

Brazil's diversity makes country a testing ground for a global stem cell biobank, scientists say

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A biobank for all, in which a person from any background could find a bone marrow donor for a stem cell transplant, is a major goal for stem

cell science. While repositories of cell lines that could be a match for most patients are successfully materializing in some countries with genetically homogenous populations like Japan and the United Kingdom, how many more we need for a universal solution remains unknown.

In a study published in the journal *Stem Cell Reports*, researchers estimate at least 559 distinct cell lines would be required to cover 95% of the more diverse, and globally representative, people of Brazil.

"Considering the possibility of creating a [global network](#) of induced pluripotent stem (iPS) cell banks, we hypothesize that, given the admixture of African, Indigenous, and European ancestries in Brazil, our [genetic diversity](#) might provide iPS cells that may cover other countries," write the research team, led by Antonio Carlos Campos de Carvalho of the Federal University of Rio de Janeiro and Marcio Lassance Martins de Oliveira of Brazil's National Institute of Cardiology, Ministry of Health.

Donor compatibility reduces the chances that a patient will reject a [stem cell transplant](#). In cases where a transplant is required, such as with severe blood diseases, family members are often the first to offer to donate their [bone marrow](#), but only 12% of relatives end up being a match. A global biobank could reduce these pressures, but it is unknown how many samples would provide an adequate diversity of cell lines.

To find the ideal number of donor cell lines in Brazil, the research team used data from the Brazilian National Registry of Bone Marrow Donors (REDOME).

From over 4 million individuals, the researchers identified nearly 2,000 cell lines that could act as potential universal donors. The team then calculated how many of these cell lines would be a match for most of the Brazilian population, and they estimated 51, 157, 267, and 559 cell lines

would provide 50%, 75%, 85%, and 95% coverage, respectively. They also predicted over 4 million individuals would need to be tested to cover 99% of Brazilians.

Notably, only 30 cell lines were enough to be a donor match for almost 40% of Brazilians. Using the Allele Frequency Net Database (AFND, which compiles [genetic data](#) from 369 studies and over 10 million individuals worldwide), the investigators found these same 30 [cell lines](#) could cover about 40% of Caucasians, 12% of African descendants, 25% of Alaska Natives and Native Americans, and less than 4% of the Asian population in the U.S..

"This discrepancy between different populations shows the importance of an initiative to constitute a World iPS Bank, to which Brazil could contribute considerably," the researchers write. "We hope that the publication of the current data will entice the existing [bone marrow donor](#) registries to share data that would allow more precise calculations of the dimension of a global iPS cell bank to supply the world population with this important source of advanced therapy for regenerative medicine."

More information: Antonio Carlos Campos de Carvalho & colleagues, Creating an HLA homozygous iPS cell bank for the Brazilian population: challenges and opportunities, *Stem Cell Reports* (2023). [DOI: 10.1016/j.stemcr.2023.09.001](#). [www.cell.com/stem-cell-reports ... 2213-6711\(23\)00336-3](#)

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