

Rare donor program in Brazil

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Brazil is a large country with approximately 200 million inhabitants and has 27 states in a total area of approximately 8 million square kilometers. The distance from north to south is 3,645 km and from west to east is 3,577 km. The Brazilian population is of heterogeneous ethnic origin, with an intense process of miscegenation and a high degree of admixture between people of European, African, and Native American descent. Therefore, finding compatible blood to meet the needs of patients requiring rare blood has been a significant challenge in Brazil.

It is estimated that 3 million units of blood are collected per year in Brazil, with approximately 70 percent of donations collected through the public system. Despite numerous efforts performed by different institutions and professionals, until 2014, there was no Brazilian national panel of rare donors—although local programs, including private and public blood centers, have their own donor panels. The frozen stocks of rare units are kept in two centers with consolidated testing laboratories—the Albert Einstein Hospital and the Sírío Libanês Blood Center.

In a multi-ethnic population such as Brazil, the prevalence of the different blood group antigens vary significantly, and it is necessary to have a range of rare blood types available. Our main difficulty is in importing rare units through international rare donor registries, because Brazilian customs procedures are restrictive and bureaucratic. Because of this, collaborations between regional and local programs have helped us to meet the needs of the patients with a rare phenotype; for example, the local program run by the Sírío Libanês Hospital Blood Bank in São Paulo holds a special inventory of liquid and frozen red blood cell (RBC) units and has helped to fulfill many requests.

To meet most of the needs of patients, and considering the importance of having a national panel of rare donors in a large country like Brazil, in 2012, the Ministry of Health, through the General Coordination of Blood and Blood Products (CGSH), started and sponsored a project in partnership with the Albert Einstein Hospital to support three public blood centers located in strategic regions (south, north, and southeast Brazil). These centers have the potential to screen large numbers of donors for rare blood group antigens and platelets using serology and DNA typing and can freeze rare units. To encourage this initiative, and also as an incentive for the establishment of a

national rare donor program, in November 2013, the Brazilian Association of Hematology and Hemotherapy, in conjunction with the International Society of Blood Transfusion (ISBT), organized an Academy Day on rare donors during the Brazilian Congress of Hematology and Cell Therapy (HEMO 2013), with positive repercussions throughout the country.

In May 2014, the Brazilian Ministry of Health, through the CGSH, established a technical committee to provide support for the implementation of a national rare donor program. At present, four blood centers located in strategic regions (Campinas, Florianópolis, Manaus, and Rio de Janeiro) were tasked with screening and freezing of rare red cells and platelets. Currently, these centers are starting the validation of cryopreservation procedures. A strategy for searching for and freezing rare units is being established by these four public blood centers and an extensive screening program for regional blood centers is being developed. Education of personnel, development of software, and creation of a process for requesting and shipping rare units have also been discussed. The role of the Brazilian national program, established by the CGSH, is to compile information on rare donors who have been identified at all blood centers in Brazil and to make this information available when rare blood is needed.

To start a national registry of rare donors, the CGSH conducted a survey at 17 public blood banks, which represent half of the Brazilian network of public blood centers. These regional blood banks do not have a screening program in place, but according to this survey, they have more than 1000 active donors whose RBCs lack high-prevalence antigens, with more than 200 new rare donors identified between 2012 and 2014. In this scenario, it is important to remember that the national program is still in the early phase and we are just implementing a rare donor database. We believe that the incentive from the government, together with the availability of resources for screening programs and the implementation of a countrywide network to establish the national rare donor registry, will significantly increase this database.

Surprisingly, we have five Rh_{null} donors identified in Brazil, including two group A sisters in the South of Brazil, two group O donors in Rio de Janeiro, and one group O donor in São Paulo. Sequencing of *RH* and *RHAG* of four of these donors showed that the two sisters have a deletion in *RHCE***ce*

(960-963 delG), one donor has the *RHAG*01N.09* allele, and the other donor has the novel *RHAG*01N.16* allele leading to a premature stop codon (Gln104Stop).

The rare units shipped domestically between 2012 and 2014 are listed in Table 1. During this period, five requests were not fulfilled: Js(b-) (3); Yt(a-) (1); and K₀ (1). Three incompatible transfusion cases were reported: two patients with anti-Js^b and one patient with anti-Yt^a. For those cases, only hydration and transfusion of small volumes were performed, with good survival of transfused RBCs. For the patients with anti-Js^b, a monocyte monolayer assay (MMA) was performed and the reactivity was less than 5 percent.

Table 1. Rare units shipped between 2012 and 2014 in Brazil

Phenotype	Number of units shipped
k-	11
Di(b-)	5
S-s-U-	3
hr ^B -	3
Vel-	2
GE:-2	2
Lan-	1
Co(a-)	1
O _n (Bombay)	1
RH:-17	1
Rh _{null}	1
hr ^S -	1
r''r''	1
Lu(b-)	1

The profile of blood donors has changed in Brazil over the past 20 years, from remunerated to non-remunerated donors, and then from replacement to community donors. To ensure an adequate rare blood supply, it is crucial to recruit suitable blood donors. Recruitment campaigns and programs that educate such donors about the importance of blood donation have been developed. As incentives and motivation for the rare donors, the local and regional programs are organizing meetings with educational lectures and breakfast meetings. Recognition of the donors with letters, cards, and certificates or in the digital media is also being used as incentives.

Although the Brazilian national rare donor program is at an early stage and much work still needs to be done, we believe that soon we can have the program established.

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