CRYOSTEM : a French national Biobank to move research forward in the field of Hematopoiteic Stem Cell Transplantation Complications

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1 Introduction

Hematopoietic Stem Cell Transplantation (HSCT) is the only curative treatment for numerous blood diseases (such as leukemia, lymphoma, aplastic anemia and others) : thanks to HSCT, **patients have the opportunity to start from scratch**. However, almost 50% of patients, cured of their hematological diseases, have to face **short and/or long-term complications**, including those conditioning-related, infections and notably **Graft versus Host Disease (GvHD)**. Moreover, 25% of these patients are suffering from severe complications, too often leading to death.

Consequently, the ultimate and current goals are **to maximize HSCT benefits by reducing complications onset and to develop curative treatments**. But, there are still too many grey areas in the knowledge and understanding of HSCT complications physiopathology, and even more of GvHD, along with limited relevant studies (relatively few patients and scarcely any long-term cohorts in the field).

In this context, the **CRYOSTEM project** was initiated in 2010 by Prof. Régis Peffault de Latour and Dr. Boris Calmels, and promoted by the Francophone Society for Stem Cell Transplantation and Cell Therapy (SFGM-TC) to establish **a nationwide, prospective and standardized multicenter cohort**. Since its creation, CRYOSTEM has stacked all the odds in its favor and has evolved in order to achieve not only its primary goal but also to be an entire part of the research in the field by **supplying the national and international scientific community** with its samples and now, through its endowment funds "***HTC Project***", **promoting science and innovative projects** to **understand, predict and treat** HSCT complications and improve transplanted patients healthcare.

2 Building a unique network and collection in Europe*

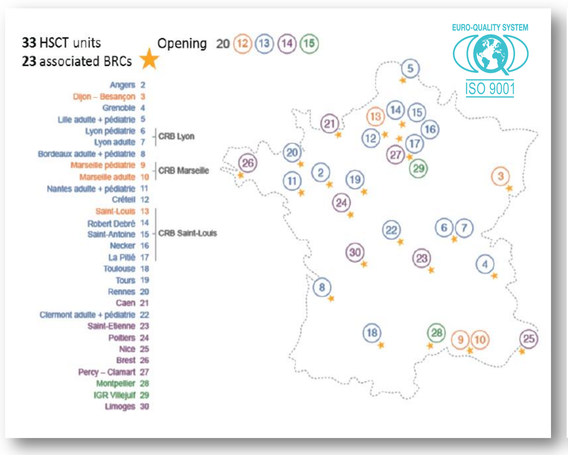
CRYOSTEM operates an enlarged and **ISO 9001-certified** network comprising **33 out of the 36 French HSCT Units (adult and pediatric)** and **23 Biological Resources Centers (BRCs).** In only three years, CRYOSTEM has succeeded in enlisting **more than 400 health professionals** to work together on this collaborative project.

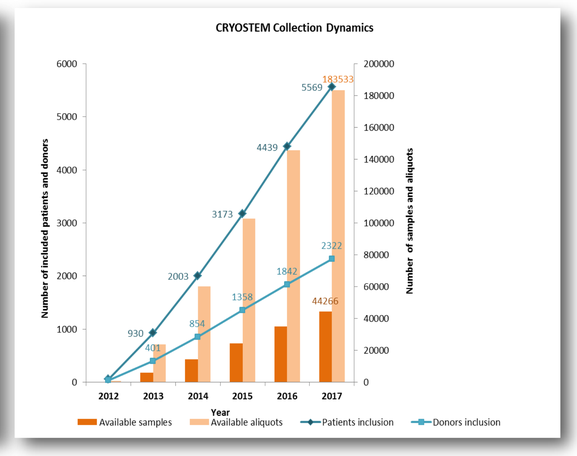
In only six years, more than **5,500 patients and 2,300 donors** have been included in CRYOSTEM (as of February 28, 2018). Blood samples are taken **pre- and post-HSCT** in line with a simple sampling schedule, **systematically (100 days, 1 and 2 years post-transplant)** and taking into account **acute and/or chronic appearance of GvHD.**

BRCs process blood samples in line with **standardized and harmonized procedures** so as to establish a high-quality and homogeneous collection, independently at each BRC. **Three sample types** are isolated and cryopreserved from blood samples: **plasma, dried pellets, and viable cells in DMSO.**

All the well-annotated **clinical data associated to biological samples** are centralized in a unique secure database: the **MBioLims CRYOSTEM**. The MBioLims is also directly linked to the EBMT (European Society for Blood and Marrow Transplantation) European clinical database, **PROMISe**.

