

Establishing the first line of human embryonic stem cells in Brazil

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Brazilian researchers, reporting in the current issue of *Cell Transplantation* (20:3), discovered difficulties in establishing a genetically diverse line of human embryonic stem cells (hES) to serve the therapeutic stem cell transplantation needs of the diverse ethnic and genetic Brazilian population.

According to the study's corresponding author, Dr. Lygia V. Pereira of the Molecular Genetics Laboratory at the University of Sao Paulo, Brazil, pluripotent human [embryonic stem cells](#) are an important tool for basic and applied [stem cell transplantation](#) research. However, immunocompatibility is an issue, especially in a genetically diverse population such as that in Brazil where the population is comprised of European, African and Native South American ancestry.

In their study, the researchers developed an hES cell line (the first in South America) they called "BR-1" derived from a Brazilian population with embryos donated by couples who had sought assistance from private fertility clinics. Their research was compatible with the 2005 Brazilian national legal, ethical and clinical guidelines for [embryonic stem cell research](#) using tissue that had been frozen for the legally mandated time of at least three years, and that had been produced for reproductive reasons.

Their results showed that the hES cell lines they established were a "worse match" to the Brazilian population than hES lines developed elsewhere, particularly those developed in the U.S. and Singapore. The

reasons for that may be several, said Dr. Pereira.

"The Brazilian population is one of the most heterogeneous in the world, and the genes of Brazilians are mosaics," said Dr. Pereira. "However, an analysis of BR-1 showed that it is mostly European in origin. The reproductive assistance offered by the Brazilian public health system does not include cryopreservation of surplus embryos, meaning that the only research material available came from private clinics where couples with above-average incomes could afford the high cost of assisted reproduction."

According to the researchers, that segment of the Brazilian population is mostly composed of people self-identified as white - of European ancestry - and so are not representative of Brazilian ethnic admixture and, thus, are unable to be widely compatible with Brazil's diverse population genetics.

"Although we have successfully established the first line of hES from the Brazilian population that adds to the pool of genetically different pluripotent cells available, it will be important to have access to embryos from the more mixed population and assistance from the Public Health System," concluded Dr. Pereira.

"Use of embryonic stem cells (ES) in regenerative medicine is very promising, but the potential problems of tumor development, cell rejection due to histo-incompatibility, and contamination with animal products employed in the cell culture need to be overcome," said Dr. Julio Voltarelli, professor of Clinical Medicine and Clinical Immunology at the University of Sao Paulo, Brazil and section editor for *Cell Transplantation*. "In this study, Dr Pereira and colleagues compared the HLA compatibility between their ES line, the first established in Brazil, and a sample of the Brazilian population who volunteered as donors for hematopoietic stem cell transplantation (REDOME). They found few

matches for the ES line in the representative population, which was attributed to the great genetic heterogeneity of the Brazilian population. This finding may add another difficulty to the clinical use of ES in Brazil and other mixed populations even once the safety issues of ES lines are resolved."

More information: Fraga, A. M.; Sukoyan, M.; Rajan, P.; Braga, D. P. F.; Iaconelli, A., Jr.; Franco, J. G., Jr.; Borges, E., Jr.; Pereira, L. V. Establishment Of A Brazilian Line Of Human Embryonic Stem Cells In Defined Medium – Implications For Cell Therapy In An Ethnically Diverse Population. *Cell Transplant.* 20(3):431-440; 2011.

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