



Professor Shyamala Mani has guest edited this issue on “Development and Disorder of the Nervous System” with meticulous care and precision. As you will read the articles the efforts by each author becomes clear and we from the editorial board thank all the authors and Shyamala Mani for their special contribution to our journal. Understanding functions of the Brain and the nervous system is an arduous task and to address issues related to disorder is of different dimension. The nine articles carefully collated by the guest editor concentrate on various aspects of the intricacies associated with the nervous system concerning morphogenesis and pattern formation. Shyamala belongs to the young brigade of modern day scientists and in fact the Centre for Neuroscience is one of the newly formed centers of our Institute.

I must commend the efforts of our editorial staff who worked round the clock to bring the issue in quick time. The importance of biological sciences is recognized in the issues we brought out in the year 2012. The issues we wish to bring out in the year 2013 will concentrate on materials, water management and storage and electronics in keeping the United Nations recognition of 2013 as the year of Water Cooperation in mind.

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Development and Disorders of the Nervous System

Developing Brain

Exiting the endless cycle of birth,
neurons navigate through the darkness
filling nothingness with urgency.
Architecture wrought by molecules
jostling through the sieve of space and time.
The future already arching towards it
as it gets ready an edifice that from within
bears knowledge of the horizon
and the template upon which a symphony shall be played.

Awareness sputters into being
a flame bravely dancing before the advancing rain.
It senses the selfless crafting of perfection
beginning its short journey towards decay.
Yet its form begets a hunger so intense
that it recreates outside all that was fashioned within
and forges an inseparable bond with its creation.
So when the structure within dissolves into silence
the world it created holds the memory to craft once more
the eyes that beheld it.

Self replicating stable forms in nature exist because rules governing morphogenesis and pattern formation are encoded in our genes and decoded during development. This volume contains information on some aspects of our understanding of what governs brain morphogenesis.

Patterning of the developing brain occurs in several stages that overlap temporally and spatially in complex ways. It initially requires signals that impart positional information to the neural tube so that the neural stem cells differentiate according to their position along the anterior-posterior and dorsal-ventral axis of the nervous system. Neurons and glia are generated from stem cells in a precise temporal order that is critical to formation of functional neural circuits. There are molecular cues that determine how many times a neural stem cell will self renew and they control the production of different cell types as the brain forms. Newly born neurons extend an axon that connects with other neurons to form circuits. Millions of axons are guided to their destination by a variety of chemoattractant and chemorepellent signals present in the milieu of the developing brain thereby wiring the different parts of the brain together. The brain is thus patterned by the tightly regulated temporal and spatial expression of different molecules and this regulated expression is encoded in our genes.

An important property of the brain is that it is not a static structure. Neural networks that are formed during development are constantly modified by the environment through brain activity. Activity in the brain network affects the network architecture of the brain and this in turn modifies brain activity. We are beginning to understand the pathways by which our interactions with the environment can affect our brain. Deciphering the pathways of normal brain development will help us better understand how aberrations in development can lead to conditions such as autism, childhood depression or schizophrenia.



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