(www.igroupnet.com) (balani@vsnl.net) was arranged during the seminar, with help from the Mangalore University library. Various aspects of UGC INFLIBNET consortium were discussed and brochures were distributed for effective use of these databases. In his valedictory address, B. Hanumaiah (Vice-Chancellor, Mangalore University) pointed out the enthusiastic participation and contribution of young scientists in the deliberations and the need for their intense involvement in further ing the knowledge in the field of mycology at the national and international level.

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Recent trends in biotechnology*

In recent years, revolution in biology has occurred due to the potentials of biotechnology. Techniques have been developed to produce rare and medicinally valuable molecules, to change hereditary traits of plants and animals, to diagnose diseases and cure them either through biotechnologically derived proteins and polypeptides forming a new class of potential drugs, or through immunodiagnostically designed vaccines and also to clean up the environment. In this way, biotechnology has great impacts in the fields of health, food/agriculture and environmental protection. Due to rapid developments, there seems to be no basic difference between the pharmaceutical industry and the biotechnological industry. However, approved products in the pipeline and renewed public confidence make it one of the most promising areas of economic growth in the near future. India offers a huge market for the products as well as cheap manufacturing base for export. Keeping these points in mind, a national seminar on 'Recent Trends in Biotechnology' was organized. About 116 participants attended the seminar.

S. V. Giri (Vice Chancellor, Sri Sathya Sai Institute of Higher Learning (SSHL) Puttaparthi), in his inaugural address, mentioned that biotechnology will be the key subject in the coming years. India, with its tropical ambience, would become a big centre for generation of biotechnological products in the near future. Giri cautioned the audience that while developing and creating innovative scientific products directly related to the welfare of humanity; ethics, sincerity and commitment in undertaking the task should not be bypassed.

In the guest lecture session, the first speaker was G. Madhava Reddy (G.M. Reddy Research Foundation, Hyderabad). While speaking on 'Recent advances in plant biotechnology for human welfare', Reddy stated that plant molecular biology techniques like isolation of specific genes, synthesis of chimeric genes, etc., have been used for developing transgenics for more than 250 traits in more than 1000 plant varieties. As examples, he cited the case of transgenic tomatoes possessing qualities such as delayed ripening, high lycopene content, and also potatoes modified with high starch content, under commercial cultivation. According to Reddy, another important area in plant molecular biology is the development of plant vaccines against diseases in humans and animals, including domestic pets. Development of hepatitis B vaccine (HBV) in tobacco is one example of this new technology. He inferred that gene manipulation through biotechnology provides an unlimited opportunity to solve problems of hunger, food security, diseases and also environmental pollution amongst the growing population in developing countries like India. The next speaker was V. Mohan (Madras Diabetes Research Foundation, Chennai). While speaking on 'Can genetic factors explain the epidemic of diabetes in Indians?' he informed the audience that India tops the world with the largest number of diabetic subjects. The number is presently estimated to be 32 million and this is projected to increase to 79.4 million by the year 2030. Mohan also presented some interesting data, where he showed that migrant Indians had elevated plasma insulin levels and greater insulin resistance, compared with their European counterparts. These studies, according to him, suggest that there could be an increased genetic predisposition to insulin resistance and diabetes in Indians.

The last speaker of this session was Indira Krishnan, Hewlett Chief (Centre for Biologics Evaluation and Research, Food and Drug Administration, Bethesda, USA). While talking on 'Application of biotechnology to medical diagnostics and blood donor testing: HIV/AIDS as a model', she said that early and accurate diagnosis of infectious agents is an effective public-health tool for prevention and spread of disease. She gave details of several new diagnostic technologies based on detection of antibodies, antigens and genes that have been developed and implemented in public-health settings, including blood banks and clinical laboratories over the past few decades. Her presentation included illustrations of the successful use of biotechnology in improving HIV/AIDS prevention through early diagnosis.

In the first technical session on Medical Biotechnology, C. B. Sanjeevi (Karolinska Institute, Sweden), spoke on 'KIR haplotypes'. According to him, KIR haplotypes are associated with susceptibility in patients with type-1 diabetes mellitus (T1DM), either by themselves or in association with other markers in the HLA region (HLA–DR and DQ and MICA). Sanjeevi described the methods by which each of the 14 KIR genes were typed using primers specific for each KIR and identification of the amplified fragment in gel electrophoresis. Preliminary results of KIR genotyping were also furnished. Another speaker of this session was H. V. Batra (Defence R&D Establishment, Gwalior). He spoke on 'Molecular approaches for identification and disease diagnosis of leptospirosis and Melioidosis'. He gave a detailed picture of diseases, causative agents, symptoms and how they spread. The recently developed molecular diagnostic

*A report on the National Seminar on the Recent Trends in Biotechnology held from 9 to 11 February 2005, under UGC SAP DRS Programme, at the Department of Biosciences, Prashanti Nilayam Campus, Vidya Giri, Sri Satya Sai Institute for Higher Learning, Puttaparthi.

