Pakistan Journal of Biochemistry and Molecular Biology

Preface

Fourteenth Biennial Conference of Pakistan Society for Biochemistry and Molecular Biology (PSBMB) was held during December 9-12, 2018 at Dr. A.Q. Khan Institute of Biotechnology & Genetic Engineering (KIBGE), University of Karachi, Karachi, Pakistan. Theme of the conference was "MOLECULAR BIOSCIENCES: RESEARCH AND INNOVATIONS". Hundreds of scientists, post-doctoral fellows and graduate students from all over Pakistan and other countries attended this conference.

Here we present abstracts of plenary lectures delivered during the conference. Editorial board is grateful to the organizing committee of PSBMB 2018 for providing abstracts of plenary lectures for publication in PJBMB.

Editorial board

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Plenary Lectures of 14th Biennial Conference of PSBMB (December 2018)

"ZAIN UL ABEDIN MEMORIAL LECTURE"

Abid Azhar

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KIBGE, University of Karachi, Karachi, Pakistan.

The Department of Biochemistry, the first independent department on the subject, was established in 1962, at the University of Karachi, with Prof. Rafiq Ahmed of the Department of Botany as the founding chairman/head. Prof. M. A. Wali soon joined as the full-time head of the department. The activities at the department sprang into life by the inclusion of a young Zain-ul-Abedin, who was a lecturer of Zoology at D.J. Sindh Govt. Science College. Zain-ul-Abedin proceeded to USA to pursue his Ph.D. in biochemistry from the Brown University, U.S.A. He resumed the department after graduation and brought with him another biochemist, his wife, Barbara K. Zain. She went on to serve as the Chairperson of the department in mid-seventies. Zain-ul-Abedin was the first elected-Dean of the Faculty of Science at the University. He later also acted as the Dean, Faculty of Pharmacy. He left for USA in 1977 and breathed his last there in 1990.

In this Prof. Zain-ul-Abedin memorial lecture, the subject very close to his heart, the molecular biology, will be discussed. Although the discipline was established in the 1930s, the term was coined by Warren Weaver in 1938, the then director of Natural Sciences for the Rockefeller Foundation. The journey from advances in fields such as

X-ray crystallography to the use of molecular biology or molecular cell biology approaches in medicine, new drugs, diagnosis of disease, the molecular medicine, the clinical research and medical therapies arising from molecular biology to the gene therapy, will be reviewed.

"MID CHUGHTAI MEMORIAL LECTURE"

IMPROVING AND DESIGNING PROTEINS FOR APPLICATIONS – UNLIMITED POSSIBILITIES

M. Waheed Akhtar

School of Biological Sciences, University of the Punjab, Lahore, Pakistan

With the advancements made in the recombinant DNA technology and the large variety of protein engineering methods supported by *in silico* tools and high-throughput screening techniques allow unlimited possibilities of improving proteins and enzymes for applications. Techniques like site-directed mutagenesis, error prone PCR, *in vitro* recombination, usage of specific substrate-binding modules, truncation of molecules, and fusion of selected protein segments from two or more proteins has been used to modify the expressed recombinant proteins. Many of these strategies have been exploited recently in our laboratory.

Truncation of the endoglucanase CelX.C from *Thermotoga meritima*, *an* extreme thermophile, by removing 11 residues from the C-terminal, resulted in 5-fold increase in activity and the product expression in *E. coli* was transformed from insoluble to a soluble form. Substitution of amino acid residues through error prone PCR of the gene encoding the enzyme can result in several-fold increased

activity as we have shown in the case of an endoglucanase of a *Clostridium* species. Use of the right carbohydrate binding module in the right orientation with respect to the catalytic domain can enhance the activity several-fold. Construction in of fusion proteins, which exhibit more than one enzyme activity required for saccharification of plant biomass cellulose and xylan, is a potential approach for making the process rapid and economical. A combination of recombinant methodologies, PCR and other techniques has allowed us to construct a series of fusion molecules with epitopes from two or more antigens of *Mycobacterium tuberculosis* for use in serodiagnosis of tuberculosis. Some of these constructs showed same sensitivity as expected from the combined sensitivities of the individual antigens. Use of fusion antigens offer a great promise for developing a cheap and reliable serodiagnosis of tuberculosis, in both the ELISA and the microbead-based assays.

"PROFESSOR MOHAMMAD ATAUR RAHMAN MEMORIAL LECTURE"

S. N. Hasnain

Department of Biochemistry, University of Karachi, Karachi, Pakistan.

I have the privilege of knowing Prof. Rahman for more than 5 decades. Prof Rahman started teaching biochemistry at Dow Medical College as demonstrator and was soon selected for higher studies in biochemistry at University College, London. Here he worked for his PhD degree on "biochemistry of retina". On his return from UK he joined the newly established "basic medical science

institute"(BMSI). The institute was set up to train young medical graduates aspiring to become teachers of basic medical subjects. From the very beginning Dr Rahman was deeply involved in guidance of MPhil/PhD candidates. His students and their students are now teaching biochemistry in different medical universities of Pakistan. He was also instrumental in establishing department of Biochemistry at the University of Karachi. At the beginning the department lacked facilities in terms of space, teachers and library. On request of Dr M. A. Wali, the (then) head of the department, he allowed the staff and students to use. Laboratory and library facilities at BMS I. During his successful career Dr Rahman guided 90 research students coming from universities/ research institutes from different parts of the country. In 1963 he laid the foundation of Pakistan Society of Biochemistry, of which he was elected secretary. The society has the distinction of publishing a research journal.

After retirement he continued to provide his expertise to different universities and institutes in Karachi. These included Hamdard, Baqai, Ziauddin, HEJ and KIBGE.

Before conclusion I would like to make comments on 2018 chemistry Nobel award. The award has been shared by 3 scientists--- Frances Arnold, George Smith and Gregory Winter. The three scientists have been awarded "for the directed evolution of enzymes" and "for the phage display of peptides and antibodies."

PLANT BIOTECHNOLOGY RESEARCHES AT FORMAN CHRISTIAN COLLEGE UNIVERSITY

Kauser Abdulla Malik
Forman Christian College University, Lahore

According to FAO, the world population will be nearly 9 billion by 2050. Such an increase needs commensurate agricultural production to feed the global population. In view of increasing urbanization and decrease in arable land, vertical increase in crop productivity is required by using all possible technologies related to sustainable agriculture. It is in this context that use of agricultural biotechnology holds great potential.

At Forman Christian College University, we have embarked upon researches related to plant biotechnology especially for value addition of economic crops namely wheat, maize and cotton. In this connection, development of transgenic wheat for increased bioavailability of Fe and Zn will be reported. In addition, other such studies with maize and cotton will also be discussed. Studies have been carried out to develop transgenic wheat with increased fertilizer use efficiency by introducing different transcription factors.