

EDITORIAL

Open Access



Regeneration and remodeling after brain injury: implications for stem cell therapy

Hailiang Tang^{1*} and Francisco Silva²

Introduction of the issue

Brain injury/damage, including brain trauma or stroke, has a high morbidity and mortality, and is often accompanied by severe neurological deficits post injury. Despite advances in therapeutics targeting brain repair and remodeling, positive clinical outcome is still a challenge and there continues to be a tremendous unmet clinical need for patients. Currently, transplantation of stem cells derived from several tissue sources has been recognized as very promising biologic-based therapy for regeneration and remodeling after brain injury, for instance, neural stem cells (NSCs), mesenchymal stem cells (MSCs) and induced pluripotent stem cells (iPS cells).

Upon brain injury, oxidative stress and inflammatory response are two early events in the biological cascade following brain injury. These two events are work synergistically and directly trigger the process of autophagy. Appropriate autophagy would contribute to brain recovery by reducing oxidative stress and inflammatory responses, whereas autophagy dysfunction exacerbates brain injury. Various studies have demonstrated that stem cells and their regenerative properties could impact tissue damage following brain injury in the following aspects: cellular replacement, secreting neurotrophic factors, and mitochondrial transfer.

Therefore, we have launched a special issue entitled “Regeneration and Remodeling after Brain Injury: Implications for Stem Cell Therapy”. The collection aims to

discuss the recent progress on stem cell therapy for brain injury, specifically studies elucidating the mechanisms in terms of oxidative stress, mitochondrion dysfunction and autophagy. All original and review articles are welcome for submission to the collection on topics such as:

1. Stem cell therapy for brain repair after brain injury/damage, including brain trauma or stroke;
2. Underlying mechanisms upon stem cell replacement for brain injury, including cellular/tissue regeneration/remodeling, oxidative stress, inflammatory response and autophagy;
3. Immune-response problems following stem cells therapy for brain injury;
4. Mitochondrial role after stem cell therapy for brain injury;
5. Detection of stem cell therapy for brain injury using imaging techniques, i.e. brain magnetic resonance;
6. Application of new tools, techniques, or models for studying stem cell viability or survival after implantation, such as organoids.

Published online: 21 October 2024

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

*Correspondence:

Hailiang Tang
tangtang052105192@gmail.com

¹Neurosurgery Department, Huashan Hospital, Fudan University, Shanghai, China

²Section Editor for Regenerative Medicine section in JTM BioRestorative Therapies, Melville, NY, USA



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.