

Special Issue

Embracing the Diversity of Perinatal Brain Injury: Molecular Mechanisms and Novel Therapeutics

Message from the Guest Editors

Perinatal brain injury (PBI) is one of the most important lifelong causes of epilepsy, cerebral palsy, and deficits in cognition, behavior, and social interaction. The pathophysiology of CNS injury following PBI reflects a combination of multiple insults, including 1) inflammation from prenatal infection and/or hypoxia-ischemia (HI); 2) individualized risk from genetic/congenital disorders; 3) acquired prenatal exposures to drugs, and toxins; 4) gut microbiota and nutritional status; and 5) postnatal stresses, such as sepsis and surgery. The cumulative effect of PBI results from a cascading impact on neurodevelopment and presents unique challenges to repair that are distinct from the mature CNS. While myelin, synapses, and circuits are plastic and modifiable throughout the lifespan, there remain many distinctive hurdles to repair of the developing brain. Notably, response to injury within the context of the constantly evolving, incompletely formed, platform of the developing CNS demands individualized and precision medicine approaches coupled with rigorous molecular and cellular mechanistic evaluation of the unique pathophysiology and mechanisms of disease.

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