EVALUATION OF THE SPECTRA OPTIA APHERESIS DEVICE FOR MONONUCLEAR CELL COLLECTION IN NON-MOBILIZED & MOBILIZED HEALTHY DONORS:
RESULTS FROM A MULTICENTER TRIAL

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BACKGROUND

SPECTRA OPTIA:
A NEWER APHERESIS DEVICE

- Cleared for use in Therapeutic Plasma Exchange (TPE) procedures (K071079) in the United States.
- Used to conduct a wide variety of therapeutic apheresis and cell therapy procedures, including mononuclear cell (MNC) collection outside of the U.S.

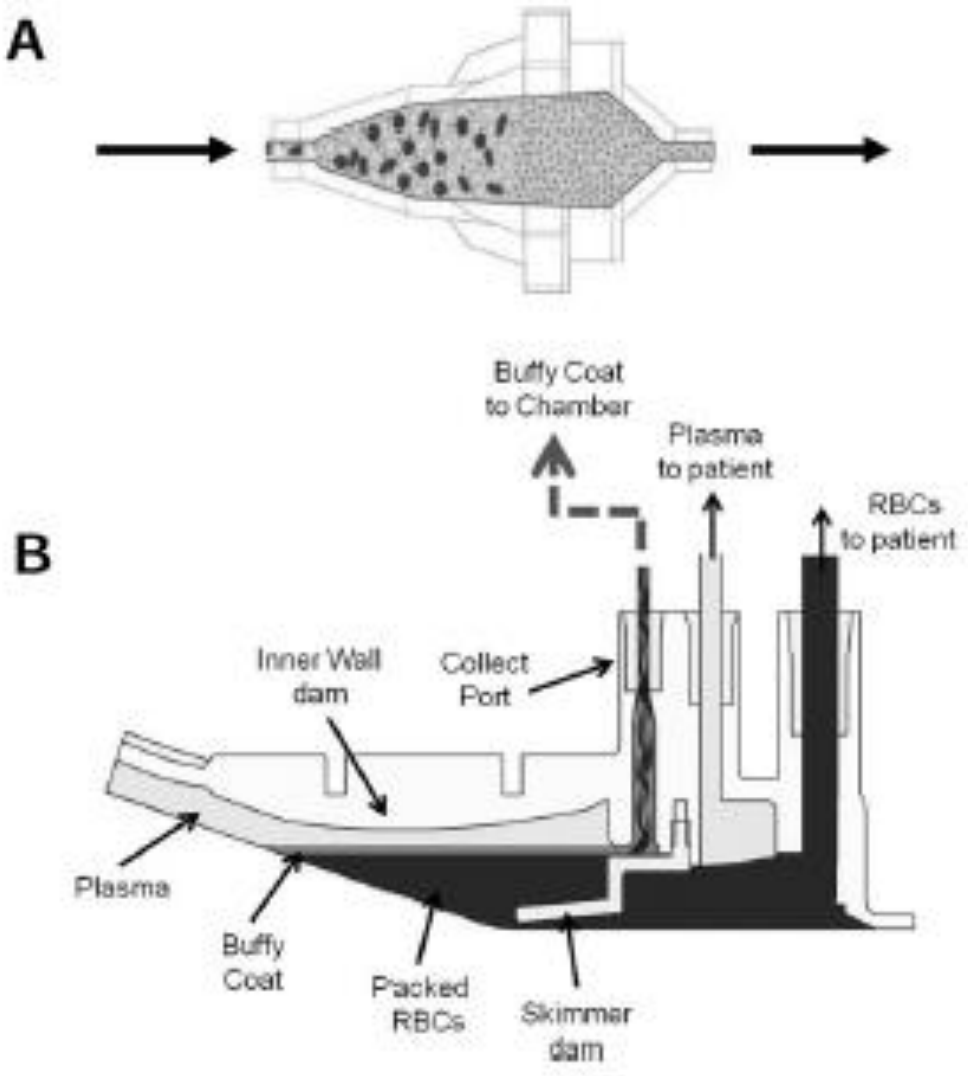
From: http://www.caridianbct.com/_layouts/uploads/CaridianBCT/OptiaSplash/EMEA_Assets/VirtualTour/files/assets/images/34600aa0-e33b-493e-aac4-e6392c245fc9.png

The Spectra Optia vs. The COBE Spectra:

- Spectra Optia has a smaller extracorporeal volume than the COBE Spectra
  - 191 mL vs. 285 mL
  - Accommodates patients with lower total blood volume (TBV) such as pediatric patients
- Minimizes the amount of operator interaction needed, allowing for more focused time with patients
- Automated Interface Management system produces consistent results through interface stability

