

Spermatogonial stem cell culture and transplantation

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摘要

Abstract

Mammalian spermatogonial stem cells, sometimes called male germline stem cells, are a small population of adult tissue-specific stem cells present in the testis. Formation of the spermatogonial stem cell population early in life and differentiation of spermatogonial stem cells in adults are responsible for continual production of sperm in the testis. Unfortunately, there are no specific biochemical or morphological markers for spermatogonial stem cells, so investigation of this cell type requires specific and consistent approaches to ensure valid data are obtained. Currently, the only assay for the presence of spermatogonial stem cells in a cell suspension is the spermatogonial stem cell transplantation technique. This requires the transfer of cells from a donor animal into the testis of a recipient animal, in which the spermatogonial stem cells will colonize and initiate donor-derived spermatogenesis. Although there is no specific marker for spermatogonial stem cells, several cell surface markers have been used to enrich for these cells prior to transplantation. Thus, selection and transplantation of spermatogonial stem cells can be used to investigate basic mechanisms regulating them. Successful transplantation and donor-derived spermatogenesis in recipient animals can lead to the restoration of fertility in infertile males. In combination with spermatogonial stem cell culture, this transplantation technique can also be used for the purpose of generating transgenic animals through the male germline. This chapter describes the methods for spermatogonial stem cell transplantation and how this approach is used to investigate testicular function.