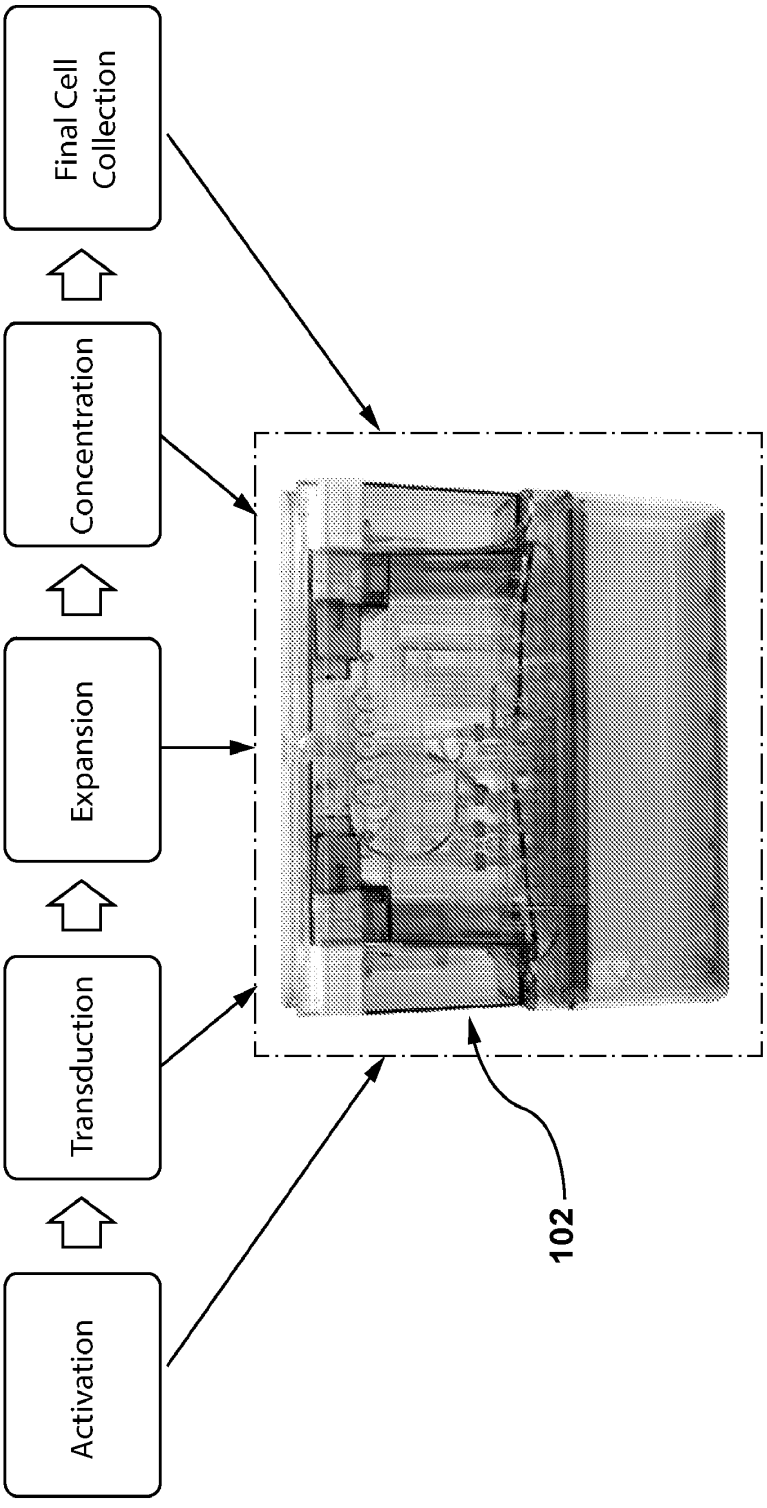

Final Cell Collection
Concentration
Expansion
Transduction
Activation
102

FIG. 1

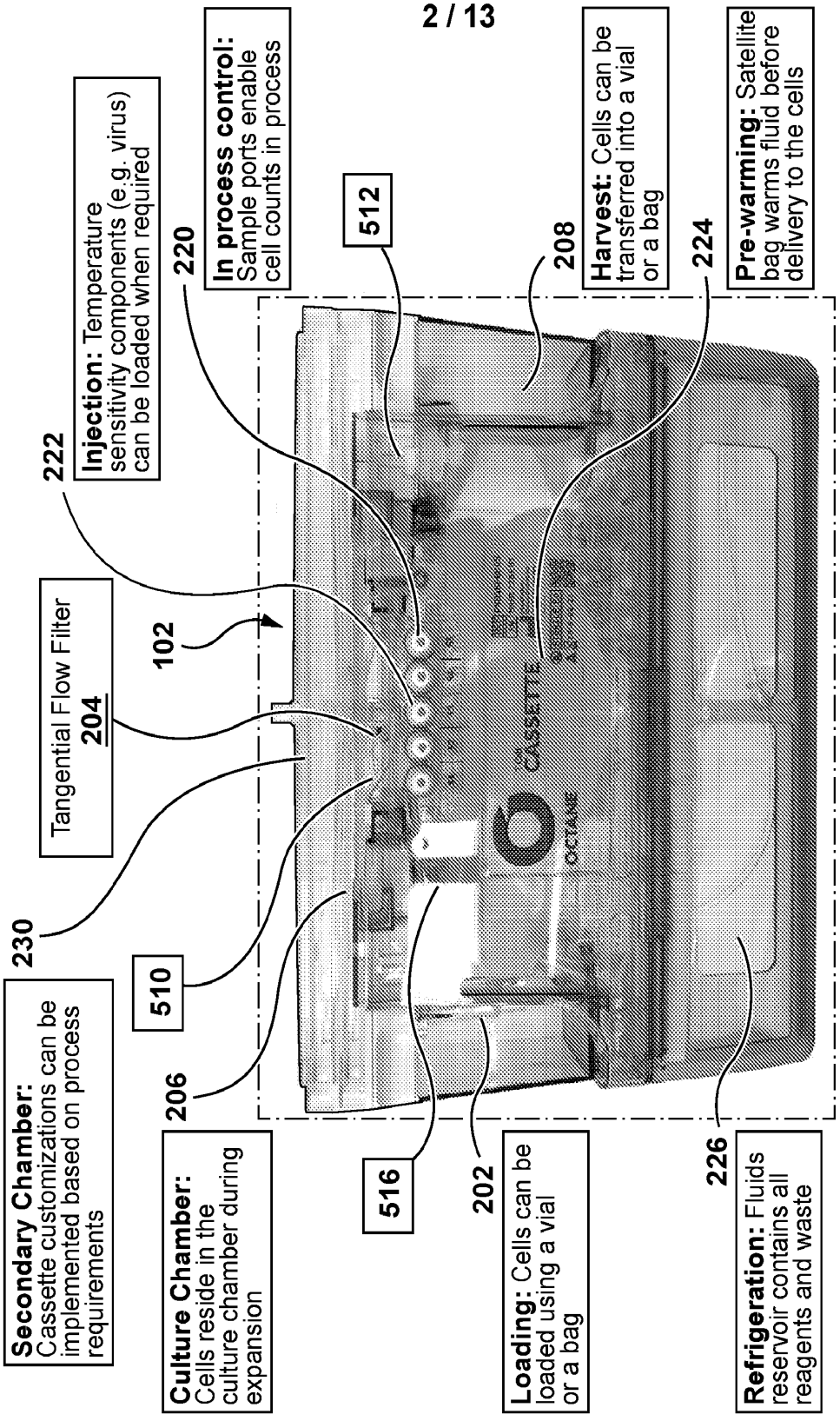

Secondary Chamber: Cassette customizations can be implemented based on process requirements
230
Tangential Flow Filter
204
Injection: Temperature sensitivity components (e.g. virus) can be loaded when required
222
In process control: Sample ports enable cell counts in process
220
102
512
208
Harvest: Cells can be transferred into a vial or a bag
224
Pre-warming: Satellite bag warms fluid before delivery to the cells
510
206
516
202
226
Culture Chamber: Cells reside in the culture chamber during expansion
Loading: Cells can be loaded using a vial or a bag
Refrigeration: Fluids reservoir contains all reagents and waste
CASSETTE
OCTANE

