

# Protective Effect of Astroglial Extracellular Matrix Induced by Hypoxic Preconditioning Against Oxygen and Glucose Deprivation-induced Injury in Neural Stem Cells

Tao Xu<sup>1,2</sup>, Rui Wang<sup>3</sup>, Luochuan Lu<sup>3</sup>, Yuanyuan Wang<sup>3</sup>, Yabin Xie<sup>1,3,\*</sup>

<sup>1</sup>Inner Mongolia Key Laboratory of Hypoxic Translational Medicine, Baotou Medical College, Baotou, China

<sup>2</sup>School of Basic Medicine and Forensic Sciences, Baotou Medical College, Baotou, China

<sup>3</sup>School of Medical Technology and Anesthesia, Baotou Medical College, Baotou, China

## Email address:

13396191834@163.com (Tao Xu), 1401323262@qq.com (Rui Wang), 1846306139@qq.com (Luochuan Lu), 1565717054@qq.com (Yuanyuan Wang), zhe8753\_ynmz@163.com (Yabin Xie)

\*Corresponding author

## Abstract

**Background** Hypoxic preconditioning (HPC) is an adaptive response of the organism to hypoxia environment which induces a series of protective mechanisms in cells. Astrocytes, as the main glial cell type in the central nervous system, play an important role in neuroprotection. **Objective** To investigate the role of astroglial extracellular matrix induced by HPC on oxygen and glucose deprivation-induced injury in neural stem cells. **Methods** Neural stem cells were divided into control group and outer matrix group. The Oxygen-glucose deprivation and reoxygenation (OGD/R) model was directly constructed in control group, and the HPC induced astroglial extracellular matrix was added to the outer matrix group, followed by the construction of an OGD/R model. CCK-8 was used to detect the cell viability of the two groups of neural stem cells. qPCR was used to determine the expression levels of metabolic enzymes such as PKM, GLS and ACSS in the cells of the two groups, and flow cytometry was used to detect the number of apoptotic cells and expression of apoptotic proteins in the two group of cells. **Results** Compared with the control group, the cell viability, the expression levels of metabolic enzymes such as PKM, GLS and ACSS were significantly increased in the outer matrix group, and the number of apoptotic cells and the expression of apoptotic proteins were significantly decreased. **Conclusions** HPC induced astroglial extracellular matrix can attenuate the oxygen and glucose deprivation-induced injury of neural stem cells and has a neuroprotective effect.

## Keywords

Hypoxic Preconditioning, Astrocytes, Neural Stem Cells, OGD/R, Neuroprotection