FOXO transcription factors

Traumatic brain injury (TBI) is a substantial clinical and social problem worldwide, causing high morbidity and mortality along with significant economic and medical costs. Forkhead box O transcription factors (FOXOs) have been found to play a critical role in the regulation of cell functions, such as nutrient metabolism, programmed cell death, and tumor suppression. In the central nervous system, FOXOs are reported to be pivotal regulators of learning and memory, neurite outgrowth, and axonal degeneration.

The role of FOXOs in TBI is still unknown. Liu et al. investigated the changes in the expression of FOXOs in the acute stage following TBI. First, they evaluated the expression of FOXO proteins in the brains of humans after TBI. A TBI model was then established in mice, and the ipsilateral cerebral cortex was collected at 3 h, 6 h, 9 h, 12 h, 24 h, and 72 h post-TBI. The dynamic expression of Foxo proteins was observed. Neuron-specific localization of Foxos was detected by double immunofluorescence staining. Following TBI, FOXO proteins in the brains of humans were significantly increased. In mice, Foxo protein levels generally peaked at 24 h. By examining co-localization with neurons, the proportion of Foxo(+) neurons was found to increase following TBI and peak at 24 h. This study reveals the time-dependent and neuron-specific expression of Foxos following TBI in mice, providing insight to enhance understanding of the role of Foxos in TBI [1].

[1] Liu XL, Gao CC, Qi M, Han YL, Zhou ML, Zheng LR. Expression of FOXO transcription factors in the brain following traumatic brain injury. Neurosci Lett. 2021 Apr 7:135882. doi: 10.1016/j.neulet.2021.135882. Epub ahead of print. PMID: 33838260.