Scholarly Activities:

The white matter consists mainly of myelinated axons, which is distributed into some specific areas including spinal cord, prefrontal cortex, corpus callosum, limbic system, and cerebellum, etc. It plays an indispensable function not only on motor movement but advanced neuro-behaviors as well, such as self-discipline, judgment, problem solving, emotional management, long-term memory, and coordination. Both extrinsic and intrinsic cues that impact on either the developing process or the developed architecture will lead to the neurological disorders. The research activities in Dr. Cai's lab focus on understanding molecular, genetic and epigenetic regulations of white matter development in the CNS as well as pathological mechanisms in white matter impairment. The myelin-forming process and oligodendroglial-axonal interaction are targeted by use of genetic, molecular and cellular approaches on the mouse models resembling human CNS development and neurological diseases. The study aims: (1) to identify and characterize candidate genes that are specifically expressed in neurons or glia; (2) to investigate the ‘molecular switch’ in the CNS that are involved in white matter injury; (3) to develop molecular and/or cellular strategies for preventive or therapeutic purpose.

Grants:

Role: Co-I, COBRE supported junior faculty
Title: Molecular determinants of developmental defects (Robert M. Greene, PI)
Subproject - Intermittent hypoxia-mediated oligodendrocyte defects in a murine model of gestational sleep apnea
Funding Agency: NIH/NIGMS
Direct Costs Funded: $100,000/year

Role: PI for pilot grant
Title: Mechanisms of plasticity and repair after spinal cord injury (Scott Whittemore, PI)
Pilot grant - The role of PAF signaling in functional recovery after the SCI
Funding Agency: NIH/NCRR
Direct Costs Funded: $22,500

Role: PI
Title: PAF signaling and white matter development in the CNS
Funding Agency: Department of Pediatrics, University of Louisville School of Medicine
Direct Costs Funded: $25,000

Publications (2013-2014):


Jun Cai, M.D., Ph.D.
Assistant Professor
Department of Pediatrics
School of Medicine


# co-corresponding author * contribute equally

External Professional Activities (2013-2014):

Editorial Boards, Associate editor, International Journal of Clinical and Experimental Pathology

Editor, Pediatrics & Therapeutics
