

THE ORGANIZATION OF RARE BLOOD PROCUREMENT IN FRANCE AND THE EUROPEAN COLLABORATION

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RARE BLOOD GROUP : DEFINITION (Décret n°95-195 - 16/02/95)

Frequency < 4/1000 in the general population

- Lack of expression of a high incidence antigen (public antigen)
 - No antigen expressed : Rh nul, JK (a-b-)
 - Low incidence antigen expressed : Lu(a+b-), Kp(a+b-)
- Rare combination of common antigens : ddCCee, ddccEE...

• D-C+E-c-e+	4/10.000
• D-C-E+c+e+	1/10.000
• D+C+E+c-e-	< 1/10.000
• D - -	extremely rare
• Rhnul	extremely rare
• Cellano- (k-)	2/1000
• Kp(b-)	4/10.000
• Ko	< 5/100.000 (Ile de la Réunion)
• Js(b-)	Afro-Caribbean 1/100
• Fy(a-b-)	Afro-Caribbean 70%
• S-s-U-	Afro-Caribbean 15/1000
• Jk(a-b-)	extremely rare (Melanesians)
• Lu(b-)	2/1000
• Yt(a-)	2/1000
• Bombay	extremely rare (Ile de la Réunion)
• Ge2-	2/10.000 (mediterranean region)
• Tj(a-)	extremely rare
• Co(a-)	2/1000
• Vel-	4/10.000
• Jr(a-)	extremely rare
• Co(a-b-)	extremely rare

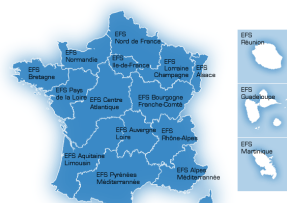
ORGANIZATION OF TRANSFUSION IN FRANCE

2.000.000 RBC units/year

- ETABLISSEMENT FRANCAIS DU SANG (EFS)
- 17 regions, 8000 professionals (1400 EFS Ile de France)

DONATION
MANDATORY TESTS
PREPARATION
STORAGE
DISTRIBUTION

+
 Immuno-hemato analyses
 Research
 HLA
 Cellular therapy,
 Therapeutic activities
 Formation, Expertise ...




MANAGEMENT OF RARE BLOOD TRANSFUSION IN FRANCE

250 RBC units transfused per year

- Official Agreement between EFS (BNSPR) and INTS (CNRGS)

BNSPR (National Bank of rare blood units) : A. Fialaire-Legendre
 Transfusion Center of the Mondor Hospital, Créteil : F.Noizat-Pirenne
 EFS Ile de France : director P.Bierling



CNRGS (Blood Group National Reference Center) : PY Le Pennec
 INTS : National Institute of Blood Transfusion : director P.Rouger(Research, Reference, formation)

BNSPR in Créteil
 Rare Unit management

CNRGS in Paris
 Data base management:
 Donor and recipient

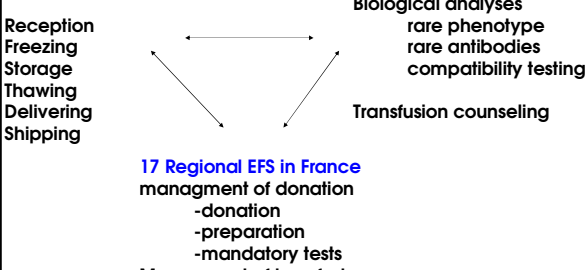
Data base management : units

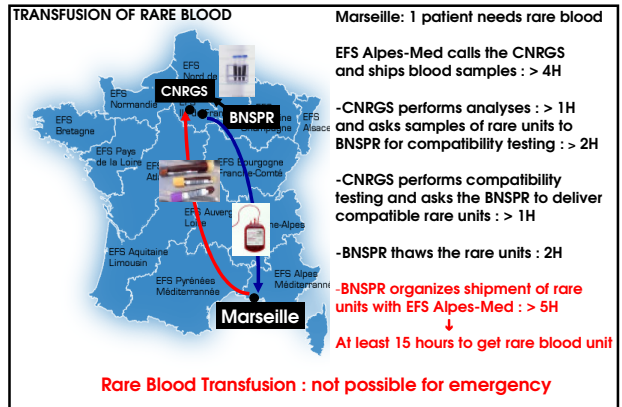
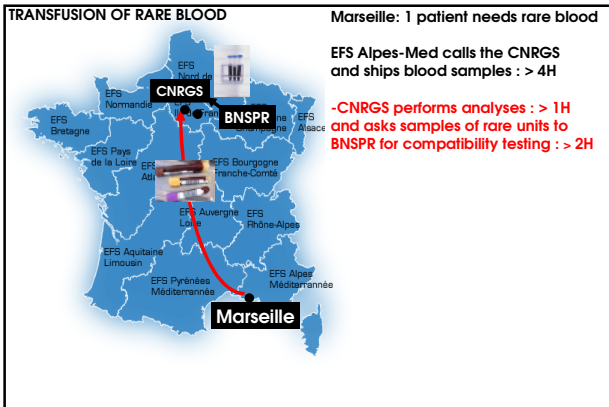
Reception
 Freezing
 Storage
 Thawing
 Delivering
 Shipping

