BioMed Research International

Special Issue on

From Micro- to Macroscopic Brain Connectivity Using Multiple Modalities

CALL FOR PAPERS

Brain is the most complex organ in the body. This organ is composed of various interacting units (e.g., single neurons, cortical columns, voxels, and brain areas at microscopic, mesoscopic, or macroscopic scales), which give rise to its functional complexity. With the advent of advanced brain imaging techniques, the study of human brain connectivity *in vivo* becomes possible and has offered new insights into understanding the cognition and the brain's information flow in health and disorders. Using different modalities of neuroimaging, both structural and functional brain connectivity can be mapped. The structural connectivity represents the anatomical links between units, such as synapses, fiber bundles, or morphological covariance. The functional connectivity is used to measure the statistical independencies of the functional signals over time between units. By integration of brain units and their interactions, recently, the brain was proposed to be modeled as a network and so was called "human connectome." The application of network science to the brain has facilitated our understanding of how the brain is structurally and functionally organized. Knowledge about network interactions on and across multiple levels of organization is crucial for a more complete understanding of the brain as an integrated system. Furthermore, studying the brain within this framework has already shed light on how many diseases and disorders affect the brain, such as Alzheimer's disease, multiple sclerosis, schizophrenia, and autism. However, there are still some challenges when mapping, analyzing, and modeling the brain connectivity at different scales.

We invite investigators to contribute original research articles as well as review articles to stimulate the continuing efforts to understand the brain connectivity mapping from micro- to macroscopic scales with different imaging techniques.

Potential topics include, but are not limited to:

- Mapping the brain connectivity with advanced neuroimaging techniques (e.g., diffusion MRI, structural MRI, functional MRI, PET/SPECT, EEG/MEG, ECG, TMS/Tdcs, and so on)
- Modeling of stationary and temporal brain connectivity and networks
- Characterizing the properties and dynamics of brain connectivity and networks
- Relationship between brain connectivity and cognitive functions
- Applications of brain connectivity analysis in brain development, aging, and disorders

Authors can submit their manuscripts via the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/bmri/molecular.imaging/mmmm/.

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