

A key conserved protective factor in ischemic neurons and astrocytes

Under a research project funded by the National Natural Science Foundation of China, Prof. Chen Xiaoqian’s laboratory at the School of Basic Medicine, Tongji Medical College, Huazhong University of Science and Technology, reported a key conserved endogenous protective mechanism in ischemic neurons in an article entitled “Selective 14-3-3 γ induction quenches p- β -catenin Ser37/Bax-enhanced cell death in cerebral cortical neurons during ischemia”, which was published in *Cell Death Dis* (2014, 5: e1184).

Ischemic insult is the most common pathological factor in the brain, which causes various neurological diseases including stroke. Although extensive studies have been carried out, the exact endogenous protective mechanisms during and after ischemic stroke remain poorly understood, which obstructs the clinical development of reliable neuronal or brain-protective drugs. 14-3-3 proteins are highly conserved scaffold/signaling proteins that exist predominantly and abundantly in the brain. The physiological function of 14-3-3 protein in the brain remains a mystery as it contains seven isoforms and binds to over a thousand of other proteins. Prof. Chen’s current and previous work has demonstrated that 14-3-3 is a selectively conserved early ischemia-inducible factor that protects both cortical neurons and astrocytes. Interestingly, 14-3-3 prevents the ischemic cell death in astrocytes by directly binding to p-Bad but in neurons indirectly by binding to p- β -catenin and then down-regulating Bax. Since neurons and astrocytes constitute a functional unit, protecting both types of brain cells is required for a normal brain function. Therefore, targeting 14-3-3 is likely a reliable protective strategy for ischemic stroke.

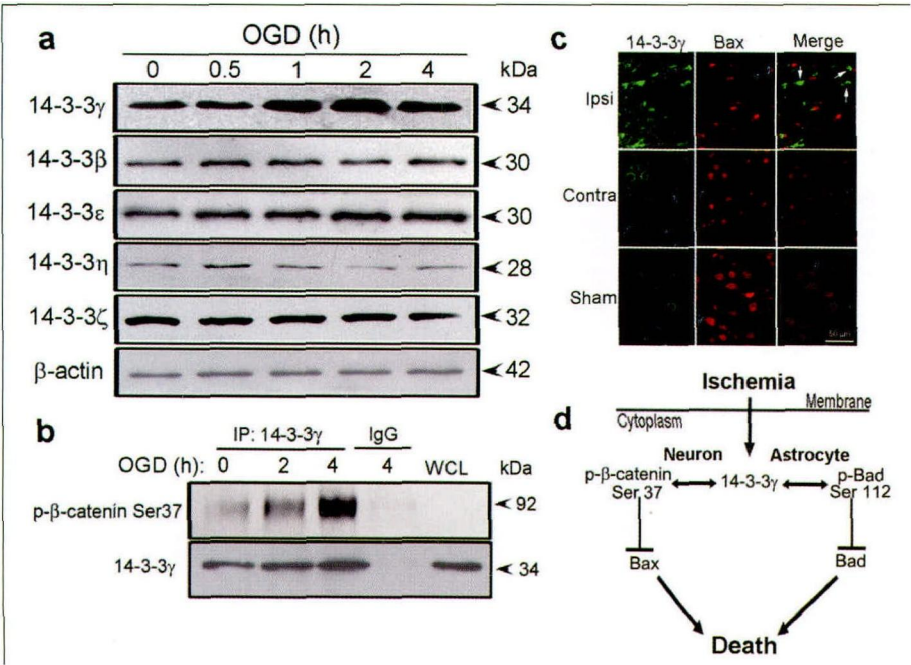


Figure a, 14-3-3 is selectively up-regulated in primary cortical neurons upon OGD. b, 14-3-3 binds to more p- β -catenin Ser37 in primary cortical neurons. c, Induction of 14-3-3 is associated with the decrease of Bax in cortical neurons in the ischemic brain. d, Induction of 14-3-3 protects neurons and astrocytes via distinct mechanisms.