Biological analyses
 rare phenotype
 rare antibodies
 compatibility testing

Transfusion counseling

17 Regional EFS in France
 management of donation
 -donation
 -preparation
 -mandatory tests
 Management of transfusion





Transportation remains the main problem

By plane : product ready 4H before take off

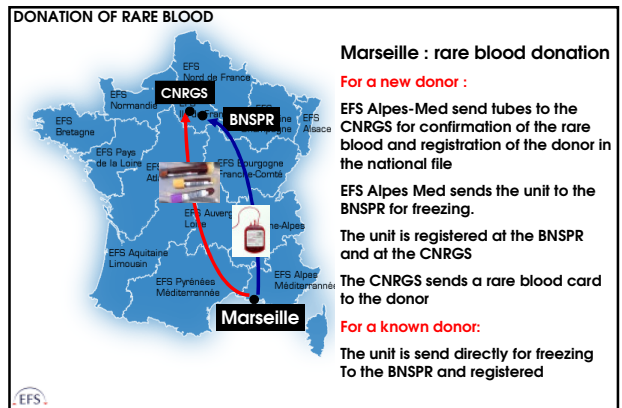
By Train : product ready 2H before departure, only TGV

By car : no delay before departure

For long distance : Canada (Kuhne and Nagel)

The product is send frozen in Carboglace

The transportation cost : payed by the receiving institution



- RARE BLOOD DONATION / DIFFERENCES WITH STANDARD BLOOD DONATION RULES**
- Blood donation
 - Age
 - Frequency
 - Donor pathology
 - Preparation
 - No leuco-depletion
 - Mandatory tests (Arrêté - 28/12/95)
 - HIV destruction
 - Other markers : specific agreement

FREEZING METHODS FOR RED BLOOD CELLS
(approved by the French Regulatory Authority AFSSaPs)

Cryoprotector	Glycerol (cf 40%)
Storage	-80°C > 10 ans
Thawed-washed units	1 h
Post wash storage period	24 h (open system) at +4°C 7 days (closed system) at +4°C in SAGM

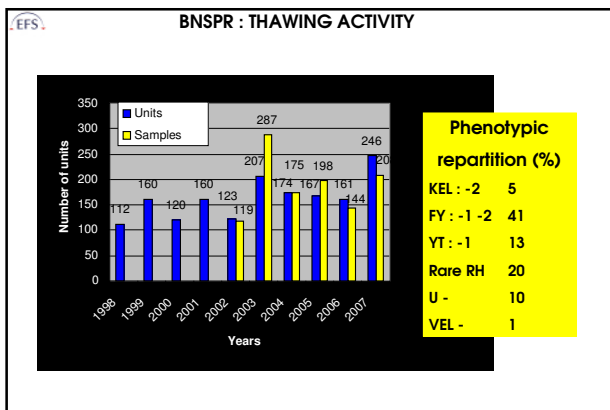
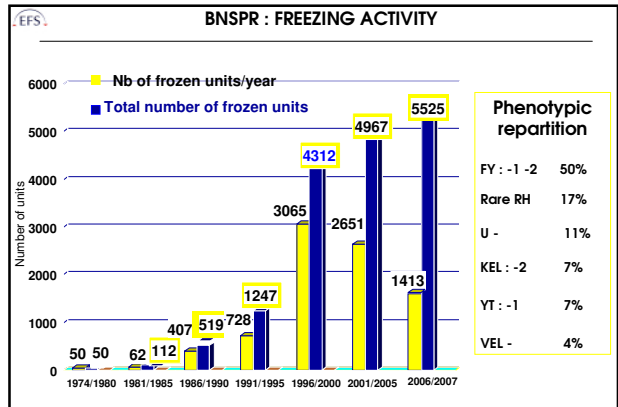
FREEZING METHODS FOR RED BLOOD CELLS
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In vitro specifications (for one unit)

