

## Placental precursor stem cells require testosterone-free environment to survive

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Trophoblast stem cells (TSCs), cells found in the layer of peripheral embryonic stem cells from which the placenta is formed, are thought to exhibit "immune privilege" that aids cell survivability and is potentially beneficial for cell and gene therapies. Further, the survivability of TSCs has been thought to require the presence of ovarian hormones. However, none of these assumptions has ever been verified. This study, published in the current issue of the journal *Cell Transplantation* (18:7) has demonstrated that it is the absence of male hormones, rather than the presence of female hormones, that allows extended transplanted cell survivability.

"Questioning whether a female hormonal environment is one of the physiological requirements for ectopic TSC survival, we surmised that a partially immune-privileged site other than the uterus might also allow TSCs to survive and exert a protective action on other nearby cells, enabling the latter to survive in locations where they normally could not," said Dr. Bert Binas, co-author of the study.

When the research team injected the livers of both male and female mice with TSCs, the cells survived in female animal livers but did not survive in male animal livers.

"This was not unexpected, given the natural uterine environment for TSCs," said Dr. Binas. "However, castration of the male mice abolished the sex hormone difference and the livers of the castrated male mice provided a perfect environment for the TSCs."



The researchers concluded that the presence of male hormones was toxic for the injected TSCs. The injected TSCs survived for three months with little if any proliferation, regardless of their immunological compatibility, but were dependent on a non-male hormonal environment in castrated male mice.

The TSCs were also found to promote survival of another cell type when transplanted together, suggesting that these cells may be able to modify their local environment and enhance the survival of co-transplanted cells. Thus a new "stem cell based trophoblastic approach" to therapeutic cell transplantation may prove to be beneficial.

"Our model provides a starting point for systematically assessing the hormonal and other physiological requirements for trophoblast cells in vivo," concludes Dr. Binas and his colleagues.

This study, for the first time, demonstrates that long term survival of trophoblast cells in the absence of ovarian hormones is possible.

"These are exciting results and clearly show that the relationship of <u>stem</u> cells with the host or transplant recipient includes a complex interaction between the 'seed and the soil'," said section editor Dr. Stephen Strom, professor in the Division of Cellular and Molecular Pathology at the University of Pittsburgh. "In the case described here, the "soil" or the natural female environment free of male hormones is an appropriate and supportive environment for TSCs, whereas, the presence of the male hormones proved quite unfavorable for the sustained engraftment of the cells. The good part is that this paper demonstrates that cells such as TSCs confer immunoprotection to another cell type when co-transplanted with the TSCs. However this benefit is only extended to female recipients - males need not apply".

More information: http://www.ingentaconnect.com/content/cog/ct



## Source: <u>Cell Transplantation</u> Center of Excellence for Aging and Brain Repair

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