Brief Report on Science Academies' "National Lecture Workshop on Viral Vaccines and Diagnostics", organized by Department of Virology S.V University, Tirupati.

During 25-26 February 2013

This workshop was sponsored by the UGC and all the three science Academies namely Indian Academy of sciences, Bangalore, Indian National Academy of sciences, Allahabad and Indian National sciences Academy, New Delhi. These academies were established during 1930's in India with the objective of promoting science and harnessing scientific knowledge for the cause of humanity and national welfare. They were considered as apex bodies of the Indian scientists and also they safeguard the interest of scientists, establishing linkages with international bodies. To promote quality of research, all the science academies have instituted several awards and they have fellows in India as well as abroad. The academies have grown in strength and in popularity by organizing several programs like lecture workshops and conferences etc.

The field of Virology has shown great progress in the last decade. A number of sophisticated molecular techniques have been introduced and put into research labs and industries. The workshop was a venture to disseminate knowledge on the latest trends on viral vaccines and diagnostics to the postgraduate students, research scholars and faculty of the universities and colleges. The first day sessions (that is on 25\textsuperscript{th} Feb, 2013) of the workshop took place in the Senate Hall S.V. University, Tirupati from 9:30 AM to 5:00 PM and second day sessions (on 26\textsuperscript{th} Feb. 2013) in the Arts Block Auditorium from 9:00 AM to 5:00 PM. More than 30 faculty, 130 research scholars and 115 post graduate students from different life science departments from the local colleges and Universities in and around Tirupati attended the lecture workshop as participants. Eminent scientists from IISc and CCMB have participated in the work shop and interacted with the participants.

The workshop was coordinated by Dr. M. Hema, Associate Professor, Department of Virology, S.V University, Tirupati and Prof. H.S.Savithri acted as convener of the workshop. Workshop inaugural session started at 10 AM with welcome note for the dignitaries, scientists, faculty, research students, post graduate students and participants from different colleges and universities by Dr. M.Charitha Devi, Faculty, Department of Virology, SV University followed by prayer. Then the workshop was inaugurated by lightning of the lamp by the Honorable Vice-Chancellor of SV University Prof. W. Rajendra, Chief guest and Prof. H.S. Savithri. Then Prof.W.
Rajendra gave the inaugural speech and he stated that understanding about the virus diseases and
diagnostics is very important in the present scenario and they play a major role in controlling the
emerging and reemerging viruses and he also stated that S.V University stands 21st position among
the Indian Universities, it is one of the best Universities, which was awarded ‘A’ grade by NAAC
Committee. Prof. H.S. Savithri explained about the Science Academies and their role for the science
development in the country. She also said about her association with Virology department and the
role of the department in developing plant viral diagnostics like sugarcane streak mosaic virus,
cucumber mosaic virus, banana bract mosaic potyvirus etc. The workshop Coordinator, Dr. M.
Hema explained the theme of the workshop and about the need of such a workshop for the students.
She also said about the Academies journal Resonance and the copies of the resonance and remittance
receipts were displayed at the Senate Hall for the faculty and students. Prof. A. Papa Rao, Principal,
S.V U College of Life sciences acted as president for the inaugural session and in his address he
encouraged students to take an active role in the participation of workshop. He also said that the
deliberations will be useful for their career. Prof. D.V.R. Sai Gopal, Head, Department of Virology
outlined the origin of Virology department at SV University and about the achievements and
activities of the department for the past 20 years. She introduced the resource persons Prof. P.
Rangarajan, Indian Institute of Science, Bangalore, Prof. C. Durga Rao, Indian Institute of Science,
Bangalore, and Dr. Shailendra K Saxena, Center for Cellular and Molecular Biology, Hyderabad to
the participants. The Inaugural function ended with the vote of thanks by Dr. R. Ranjani, Faculty,
Department of Virology, S.V. University. The whole program comprised of 8 lectures addressing
different themes in each session.
Technical Programme

25.02.13 Day-1 Forenoon session-1 Chaired by Prof. DVR Sai Gopal, Head, Dept. of Virology, SV University, Tirupati
Co-Chaired by Dr. V. Kalarani, Associate Professor, Dept. of Biotechnology, Sri Padmavati Women's University, Tirupati

Lecture-1 by Prof. HS Savithri, IISc, Bangalore, 11:00-12:15 PM
Topic: Virus structure, biology and purification

The lecture covered the topics of basic structures of plant and animal viruses. Importance of understanding viral life cycle in choosing the target for viral inhibition was explained. Purification of virus has been illustrated and the use of dynamic light scattering to assess the density of virus was mentioned. Sizing of viral particles and assembly of several viral particles including TMV has been explained. At the outset, the importance of understanding the structure of virus in developing control measures has been explained.

