

Title: Human olfactory neurosphere-derived cells: a unified tool for neurological disease modelling and neurotherapeutic applications

Author: Saad Irfan, Maudlyn O Etekochoy, Atanas G Atanasov, Vishnu P Prasad, Ramesh Kandimalla, Mohammad Mofatteh, Priyanka V, Talha B Emran

Abstract: As one of the leading causes of global mortality and morbidity, various neurological diseases cause social and economic burdens. Despite significant advances in the treatment of neurological diseases, establishing a proper disease model, especially for degenerative and infectious diseases, remains a major challenging issue. For long, mice were the model of choice but suffered from serious drawbacks of differences in anatomical and functional aspects of the nervous system. Furthermore, the collection of postmortem brain tissues limits their usage in cultured cell lines. Overcoming such limitations has prompted the usage of stem cells derived from the peripheral nervous system, such as the cells of the olfactory mucosa as a preferred choice. These cells can be easily cultured in vitro and retain the receptors of neuronal cells life-long. Such cells have various advantages over embryonic or induced stem cells, including homology, and ease of culture and can be conveniently obtained from diseased individuals through either biopsies or exfoliation. They have continuously helped in understanding the genetic and developmental mechanisms of degenerative diseases like Alzheimer's and Parkinson's disease. Moreover, the mode of infection of various viruses that can lead to postviral olfactory dysfunction, such as the Zika virus can be monitored through these cells in vitro and their therapeutic development can be fastened.

Keywords: Neurological diseases, Global mortality and morbidity, Disease modeling, Degenerative diseases, Infectious diseases, Mouse model limitations, Nervous system, Postmortem brain tissues, Cultured cell lines

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