Hematocrit	50 - 80 %
Hemoglobin	> 35 g
Residual extracellular hemoglobin	≤ 1.2 % of total hemoglobin
Residual extracellular glycerol	≤ 1 g

In vivo results

Freeze thaw wash recovery	90.4 ± 2.3 %
Survival at 24h	83.6 ± 6.9 %



STORAGE REGULATION

Between 2002 and 2007 : 2426 units were destroyed for storage regulation

To reach the mandatory requirements for the entire stock (NAT)

To ameliorate the phenotypic/genotypic characteristics of the units

Fy(a-b) : frozen only if

- homozygoties in JK, MNS
- RH:-20 and/or KEL:-7

BNSPR/ CHARACTERISTICS OF STORED UNITS

Age of units	< 5 years	58 %
	5 - 10 years	25%
	10 - 15 years	9 %
	15 - 20 years	5 %
	> 20 years	3 %
Units frozen in the close system	1630	29,5%
Units with NAT on donation	3571	64,6%
Units with NAT on donor	4638	83,9%
Units with biological abnormalities	116	2,1% 68% AchBc 28% Palu+ syphilis
Non leucodepleted units	47	0,9%
Units with CI in donors	109 units 60 donors	2,0% 75% from transfused donors and 43% from travelers in malaria area

DATA IN THE NATIONAL FILE

For all individuals with a rare blood group : donors and recipients

- Personal data
 - Identity, birth-date, address
- Immuno-hematological data
 - Rare blood group, full phenotype, antibodies in the serum
- Pathology
- Donations
 - Number of units available, unit number identification, date of donation, marker requirements
 - For transfused units : date of transfusion, recipient, hospital, transport
- Transfusions
 - Identification number of units received, identity of donor, date of transfusion

REMAINING PROBLEMS IN THE ORGANIZATION OF RARE BLOOD TRANSFUSION

- Need to upgrade the mandatory tests and requirements
 - The nucleic acid test (NAT) since 2001
 - Leuco-depleted blood since 1998
- Delay between request and supply : thawing, shipment
- Risks management implementation because of
 - Positive mandatory tests
 - Storage for long term duration: development of donor pathologies with units in the BNSPR

EUROPEAN AND INTERNATIONAL COLLABORATION

Since 2002 : 16 units have been shipped to different regions

The Netherlands, Belgium, Switzerland, Canada

Request to the CNRGS ⇨ If units available :

Management of the shipment with BNSPR and receiving institution

Depending of the distance :

frozen units : thawing procedure as to be the same as in France
thawed units : have to be transfused before 24H

Authorization for the exportation, signed by the EFS director

Price : the same , will probably increase

Last collaboration in august 2008 :

One unit needed in Switzerland for a child with the McLeod phenotype

The unit was not available at the BNSPR

A donor of the CNRGS file, living in Bordeaux, has been asked to give blood at the regional center of the EFS

The unit has been shipped to Paris at the BNSPR, then to Switzerland

France participates to the Rare Donor Working Party

ISBT Working party : concerned by quality of shipment and international requirements : a form has to be completed:

The form is packed by the shipper and completed by the receiving facility

The form is sent by FAX to the IBGRL

- Phenotype of units
- Number of units,
- Condition of the units at arrival,
- Expected time respected
- Infectious disease : Tests performed and documented
- Billing document in order
- Transfusion outcome

French donors are not on the International Panel

Because of the Official Agreement BNSPR and CNRGS are the only institutions allowed to manage rare blood. In France, the rare donor panel is not available for the French users.

An institutional collaboration in Europe has to be made at the European Council
First meeting: july 10, 2008
France was represented by Dr A.Fialaire-Legendre

Discussions were on transportation and possibilities to organize a European rare blood file

CONCLUSION

- The existence of a national file of rare individuals at risk for transfusion allows a better follow up of the patients
- The existence of a large number of frozen units
 - Makes easier the answer to emergency cases
 - Allows a better prevention of the allo-immunization for the rare phenotype and the most common immunogenic antigens
- European collaboration has to be developed
- France can share its experience with other countries