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Reprogramming of human amniotic mesenchymal stem cells (hAMSCs) reduces the immunomodulatory property of the original hAMSCs

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Background: Human amniotic mesenchymal stem cells (hAMSCs) are isolated from amniotic membrane underlying the chorion of placenta. The hAMSCs demonstrate immunomodulatory properties known to suppress host immune responses. Immunologic reaction is a critical issue in stem cell therapy when using non-matched cells. To address this issue, the immune characteristics of hAMSCs and iPSCs derived from hAMSCs (MiPSCs) are investigated employing in vitro and in vivo experimental models.

Method and Results: A single polycistronic lentivirus is introduced into hAMSCs to generate MiPSCs. The MiPSCs similarly express high levels of HLA-G and CD59. The immunological property characterized by CD59 +, HLA-G +, and HLA-DR- suggest that the MiPSCs retain the immunosuppressive properties of the hAMSCs. To investigate in vivo survival, the hESCs (H7), hAMSCs and MiPSCs are transduced with luciferase reporter gene and injected into hind limbs of immunocompetent FVB mice. The in vivo study demonstrated robust BLI survival signal by the luciferase-transduced MiPSCs and hAMSCs at week 1, while H7 died at day1.

Conclusions: The generation of induced pluripotent cells (iPSCs) from the adult cells has vast therapeutic implications in regenerative medicine. Our data revealed that hAMSCs and MiPSCs are able to survive in immunocompetent FVB mice, which suggest that HLA-G and CD59 may play an important role in the immunomodulatory effects. In our future work, the immune properties of MiPSCs will be elucidated by enhancing the expression of HLA-G and CD59 to assess the survival of MiPSCs in immunocompetent FVB mice to study the role of allogeneic iPSC transplantation therapy.

Biography

Aditya is a high school student at the age of 17 years from Monta Vista High School, and is a student trainee at the Stanford University School of Medicine.

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