Modified from http://advancingapheresis-emea.terumobct.com/protocols

MNC Collection in the Spectra Optia



A. Intermediate collection chamber.

B. Blood separation in the connector.

Reinhardt et al, Transfusion, 2010

MNC COLLECTIONS

Study Date	Study site	Study design	Subjects
August, 2006	three-center ,U.S.	Within-subjects comparison of MNC collection efficiency	10 normal subjects
Sep			jects
May			ts
Mar			
Mar			
Oct			ts jects
May, 2010	Multi site, Europe	2nd market acceptance study (with optimized protocol)	36 patients

The optimized Spectra Optia MNC Protocol appeared ready for broad evaluation in a multisite U.S. clinical trial based on:

- Based on these studies' outcomes
- CaridianBCT's extensive experience outside of U.S.

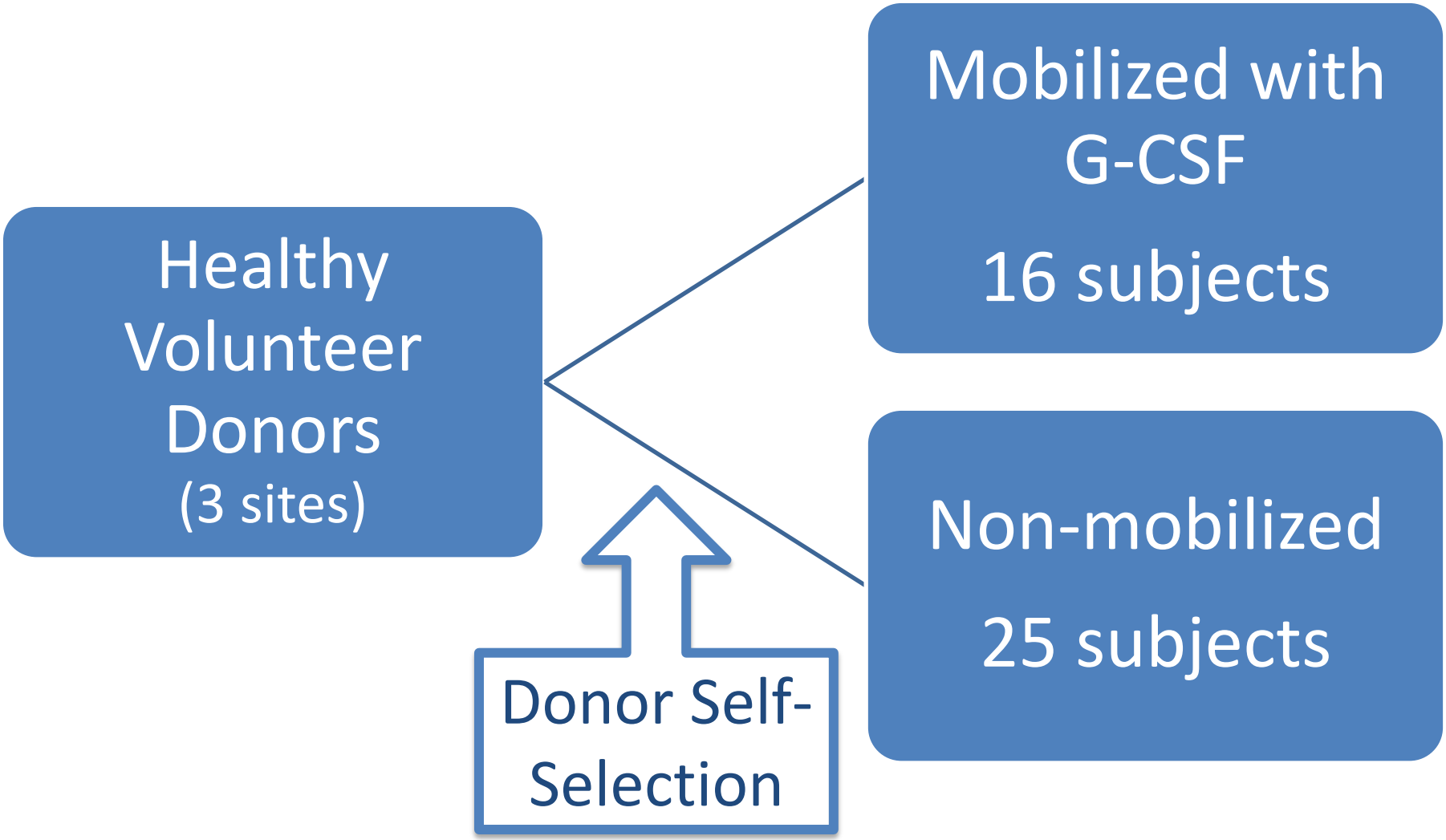
Study Objective

- To characterize the performance of the Spectra Optia Apheresis System's MNC Protocol, when used to collect mononuclear cells from healthy blood donors.