FIG. 2A

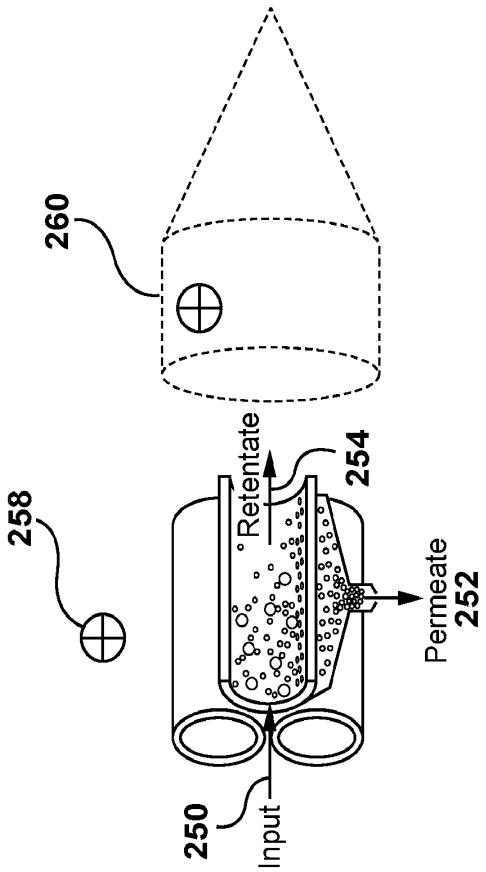

260
258
Retentate
254
Permeate
252
250
Input

FIG. 2C

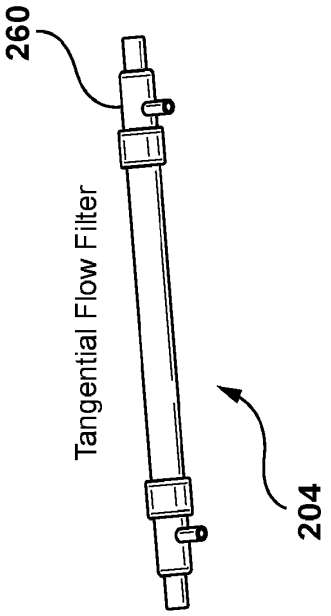

260
Tangential Flow Filter
