

Cite this as: Shimaa O. ALI, Nancy N. SHAHIN, Marwa M. SAFAR, Sherine M. RIZK. Potential effect of endothelial progenitor cells on pentylenetetrazole-induced seizures in rats: an evaluation of relevant lncRNAs. *Journal of Zhejiang University-SCIENCE B (Biomedicine & Biotechnology)*, 2025, 26(8):789-804. <https://doi.org/10.1631/jzus.B2400242>

Potential effect of endothelial progenitor cells on pentylenetetrazole-induced seizures in rats: an evaluation of relevant lncRNAs

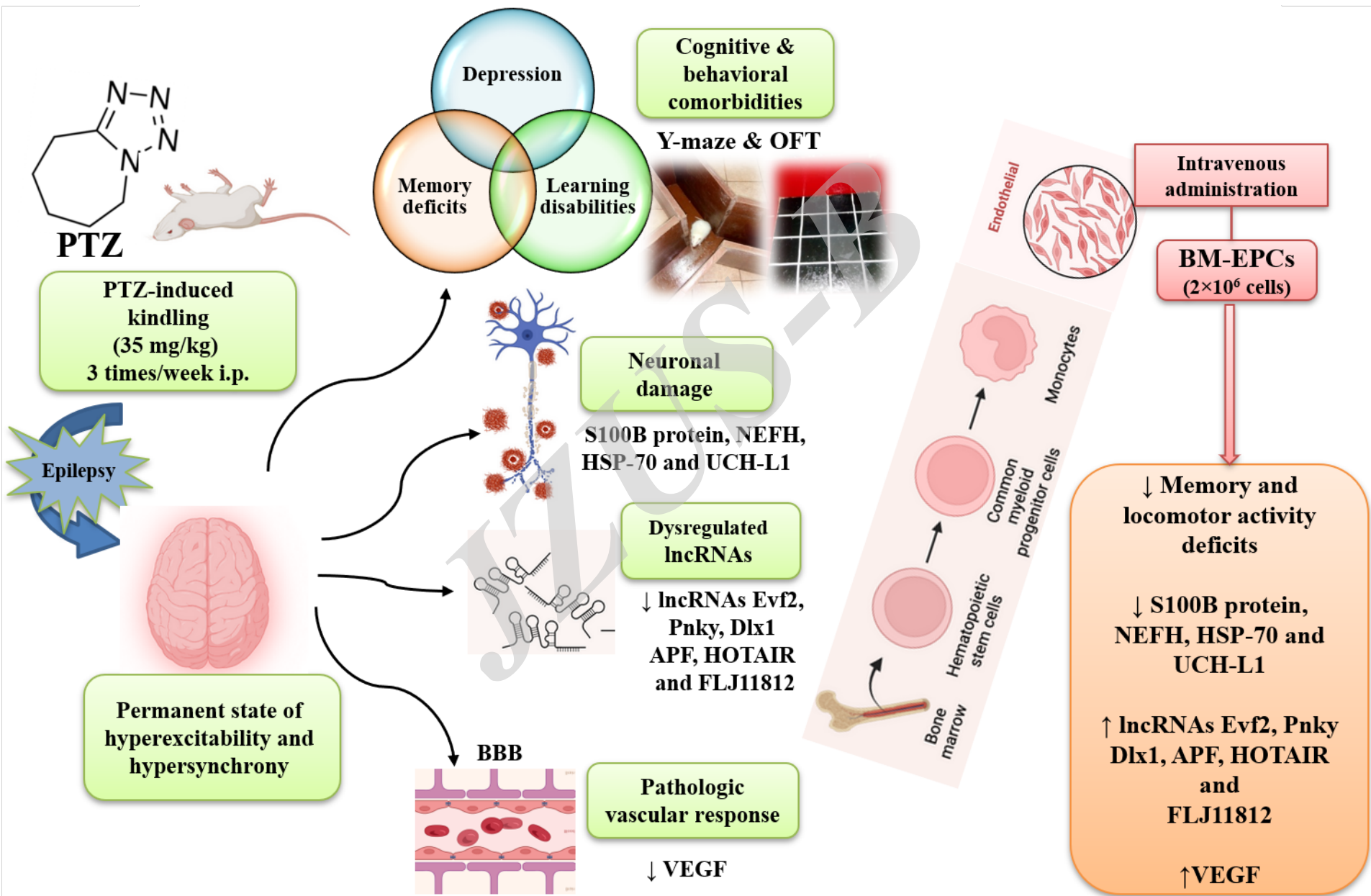
Key words: Endothelial progenitor cell (EPC); Long noncoding RNA (lncRNA); Pentylenetetrazole (PTZ); Neuronal damage; Seizure

Research Aim

In an attempt to better understand the processes underlying epileptogenesis, and develop more effective treatments for patients with uncontrolled seizures and disabling comorbidities, the present study mainly focused on:

1. Investigation of the potential therapeutic effect of bone marrow-derived **EPCs administration** on **PTZ**-induced kindling, a model of **epilepsy**-induced comorbidities and neurochemical alterations in rats.
2. Profiling brain development- and autophagy-related **lncRNAs** dysregulated in epilepsy.

Research Summary



Conclusion



- ❑ PTZ-induced epilepsy is associated with marked **behavioral comorbidities**, **neuronal damage**, **vascular abnormalities** as well as **molecular changes**.
- ❑ Alterations in the expression of **lncRNAs** that regulate brain development and autophagy, evoked in **PTZ-treated rats**, have a central role in the **etiology of epilepsy**.
- ❑ **Administration of EPCs significantly reversed most changes associated with epilepsy:**
 - **Intravenously administered EPCs homed** into the epileptic rat hippocampus.
 - **EPCs amended** the memory and locomotor activity deficits related to epilepsy.
 - **EPCs corrected** the neuronal damage.
 - **EPCs up-regulated** expression of lncRNAs that control the CNS development as well as the autophagy process.
 - **EPCs mitigated** the vascular anomalies.

The therapeutic application of EPCs in neurological disorders remains constrained, with scant reports in animal models. We want to emphasize the effective potential of EPCs in reducing epileptic activity, offering a hopeful treatment approach that could lessen the impact of the disease and enhance the quality of life for people with epilepsy. Therefore, we encourage more research to improve the utility of using EPCs to treat epilepsy.