Lecture-2 by Prof. P.N. Rangarajan, IISc, Bangalore, 12:15-1:30PM
Topic: Conventional and modern approaches for development of viral vaccines/therapeutics

Prof. P.N. Rangarajan started his lecture by giving the definition and types of vaccines and explained the origin of vaccines against small pox, polio virus etc. He explained how the eradication of viral infection has been done. He focused on zoonotic diseases and their control measures. Development and use of hepatitis-B vaccine and cervical cancer vaccine was explained. Status of peptide vaccines and carbohydrate vaccines was explained. Advantages of DNA vaccines were explained. Emergence of adjuvants, edible vaccines and their limitations has been put forth.
Afternoon Session-II
Chaired by Dr. D. Sreenivasulu, Principal and Head, Dept. of Virology, Sri Venkateswara Veterinary University, Tirupati and Co-Chaired by Dr.M.Bhaskar Reddy, Senior Scientist, Plant Pathology, RARS, ANG Ranga Agricultural University.

Lecture: III by Prof. PN Rangarajan, IISc, Bangalore; 2:30 PM to 3:45 PM
Topic: Manufacturing viral vaccines: lab scale to industrial scale

The basics of Good manufacturing procedures to be followed were well elucidated. Differences between academic and industrial research was explained well. Various steps involved in the production of vaccines right from the selection of strain to the final product outcome, various cell lines used in the traditional viral vaccine production and its advantages and disadvantages were covered. He explained the purification of viruses by several techniques like centrifugation, chromatography, filtration etc. Various methods of viral inactivation were explained. Different preservatives and adjuvants used in the vaccine manufacturing were described. Importance of quality control procedures to be followed in vaccine production was explained. The process of production of Influenza vaccine by traditional and recombinant approaches was explained.

Lecture: IV by Prof. H. S Savithri, IISc, Bangalore, 4:00-5:15 PM
Topic: Structure and assembly of Viruses-Applications

She explained about the viral protein and RNA interactions and virus-like particles and their utilization in diagnostics. She explained the use of viral proteins in epitope presentation and its applications in diagnostics taking FMD as an example. She explained mechanism of VLPs formation and their utilization in imaging and tumor targeted drug delivery by taking an RNA icosahedral plant virus as an example. Various biological and molecular methods for plant virus detection were explained. Difference in production of antibodies by traditional and recombinant approaches was elucidated. Viral diseases of tomato and its detection by serological and molecular methods were explained.
26.02.13 Day-2 Forenoon Session-III Chaired by Prof. P. Uma Maheswari Devi, Dept. of Microbiology, Sri Padmavati Women’s University, Tirupati,
Co-Chaired by Dr. A. Uma Maheswari, Associate Professor, Dept. of Bioinformatics, Sri Venkateswara Institute of Medical Sciences (SVIMS), Tirupati

Lecture-5 by Prof. C. Durga Rao, IISc, Bangalore-9.00 AM-10:15PM
Topic: Virus replication and virus-cellular interactions

Prof. Durga Rao started his lecture by telling about the importance of RNA world and connecting the existence of RNA to virus origin. He also said about the impact of RNA variation in the speciation of viruses. Later he explained the different strategies of virus replication by taking one example for each genome type (e.g., polio virus, enterovirus, influenza virus, rotavirus; SV40, adenovirus and HIV). He pointed out different host proteins that are responsible and their interaction with viral factors for the virulence of respective viruses (e.g., significance of TAT proteins in the virulence of HIV).

Lecture 6 by Prof. C. Durga Rao, IISc, Bangalore-10.45 AM-12 PM
Topic: Conventional and modern diagnostic approaches

In his second lecture, Prof. C. Durga Rao listed and explained the conventional like virus isolation, plaque assays, Ouchterlony double diffusion test etc and modern diagnostic techniques like ELISA, different formats of PCR and microfluidic biosensor methods. He started his lecture by giving definitions for antigen and antibody and immunoassays. He explained in detail about the production of monoclonal antibodies and their use in the immunological tests. He explained basic principles of ELISA technique, different formats of ELISA like direct, indirect, sandwich, competitive ELISAs and their applications. He gave a detailed account of different formats of PCR like LAMB, Inverse PCR, multiplex PCR, nested PCR, PCR-ELISA, BARBIT, Real time PCR etc and their applications. He concluded his lecture by giving some of the non-PCR alternative analytical methods like biosensors, micro fluidic devices.
Lecture 7 by Dr. K. Shailendra Saxena, CCMB, Hyderabad 12.00 PM to 1.15 PM

