



# Viability of Malaria Parasites in Plasma

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# Transfusion-Transmitted Malaria

- ✦ Malaria could be induced by transfusion with:
  - Whole Blood, including red blood cells
  - Platelets
  - Leukocytes
  - Fresh Plasma



# Frozen Plasma Products

- ◆ The implication of cryoprecipitate in TTM was first raised by Wells and Ala in 1985\* with no supporting data.
- ◆ Frozen plasma has never been implicated in TTM.
- ◆ Limited data available on viability of intra-erythrocytic malaria parasite in frozen plasma.

\* Wells L and Ala FA. Lancet 1, 1317-1319 (1985).

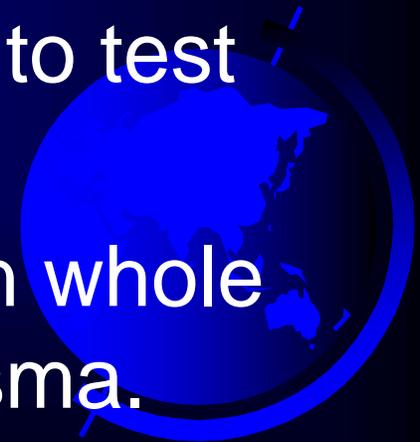


# Viability Studies

Viability of malaria parasites were studied during early to mid-1900s due to:

- ✦ High incidence of TTM during the first half of the century,
- ✦ Parasites were used to induce malaria as a therapy for neurosyphilis or to test chemotheapeutics in volunteers.

Most of the studies concentrated in whole blood and only 1 reported in plasma.



# Parasite Viability in Plasma\*

Plasma (citrated, centrifuged at 2500 rpm for 1 hr.) collected from donors with active malaria and injected in patients:

- ✦ No infection in recipients (20 with frozen plasma, 3 with freeze-dried plasma)
- ✦ 1/12 definitive and 1/12 probable infection from liquid plasma.

\*Lozner EL & Newhouser LR, Amer J Med Sci 206:141-146 (1943)



# Parasite Viability in Plasma

Concern about the potential viability of malaria parasites in frozen plasma remains:

- ◆ Intra-erythrocytic malaria parasites are known to survive for extended periods of time under varying storage conditions.
- ◆ Residual RBC and other cellular components are present in plasma.



# Cryopreservation of blood stages of malaria parasites\*

Species	Temp (°C)	Duration of Storage
Pf	-72 to -80 -70	156 days (Brumpt, 1949) 739 days (Jeffery & Rendtorff, 1955; Jeffery, 1957)
Pv	-70 -70	166 days (Saunders et al, 1948) 354 days (Jeffery & Rendtorff, 1955)
Pm	-70	60 days (Jeffery & Rendtorff, 1955)
Po	-70	997 days (Jeffery & Rendtorff, 1955; Jeffery, 1957)

\*Nguyen-Dinh, P. in Malaria, 1988, ed. WH Wernsdorfer and Sir I McGregor, pub. by Churchill Livingstone, p. 1801-1811.



# Residual RBC in Plasma

- ◆ Gambro BCT and Haemonetics reported residual RBC below detection limit of automated cell counter ( $<0.1 \times 10^6/\mu\text{l}$ ).
- ◆ Baxter/Fenwal reported  $\sim 40 \text{ RBC}/\mu\text{l}$  ( $= 4 \times 10^4/\text{ml}$ ) in plasma collected by Autopheresis-C.

(Transfusion, 1998, Vol. 38 supplement)