techniques for early and accurate laboratory diagnosis of leptospirosis, including PCR assays, dot-blotting, *in situ* hybridization methods, and cloning and expression of the 600 bp fragment of *omp* gene of *B. pseudomaelli*, the causative agent of melioidosis in prokaryotic *Escherichia coli* system, using pQE 30 vector with generation of high affinity-specific monoclonal and polyclonal antibodies against the recombinant *omp* of *B. pseudomaelli*, were also included in his talk

In the technical session on Plant Biotechnology, E. V. S. Prakasa Rao (CIMAP, Bangalore), spoke on 'Medicinal plants–potentials and prospects'. According to him, since there is an increasing number of clues from plants for cure of human diseases, conservation of this depleting medicinal plant resource is of serious concern. Rao mentioned some of the methods of *in situ* and *ex situ* conservation strategies, modern methods of cryopreservation of seeds/materials, issues involved in cultivation of medicinal plants, including plant improvement, agro-technologies, post-harvesting methods, preliminary value-addition, cropping systems, quality and economics in great detail. Another speaker in this session was G. A. Ravishankar (CFTRI, Mysore). While speaking on 'Development of processes through algal biotechnologia and plant biotechnology', he gave a detailed description of the studies on plant tissue culture, plant improvement and algal biotechnology for production of value-added compounds for food applications, that are being carried out in CFTRI. Studies on biotransformation of phenylpropanoid compounds, metabolic engineering of coffee, microalgal biotechnology for production of pigments such as phycocyanin, carotene and astaxanthin were highlighted and presented with an emphasis on technology development.

The theme of the third technical session was Microbial Biotechnology. K. Natarajan (University of Madras), spoke on 'Ectomycorrhizal association in forests of South India'. He detailed the studies that were undertaken on ecology of ectomycorrhizal association of *Pinus patula* plantations in the Nilgiri hills. His reports included observations made on occurrence of basidiomata of ectomycorrhizal fungi in *P. patula* plantations, the number of species of fungi occurring in the plantations of different age levels and also the sequence of occurrence of different species in different plantations. Another speaker in this session was Desirazu Rao (IISc, Bangalore). While speaking on 'Those flipping methylases', he described all three types of DNA methylases found in bacteria, in which adenine methylation in particular has diverse biological roles, including transcriptional regulation, DNA mismatch pair, regulation of DNA replication and restriction-modification. The results of the investigation supporting the hypothesis of DNA distortion, including a flipped dA base, on DNA binding to the *Eco*P151 DNA methyltransferase, was also discussed.

In the technical session of Behavioural Biology, the first speaker was Vijayan Edathil (Pondicherry University, Pondicherry). He spoke on 'Role of nitric oxide synthase in pregnancy and GNRH release'. He also stated that nitric oxide (NO), being a ubiquitous molecule, acts as the smooth muscle relaxant in the vascular system, as a neurotransmitter in the brain and peripheral nervous system and is also involved in regulation of blood flow through the foetoplacental circulation in pregnancy. He gave a description of major advances in understanding the role of NO in the foreseeable future that could suggest novel therapies for conditions that are resistant to currently available methods. Another speaker in this session, Archana Bhardwaj Siva (CCMB, Hyderabad), spoke on 'Understanding sperm capacitation through *in vitro* studies'. She described the use of agents that interfere with normal physiology of cells, which has been the approach followed, to gain greater insights into the functioning of the cells. She laid stress on studies that were undertaken to understand sperm phenomenon of capacitation by using the drug, ornidazole, a known glycolytic inhibitor.

In the technical session on Environmental Biotechnology, M. Sivakumar (University of Wollongong, Australia) spoke on 'Anaerobic bio-hydrogenation from cattle excrement'. According to him, anaerobic bio-hydrogenation from biomass is receiving recent attention as one of the new sources of energy production, because wastewater and other biomass can be used as raw material and hydrogen gas can be continuously produced in an anaerobic fermenter. Sivakumar discussed in a brief review, the experimental methods, results and the optimal parameters that control the bio-hydrogenation process, stressing on the isolation of the spore forming *Clostridium* sp. that carry out the hydrogenation process, from cattle excrement.

In the valedictory session, Renu Swaroop (DBT, Govt. of India) spoke on 'Recent trends in biotechnology: The Indian scenario'. According to her, biotechnology has the potential to generate major economic, health and environmental benefits. With approximately 200 industries, the growth in the biotechnology sector in India has been dynamic.The industry grew by 39% to reach US$ 705 million in 2003–2004. Total investment also increased in 2003–2004 by 26% to reach US$ 137 million, she said. Swaroop also summarized the latest biotechnological developments in the fields of healthcare, agriculture, bioresource development and utilization, food and nutrition, and microbial bioremediation.

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