**For more information, see the poster B442*





Benefits :

- ➔ **High inclusion rate : 70%** of the French transplanted patients included in CRYOSTEM with a mean inclusion rate of **100 patients/month**
- ➔ **Limited cryo-preservation delays** : **60%** of blood samples treated **in less than 4 hours**

3 Fueling excellence in research on HSCT complications

One of CRYOSTEM initial objectives was supplying with these samples the national and international scientific community, from both academia and industry, for **large-scale research** on **GvHD and other HSCT complications** to **increase biomedical knowledge** in the field. The ultimate goal is to improve the healthcare of transplanted patients by obtaining a **better understanding of HSCT complications physiopathology** and by **developing predictive tests and treatments**.

Since mid-2015, physicians and scientists are getting access to the CRYOSTEM collection via **annual calls for proposals**. **CRYOSTEM Scientific Committee** and **international experts** proceed to the selection and review.

To date, **5 French and 1 German research projects exploring GvHD or HSCT complications** have been granted with almost **3,800 CRYOSTEM samples**. Scientific publications are expected for 2018.

In 2017, CRYOSTEM has received **8 additional applications**, including **1 international**, currently under reviewing.

If your are interesting for working on CRYOSTEM samples, please submit your project.

CRYOSTEM

Already supplied:

Cells in DMSO
≈ 2,700 aliquots

Plasma
≈ 1,100 aliquots

#1 – Investigation of a potential association between ILCs and acute and chronic GvHD (Dr F. Vély and Pr E. Vivier, Marseille, France)

#2 – Comprehensive assessment of the recovery and potential contribution of MAIT cells in controlling acute GvHD (Pr S. Caillat-Zucman and Pr JH. Dalle, Paris, France)

#3 – Validation of plasmatic protein biomarkers of acute and chronic GvHD for predicting and monitoring responses to therapy (Dr E. Daguindau and Pr PS. Rohrlich, Nice, France)

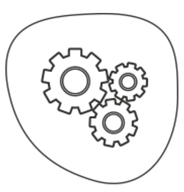
#4 – Identification of pathogenic mechanisms involved in acute GvHD by metabolomic and transcriptomic mapping (Dr D. Michonneau and Pr G. Socié, Paris, France)

#5 – Predicting complications such as EBV, GvHD and PTLD (Dr E. Drouet, Grenoble, France)

#6 – Understanding mechanisms of mortality after acute GvHD to better treat the complication (Dr T. Luft, Heidelberg, Germany)

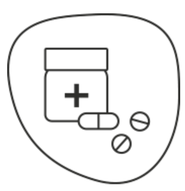
4 Science and Innovation Promotion through *HTC Project*

Since 2017, CRYOSTEM has moved HSCT complications field forward by launching the ***HTC Project endowment funds***, **an international program of research, innovation, education for both physicians and patients** to achieve 3 objectives :



Understand
biological mechanisms associated to HSCT complications

Predict
HSCT complications onset and improve the candidates recipients/donors selection



Treat
patients suffering from HSCT complications or at risk with existing drugs or under development

5 Join HTC Project today!

HTCPROJECT

Submit your research on HSCT complications

Projects can be submitted through the CRYOSTEM's **call for projects** program.

To insure a total transparency, applications are transmitted for review and funding decision to a panel of independent international experts. Selected proposals will have access to CRYOSTEM's collection and can be partially or fully funded by the endowment funds.

For more information on the general terms and application file, please visit our website **www.cryostem.org** or contact our project managers **contact@cryostem.org**

Share our program within your network. Visit www.htcproject.org

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