

CTCF

Transcriptional repressor CTCF also known as 11-zinc finger protein or CCCTC-binding factor is a transcription factor that in humans is encoded by the CTCF gene.

CTCF is involved in many cellular processes, including transcriptional regulation, insulator activity, V(D)J recombination and regulation of chromatin architecture.

Histone deacetylase 9 (HDAC9) has been reported to be elevated in ischemic brain injury, but its mechanism in stroke is still enigmatic. Shen et al. aimed to unveil the manner of regulation of HDAC9 expression and the effect of HDAC9 activation on neuronal function in cerebral ischemia. MicroRNAs (MicroRNAs) targeting HDAC9 were predicted utilizing bioinformatics analysis. They then constructed the oxygen glucose deprivation cell model and the middle cerebral artery occlusion rat model, and elucidated the expression of CCCTC binding factor (CTCF)/miR-383-5p/HDAC9. Targeting between miR-383-5p and HDAC9 was verified by Dual-Luciferase Reporter Assay and RNAi. After conducting an overexpression/knockdown assay, they assessed neuronal impairment and brain injury. They found that CTCF inhibited miR-383-5p expression via its enrichment in the promoter region of miR-383-5p, whereas the miR-383-5p targeted and inhibited HDAC9 expression. In the oxygen glucose deprivation cell model and the middle cerebral artery occlusion rat model, they confirmed that elevation of HDAC9 regulated by the CTCF/miR-383-5p/HDAC9 pathway mediated apoptosis induced by endoplasmic reticulum stress, while reduction of HDAC9 alleviated apoptosis and the symptoms of cerebral infarction in MCAO rats. Thus, the CTCF/miR-383-5p/HDAC9 pathway may present a target for drug development against ischemic brain injury¹⁾.

1)

Shen J, Han Q, Li W, Chen X, Lu J, Zheng J, Xue S. miR-383-5p Regulated by the Transcription Factor CTCF Affects Neuronal Impairment in Cerebral Ischemia by Mediating Deacetylase HDAC9 Activity. Mol Neurobiol. 2022 Aug 4. doi: 10.1007/s12035-022-02840-4. Epub ahead of print. PMID: 35927544.

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