- Complements a separate, historically controlled study, conducted in patients with multiple myeloma (Protocol No. BCT10-02).

METHODS

Design:
A Prospective Observation Study



Inclusion Criteria

- Qualified blood donor & in general good health
- Age: 18-50 years
- Weight: 50-125 kg
- Male or non-pregnant, non-nursing female
- Acceptable lab values for eligibility & mobilization
  - Complete blood count, electrolytes, coagulation tests
  - Negative pregnancy test in female subjects
- Adequate peripheral venous access to allow for collection

Apheresis Procedure

- Dual-needle peripheral access
- Target the lesser of 12.5 ± 0.5 L or 2.0 ± 0.2 TBV processed
- Flow Rate: 30-125 mL/minute
- Target collect Hematocrit: < 5%
- Anticoagulant: ACD-A
- Inlet:AC Ratio: 6-15
- ACD-A Infusion Rate: 0.8 – 1.2mL/L TBV/min
- TUMs, IV calcium gluconate, or magnesium sulfate given to treat or prevent symptoms caused by citrate

Outcomes & Analysis

- Collection Efficiencies (CE)
  - MNC counts (all subjects)
  - CD34 cell counts (mobilized subjects only)
- Cross-cellular contamination (stem cell product)
  - Granulocytes (% of WBCs)
  - Platelets (CE)
  - Red blood cells (Hct)
- CD34+ cell viability by 7-AAD staining
- Summary statistics: mean, standard deviation, median, range, and 95% confidence intervals

Collection Efficiency

$$(C_{COL} * V_{COL}) \div (C_{AV} * V_{WB}) * 100\%$$

C_{COL} = # of cells/mL in the collected product

V_{COL} = volume (mL) of the collected product

C_{AV} = (# of cells pre-apheresis + # of cells post-apheresis per mL)/2

V_{WB} = volume (mL) of whole blood processed

RESULTS

Donor Demographics

Study Protocol (n)	Gender (M/F)	Age (years)	TBV (mL)	Hct (%)	WBC (e^3/uL)	Platelets (e^3/uL)
Non-mobilized Donors (15)	11/4	33 (29-47)	5149 (3887-6332)	44 (35-49)	5 (3-10)	244 (164-333)
Mobilized Donors (15)	12/3	25 (19-45)	5435 (3405-6705)	43 (38-50)	19* (10-34)	230 (161-390)

Reported as median (range) unless noted.

*Higher in mobilized arm ($P < 0.05$)

Collection Conditions

Study Protocol (N)	Blood Volume Processed	Inlet Flow Rate (mL/min)	Inlet:AC Ratio	Run time (min)	Product Volume (mL)
Non-mobilized Donors (15)	1.9 (1.8-2.0)	56 (40-70)	12 (9-15)	180 (150-241)	128 (81-207)
Mobilized Donors (15)	1.9 (1.6-2.1)	58 (40-80)	13 (12-15)	184 (162-259)	223* (150-345)

Reported as median (range) unless noted.

*Higher in mobilized arm ($P < 0.05$)

PERFORMANCE CHARACTERISTICS

Measure	Non-mobilized		Mobilized	
	Median	Range	Median	Range
MNC collection efficiency (%)	57	27 to 92	61	17 to 147
CD34 collection efficiency (%)	NA	NA	77	43 to 111
WBC Viability (%)	NA	NA	99	90-100
Platelet collection efficiency (%)	12	5 to 21	19	12 to 47
Product Hct (%)	4	2 to 5	4	1 to 6
Product granulocytes (%)	2	0 to 9	15	0 to 48

Adverse Events

- No serious adverse events or device malfunctions
- In total, there were 11 citrate reactions
  - One citrate reaction was Grade 3 (severe).
  - All other adverse events were mild to moderate.
- Other apheresis-related adverse events:
  - Venous access issues (4 subjects)
  - Arm numbness/stiffness (2 subjects)
  - Nausea (2 subjects)
  - Fatigue (1 subject)

SUMMARY

DISCUSSION

- This study characterized the performance of the Spectra Optia MNC collection protocol in healthy donors

- MNC collection efficiency was similar in both arms of the study and the presence of contaminating non-MNCs in the collected cell products was minimized

CONCLUSIONS

- The Spectra Optia can be used for safe and efficacious collection of MNCs for donors.
- Adverse events were limited and similar to other collections systems.
- FDA 510(k) approval for use of the Spectra Optia device for MNC collection was achieved in the U.S. based partly on the results of this study.

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QUESTIONS