using DNA technology.

In the field of bioinformatics and biology, the alphabets used to categorize DNA (e.g. A-, B-, Z-DNA) now cover 18 out of the 26 English alphabets highlighting the progress since the 1953 Watson and Crick structure of DNA (Manju Bansal, IISc, Bangalore). Talks described the use of bioinformatics suitably in drug design through computer modelling (Dinakar M. Salunke, National Institute of Immunology, New Delhi); protein recognition of the DNA helix through protein-DNA interactions and their classification (B. Jayaram, Indian Institute of Technology, Delhi); comparison of organisms by functional genomics with constraints in constructing comparative maps, proteome and functional classification and large-scale sequence visualization being especially problematic (Alok Bhattacharya, Jawaharlal Nehru University, New Delhi). A historical perspective of bioinformatics as a biological tool and the role of protein data banks was presented by A. S. Kolasker, University of Pune, Pune.

The Genes and Society session had speakers such as N. K. Ganguly, Indian Council of Medical Research, New Delhi (Community control of genetic disorders), Anuranjan Anand, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore on understanding deafness-causing genes among Indians, V. Ravindranath, National Brain Research Centre, New Delhi on the hunt for cures for neurodegenerative brain diseases from the study of mitochondrial dysfunction in degenerative disorders such as Parkinson's, Alzheimer's, etc.

The concluding session chaired by Manju Sharma, Secretary, Department of Biotechnology, New Delhi considered general issues of biotechnology research in India.

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