

Preface

ON the recommendations of the PAC in neurobiology, a Multidisciplinary Interaction Meeting on Neurosciences was organized at the Department of Physics, Indian Institute of Science, Bangalore, on 16–18 April 1993. The broad objectives of this meeting were:

1. To take a critical look at the current status and discuss future directions for research work in allied disciplines of relevance to neurosciences.
2. To plan the future course of action for developing multidisciplinary programmes in neurosciences.

The programme included invited talks by leaders in the respective fields to highlight the state-of-the-art overview of the subject, current work being done in India, future perspectives and concrete suggestions for possible multidisciplinary interaction to strengthen the ongoing research in the country. There were 23 lead talks (see Annexure 1) on wide-ranging topics like physics and consciousness, information processing in biological vision, neural network and neurocomputers, ion channels, signal transduction, molecular perspectives of neurotoxicology, quantum-mechanical motivation, etc.

The second part of the programme consisted of 'free for all', uninhibited discussion which ultimately led to delineation of specific recommendations for future action.

Besides the well-established scientists, some young scientists were also invited to participate (Annexure 2). It was generally agreed that this unique meeting was extremely useful in creating an awareness of the diverse expertise available within the country which could be harnessed to accelerate and expand neurobiology research in the country to frontline international level. To disseminate this information more widely, it was decided to publish the proceedings of this meeting. Some specific areas were identified for multidisciplinary interaction.

Specific areas

Genetics

1. Genetic studies on human neurological diseases of special interest to India.

2. Molecular neurogenetics for the study of developmental neurobiology.
3. Developmental biology, specially in human material.

Behaviour

4. Neuroethology.
5. Human behaviour/consciousness/memory/intelligence/cognition.

Molecular studies

6. Neurotoxicity.
7. Receptor studies for drugs and toxicity screening.

Biochemical studies

8. Myelin – composition and function.
9. G-protein – Mechanisms of transduction.
10. Chemistry of brain in intact animals – NMR and PET.

Neural networks, artificial intelligence, neural prothesis

11. Creation of a number of multidisciplinary groups.
12. Theoretical models in neurobiology: modelling and stimulations software packages.

Cognitive science

13. Initiate activity in this field.

Creation of facilities

14. An animal facility for mutants, natural and transgenic.
15. A database in the above areas.
16. At least one PET-scanning facility.
17. Facility for magnetoencephalography.

In addition, some general recommendations were made with a view to catalyse the ongoing activity to a wider and higher level:

1. Arranging group discussions at different places for in-depth debate and planning of well-defined multi-disciplinary research programmes, e.g. Genetics and Neural networks.
2. Holding information-sharing training programmes, courses on neural networks, information processing and experimental neurobiology.
3. Establishing a few units in areas of our strength.
4. Creating some facilities for new techniques not already existing.
5. Creating post-doctoral fellowships in these areas.

P. N. TANDON

Annexure I

Interdisciplinary Interaction Meeting in Neurosciences
Department of Physics, Indian Institute of Science,
Bangalore, India

16-18 April 1993

P. N. Tandon	Opening remarks and overview
B. V. Sreekantan	Physics and consciousness
G. Gopinath	Neuromorphology
G. Govil	Imaging
N. Kumar	Imaging from scattering media
N. B. Joshi	Signal transductions/biophysical studies
S. K. Sikdar	Ionic channels and neuronal mimics

16 April 1993

Y. V. Venkatesh	Some aspects of information processing in biological vision
B. N. Dhawan	Pharmacological approaches to the study of receptors
H. Sharat Chandra	Relevance of certain human genetic disorders
K. Vijayaraghavan	Genetic analysis of the nervous system
L. M. Patnaik	An overview of neurocomputers
T. P. Seshadri	Crystal structures of blood-coagulating proteins
S. Ramakumar	Structural studies on myelin proteins

N. Shamala	Some structural aspects in neuro-biology
P. G. Joshi	Glycolipid mediated from transmembrane signalling

17 April 1993

G. Padmanaban	Neurotoxicology – A molecular-biological perspective
R. Gadagkar	Observational study of animal behaviour: From instinct to intelligence
Gourie Devi	Studies and prospects in electrophysiology
P. S. Sastry	Problems and prospects in neuro-chemistry

17 April 1993

M. A. L. Thathachar	Learning agents
Chandandas Gupta	Review of theoretical models in neuro-biology
G. Krishna	Cognitive science, mind-body problems
Bikash Chakrabarti	Neural network models
N. Mukunda	Quantum-mechanical motivation

Annexure II

1. Dr. S. K. Sikdar, Molecular Biophysics Unit, IISc, Bangalore 560 012, India
2. Dr. K. Vijay Raghavan, IISc, Bangalore 560 012, India
3. Dr. Chandandas Gupta, Department of Physics, IISc, Bangalore 560 012, India
4. Dr. T. R. Raju, Department of Neurophysiology, NIMHANS, Bangalore 560 029, India
5. Dr. Bikash Chakravorty, Saha Institute of Nuclear Physics, I/AF, Bidhan Nagar, Calcutta 400 005, India
6. Dr. Shashi Wadhawa, Department of Anatomy, AIIMS, New Delhi 110 029, India
7. Dr. Gautam Palit, CDRI, P.B. No. 173, Lucknow 226 001, India
8. Dr. R. Gadagkar, Centre for Ecological Sciences, IISc, Bangalore 560 012, India
9. Dr. N. Shamala, Department of Physics, IISc, Bangalore 560 012, India
10. Dr. S. Ramakumar, Department of Physics, IISc, Bangalore 560 012, India
11. Dr. T. P. Seshadri, Department of Physics, IISc, Bangalore 560 012, India
12. Dr. P. G. Joshi, NIMHANS, Bangalore 560 029, India
13. Dr. N. B. Joshi, NIMHANS, Bangalore 560 029, India