FROM GENETICS TO GENOME ENGINEERING – NEW VISTAS IN LIFE SCIENCES

REPORT FOR THE YEAR 2017 - 2018

Title of the seminar: From Genetics to Genome Engineering – New Vistas in Life Sciences

Date and year of the seminar: 12th and 13th September, 2017

Resource Person: Prof. K. Muniyappa

Number of Participants: 77

Workshop Methodology: Interactive

Brief Summary:

Report

The Indian Science Academies (The Indian Academy of Science at Bengaluru, the National Academy of Sciences, India at Allahabad and the Indian National Science Academy at New Delhi) are actively involved in the promotion of science and science education. The Academies sponsor lecture workshops for undergraduate and postgraduate students as well as teachers, refresher courses for teachers and summer research fellowships for both students and teachers throughout the country. A two-day Lecture Workshop, sponsored by the Science Academies, on the theme "From Genetics to Genome Engineering – New Vistas in Life Sciences", was held at the Maharani Lakshmi Ammanni College for Women, Autonomous on September 12-13, 2017.

Objectives of the Workshop

The aim of the Workshop was to enable students to get an overview of the diverse aspects of life science research and to acquaint them with newer technologies like genome engineering as well as to provide a platform for promoting interaction between scientists and students.

Participants

The Lecture Workshop elicited a good response from various colleges. The participants included 14 faculty, 59 students from different institutions like Maharani's Science college for Women, Government First Grade College(Kolar), Government Science College, HKES'S Sri Veerendra Patil Degree College, Vijaya College, MES College, Bangalore University, BMS College, Seshadripuram College, Surana College, Brindavan College and Sapthagiri College. Apart from them 77 students and 14 faculties from the host institution also participated in the Workshop.

Proceedings of Day 1 (12th September, 2017)

Inaugural Function

The function commenced at 10.00am with an invocation and lighting of the lamp. The Welcome Address was delivered by Prof. M.B.Nagaveni, Dean of Science, Maharani Lakshmi Ammanni College for Women. She hailed the yeoman service rendered by the three Science Academies towards the promotion of science and science education among college students. She spoke about the need for inculcating a scientific temper and stressed the need for a scientific

approach in tackling various issues. This was followed by the Inaugural Address delivered by the Convenor of the Lecture Workshop, Prof.K.Muniyappa, Department of Biochemistry, Indian Institute of Science. He spoke about how the Workshop was conceptualized to provide the audience with an overview of the developments in the field of life sciences, from the initial stages of genetic engineering to cutting edge technologies like genome engineering. He hoped that the lectures would provide the participants with an insight into the application of these techniques for addressing questions in the life sciences. Prof. Roddam Narasimha, Chairman, mLAC, delivered the Presidential Address. He spoke about the immense diversity of the field and the importance of enhancing the awareness of the student community about the enormous opportunities in the Life sciences. The Inaugural Function concluded with the Vote of Thanks delivered by Ms. Jayashree N.S., Dept. of Biochemistry.

Scientific Sessions

The Scientific Sessions commenced with a talk by the Convenor, Prof. K. Muniyappa on "Engineering the End: DNA Processing at Telomeres". He spoke about the role of telomeres and telomerases in solving the end-replication problem in chromosomal replication. He also highlighted their importance as therapeutic targets for cancer. The next talk by Prof. Usha Vijayaraghavan, Dept. of Microbiology and Cell Biology, IISc,
on "Transcription Factors Regulating Development of The Rice Flowering Stem and Florets" dealt with developmental biology. She spoke about how developmental pathways are dependent on the precise regulation of gene expression. She described how the tools of genetic engineering can be used for dissecting the components and mechanisms of these pathways. The lecture was well-received by the audience.

The afternoon session continued with the theme of plant growth and development. Prof. Utpal Nath, Dept. of Microbiology and Cell Biology, IISc, delivered two lectures on plant growth and development. The first lecture on "Genes and Geometry I: The Rule of Growth in Plants" introduced the audience to the concepts of organ growth, in plants, using the leaf as example. The first day's sessions concluded with the second lecture titled ""Genes and Geometry II: How to grow to a shape?" dealt with the events involved at a molecular level. The lectures were highly interactive and informative.

Proceedings of Day 2 (13th September, 2017)

The scientific sessions of the second day started with a talk by Dr.K.K.Narayanan, Founder and Advisor, Metahelix Life Sciences Limited, on "Emerging Trends in Plant Genome Engineering: Gene Suppression for Crop Improvement." The talk focused on how the tools and technologies of genetic and genome engineering can be applied for crop improvement. The next two lectures of the morning session were delivered by Prof.P.N.Rangarajan, Dept. of Biochemistry, IISc. He explored both the basic and applied aspects of life sciences research in these lectures. The first, titled "Vaccines: past, present and future" acquainted the audience with the history of vaccine research and the newer developments in the field to which genetic engineering techniques have contributed. The second lecture titled "Metabolism and Gene Regulation: Our Studies in the Methylotrophic Yeast, *Pichia Pastoris*" explored the paradigm of gene regulation. The juxtaposition of these two lectures highlighted the importance of genetic engineering tools in different aspects of life sciences research.

The afternoon session consisted of two lectures on genome engineering. Prof. Ganesh Nagaraju, Dept. of Biochemistry, IISc, delivered two lectures on this topic titled "Correction of a Pathogenic Gene Mutation in Human Embryos I" and "Correction of a Pathogenic Gene Mutation in Human Embryos II". He provided an overview of the technique of genome engineering in the first lecture and provided an example of its application in the second lecture. The lectures were lucid and informative, enabling the participants to grasp the potential of this technology.

The proceedings of the two-day lecture workshop concluded with the Valedictory Function. Feedback about the Workshop was provided by the participants. Some of the salient points are listed below.

- The choice of theme and the organization of the workshop were appreciated.
- Exposure to different aspects of life sciences and knowledge about newer areas.
- The hospitality of the host institution was appreciated.
- The number of participants should be increased in order to benefit students.

The valedictory function concluded with the Vote of Thanks by the Coordinator, Dr.S.Saraswati, Asst. Professor, Department of Biotechnology, mLAC.

ATTESTED

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