Document details

Back to results | 1 of 1

Full Text | View at Publisher | Export | Download | Add to List | More...

Experimental and Therapeutic Medicine

Volume 13, Issue 3, March 2017, Pages 976-982

Effect of intranasal stem cell administration on the nigrostriatal system in a mouse model of parkinson's disease (Article)

Salama, M.[ab], Sobh, M.[a], Emam, M.[a], Abdalla, A.[a], Sabry, D.[a], El-Gamal, M.[a], Lotfy, A.[a], El-Husseiny, M.[a], Sobh, M.[ac], Shalash, A.[d], Mohamed, W.M.[ef]

[a] Medical Experimental Research Center, Mansoura University, Mansoura, Egypt

[b] Toxicology Department, Faculty of Medicine, Mansoura University, Mansoura, Egypt

[c] Urology Nephrology Center, Mansoura University, Mansoura, Egypt

View additional affiliations

View references (33)

Abstract

Parkinson's disease (PD) is the second most common neurodegenerative disease worldwide. It affects the locomotor **system**, leading to **a** final severe disability through degeneration of dopaminergic neurons. Despite several therapeutic approaches used, no treatment has been proven to be effective; however, **cell** therapy may be **a** promising therapeutic method. **In** addition, the use of the **intranasal** (**IN**) route has been advocated for delivering various therapies to the brain. **In** the present study, the **IN** route was used for **administration** of mesenchymal **stem** cells (MSCs) **in a mouse** model of PD, with the aim to evaluate **IN** delivery as an alternative route for **cell** based therapy **administration in** PD. The PD model was developed **in** C57BL/6 mice using intraperitoneal rotenone **administration** for 60 consecutive days. MSCs were isolated from the mononuclear **cell** fraction of pooled bone marrow from C57BL/6 mice and incubated with micrometer-sized iron oxide (MPIO) particles. For **IN administration**, we used **a** 20 µl of $5x10^5$ **cell** suspension. Neurobehavioral assessment of the mice was performed, and after sacrifice, brain sections were stained with Prussian blue to detect the MPIO-labeled MSCs. **In** addition, immunohistochemical evaluation was conducted to detect tyrosine hydroxylase (TH) antibodies **in** the corpus striatum and dopaminergic neurons **in** the substantia nigra pars compacta (SNpc). The neurobehavioral assessment revealed progressive deterioration **in** the locomotor functions of the rotenone group, which was improved following MSC **administration**. Histopathological evaluation of brain sections **in** the rotenone+MSC group revealed successful delivery of MSCs, evidenced by positive Prussian blue staining. Furthermore, rotenone treatment led to significant decrease **in** dopaminergic neuron number **in** SNpc, as well as similar decrease **in** the corpus striatum fiber density. By contrast, **in** animals receiving **IN administration** of MSCs, the degeneration caused by rotenone treatment was significantly counteracted. **In** conclusion, the present study validated that **IN** delivery of MSCs may be **a** potential safe, easy and cheap alternative route for **stem cell** treatment **in** neurodegenerative disorders.

Author keywords

Animal model; **Intranasal**; Parkinson's disease; **Stem** cells

ISSN: 17920981 **Source Type:** Journal **Original language:** English
DOI: 10.3892/etm.2017.4073 **Document Type:** Article
Publisher: Spandidos Publications

References (33)

View in search results format

All | Export | Print | E-mail | Save to PDF | Create bibliography

1 Chen, R.C., Chang, S.F., Su, C.L., Chen, T.H.H., Yen, M.F., Wu, H.M., Chen, Z.Y., (...), Liou, H.H.
Prevalence, incidence, and mortality of PD: A door-to-door survey in Ilan County, Taiwan
(2001) *Neurology*, 57 (9), pp. 1679-1686. Cited 79 times.
View at Publisher

2 Aarsland, D., Londos, E., Ballard, C.