Topic: Viral-vector interactions (Epidemiology and surveillance)

In his first lecture, Dr. Shailendra K Saxena illustrated the importance of epidemiology in general with respect to infectious diseases and explained the important definitions of general epidemiological terms like epidemic, pandemic, sporadic, zoonosis etc. He took several examples of infectious, zoonotic, transmissible human and animal viruses and explained in detail regarding their surveillance in the nature by adapting several strategies. He also explained about the reasons in getting more and more emerging viruses due to the lack of proper epidemiological data and surveillance. He stressed on the importance of biosafety guidelines and the importance of laboratory safety measures in conducting experiments with infectious diseases. He explained some of the mathematical formulas to calculate PCD of infectious diseases and in each and every step, he took some virus examples to explain the definition.

Afternoon session IV Chaired by Prof. M. Bhaskar, Head, Dept. of Zoology, SV University, Tirupati, Co-chaired by Dr. T. Vijaya, Associate Professor, Dept. of Botany, SV University, Tirupati.

Lecture 8 by Dr. K. Shailendra Saxena, CCMB, Hyderabad 2.15 PM to 3.30 PM

Topic: Emerging and re-emerging viruses-A special review

The post lunch session has been started with the second lecture of Dr. K. Shailendra Saxena on emerging and reemerging viruses. Initially he showed a English movie clipping where they have explained the situation of developed and developing countries with respect to the emerging viruses and reemerging virus infections. It was very effective, informative and self-explanatory. He gave elaborated information on the factors contributing for emergence of emerging diseases and solutions to overcome the situation. Some of the factores which contribute for disease emergence are mass migration. Sexual practice, immune suppression, global warming, malnutrition, population displacement etc., He also emphasized the emergence of infectious disease such as SARS, Swineflu, Chickengunea, dengue, H1N1 and solutions to prevent them. He also highlighted the threat of viral diseases in bioterrorism. He also narrated the significance of global outbreak Alter and Response
network (GOARN) in relation to WHO. He stressed the importance of 4 P’s and also multiple strategies, expertise that are needed to control the infections and the synergy at global, regional and national level.

Valedictory session 4:00 PM to 5:00 PM

Prof. D.V.R.Sai Gopal, Head, Dept. of Virology, SV University was the president of the valedictory session and Dr. Shailendra K. Saxena, Senior Scientist, CCMB, Hyderabad was the chief guest. Session started with Dr. Charitha Devi welcome note, followed with prayer by Miss. Soumya, Virology research student. Dr. Shailendra K Saxena addressed the gathering and he explained the importance of the lecture workshops in the area of Virology. He said that this will be the first workshop where the whole theme was covered with virus related topics and he thanked Science Academies for taking this type of workshops in the country. Dr.M. Hema, Coordinator of the lecture workshop read the detailed report of the proceedings of the workshop. Then Dr. Nagaraju, (Dept. of Chemistry, SV University), Mr. Manohar (M.Sc., student of Virology), Dr. M. Rajasekhar (Dept. of Zoology, SV University), Dr. D.M. Mamatha (Dept. of Seribiotechnology, Sri Padmavati Women’s University), Dr. Srilatha (Dept. of Medicine, Sri Venkateswara Veterinary University) and Dr. Paramageetham (Dept. of Microbiology, SV University) expressed their views regarding the lecture workshop. They all said that the topics covered under this theme were very useful for them in terms of teaching and research as well. Valedictory session was ended with vote of thanks by Dr. G. Narasimha, Faculty, Dept. of Virology, SV University. Tirupati.

Dr. M. HEMA, Ph.D.
Associate Professor
Department of Virology
SRI VENKATESWARA UNIVERSITY
TIRUPATI-517 502, A.P., INDIA.
Science Academies Lecture workshop on “VIRAL VACCINES AND DIAGNOSTICS”
Department of Virology, S. V. University.

Programme Sheet

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<td>25-2-2013</td>
<td>Inauguration</td>
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<td>9:30 to 10:30 AM</td>
<td>Tea Break</td>
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<tr>
<td><strong>Session -1</strong></td>
<td>Lecture by Prof. H. S. Savithri, Department of Biochemistry, IISc, Bangalore</td>
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Venue: Arts Block Auditorium, SV University.

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<td>9:00 AM to 10:15 AM</td>
<td>Lecture by Prof. C. Durga Rao, Department of Molecular and cell Biology, IISc, Bangalore</td>
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<tr>
<td>3:45 PM to 4:45 PM</td>
<td>Valedictory session</td>
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