

The Center for Research in Cell Therapy (CTC) focuses on advanced basic and applied research on stem cell (SC) biology. The CTC is composed of Brazilian investigators with renowned leadership in the area of Cell Therapy, along with a team of international collaborators.

The scientific project involves an ambitious multidisciplinary program aiming at the study of the molecular, cellular, and biologic features of normal and pathologic stem cells (SCs) and to critically evaluate their potential therapeutic use.

Studies will be conducted on pluripotent stem cells [embryonic (ESCs) and induced (iPSCs)] and on somatic (hematopoietic, mesenchymal, and endothelial) SCs. The intention is to generate Brazilian ESC lineages to be expanded and used in preclinical protocols, as well as investigate the mechanisms involved in pluripotency. To model diseases, iPSCs from patients with dyskeratosis congenita, Fanconi anemia, hemophilia A, and Parkinson disease will be generated to understand the mechanisms involved in the pathologic maintenance of pluripotency and to investigate disease-specific molecular pathways and the process of cell differentiation in affected tissues. Hematopoietic cells will be derived from ESCs and iPSCs, and cell lines will be established from both normal and leukemic SCs for studies on the mechanisms that control normal and neoplastic hematopoiesis. Transgenic animal models of acute promyelocytic leukemia will be produced for basic and preclinical studies. Cancer SCs will be studied to understand the processes of epithelium-mesenchymal and endothelial-mesenchymal transition implicated in the development of metastases; these mechanisms will also be studied in the context of cell reprogramming and in SC generation.

Clinical assays will be conducted using allogeneic mesenchymal SCs in the treatment of insulin-dependent diabetes, severe aplastic anemia, prevention of graft-versus-host disease in hematopoietic SC transplantation, and in haploidentical allogeneic hematopoietic SC transplantation. Finally, processes will be developed for the large-scale production of SCs under good



Cells cultivated in vitro are differentiated into several tissues for transplant in humans to treat diseases

manufacturing practice conditions to allow their potential clinical use.

The CTC project encompasses an advanced education outreach program fostering the interaction between (senior and junior) researchers and middle and high school students and teachers. This program is focused on science education and is rooted in the school-teacher-student triad. Teachers and students will be encouraged to engage together in activities based on scientific questions that produce results. They will also be encouraged to visit laboratories and obtain involved in objective scientific experiments under the guidance of our investigators and the “Adopt a Scientist” project, introducing them to the scientific method. The “Cellularium” is an exhibition project that involves an inflatable “planetarium” that invites students for a voyage into the cell, presenting 3D animation movies made by the CTC team. Additionally, the Center will recruit journalism college students to get involved in seminars and courses in sciences to develop their training in scientific journalism.

Finally, the CTC has a solid technology transfer project focused on the improvement of public health. The project involves interaction with the private sector for the generation of new recombinant proteins for clinical purposes and the development of new diagnostic tests for blood transfusion and hematologic diseases. The Center will interact with other medical institutes to develop new laboratories for clinical cell processing. The Center will also work together with government agencies responsible for health policies to expand and improve the National Health System.

Host Institution

University of São Paulo (USP, campus Ribeirão Preto)

Associated Institutions

Hemotherapy Center of Ribeirão Preto
University of Montreal, Canada
University of Guelph, Canada
University of Oxford, United Kingdom
Federal University of São Carlos (UFSCar)
University of California, United States
University of Munchen, Germany
King's College, United Kingdom
University of Southern California (USC), United States
Northwestern University, United States
Paris University, France
Leiden University, Netherlands
University of Feinberg, United States
São Paulo State University (UNESP)

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