204

FIG. 2B

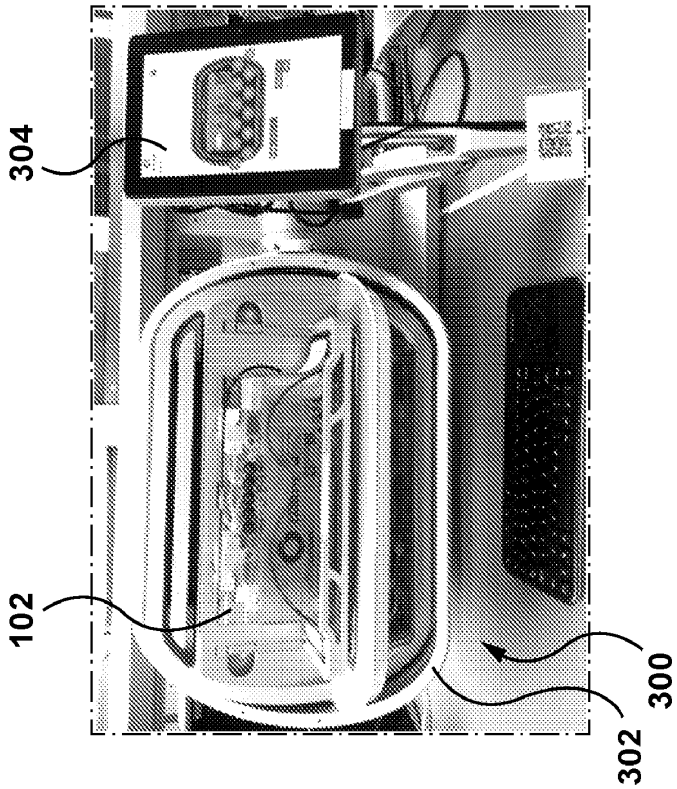


FIG. 3B

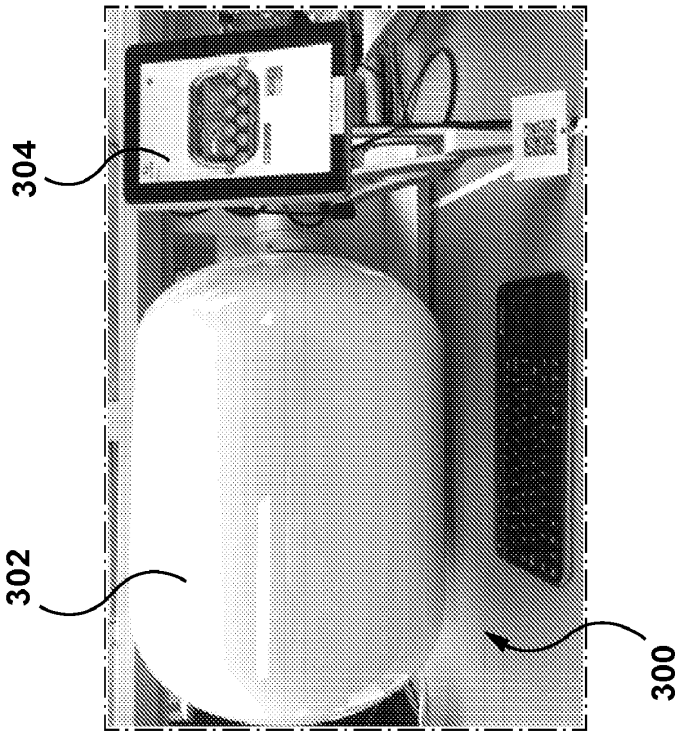


FIG. 3A

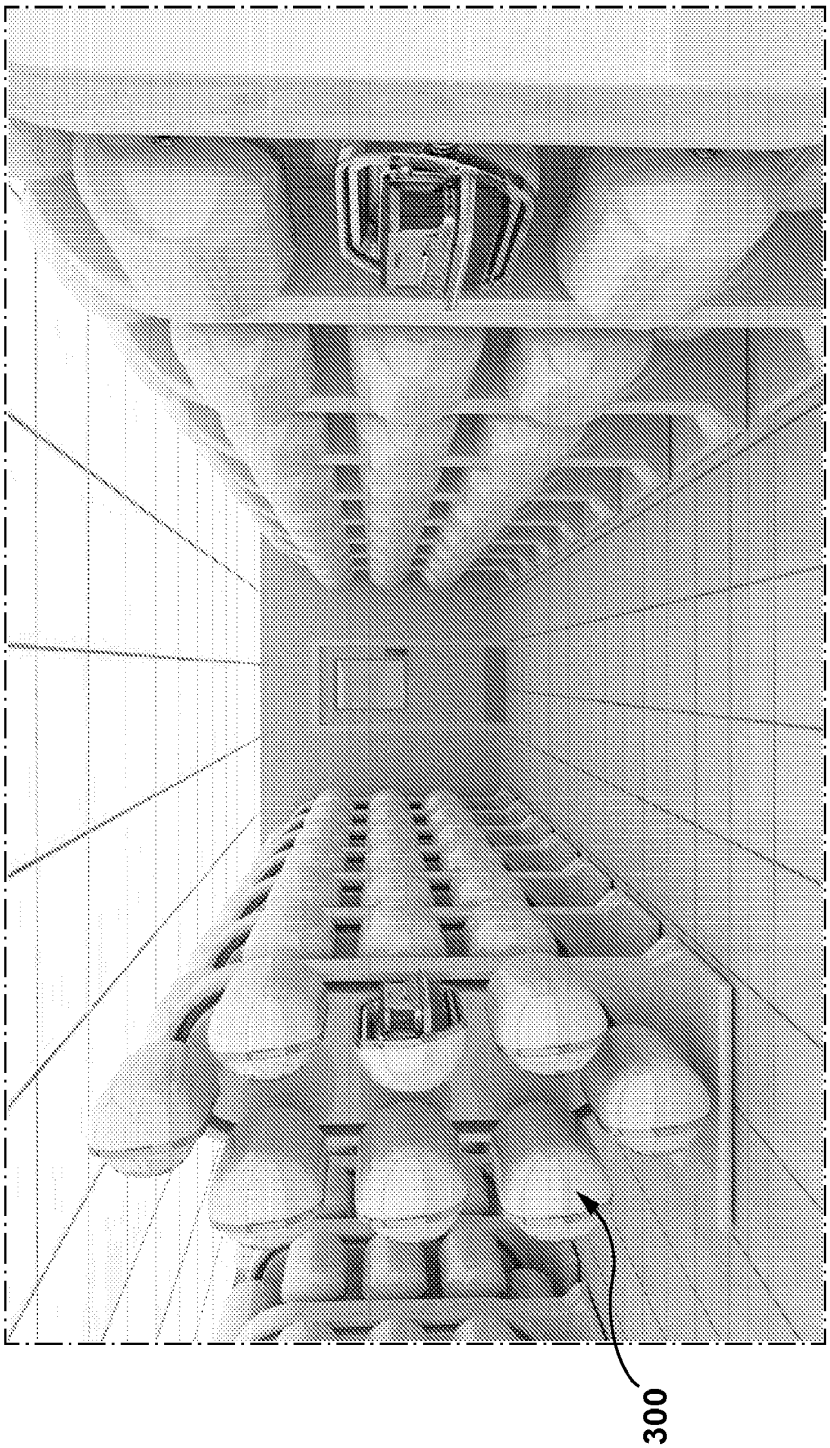


FIG. 4

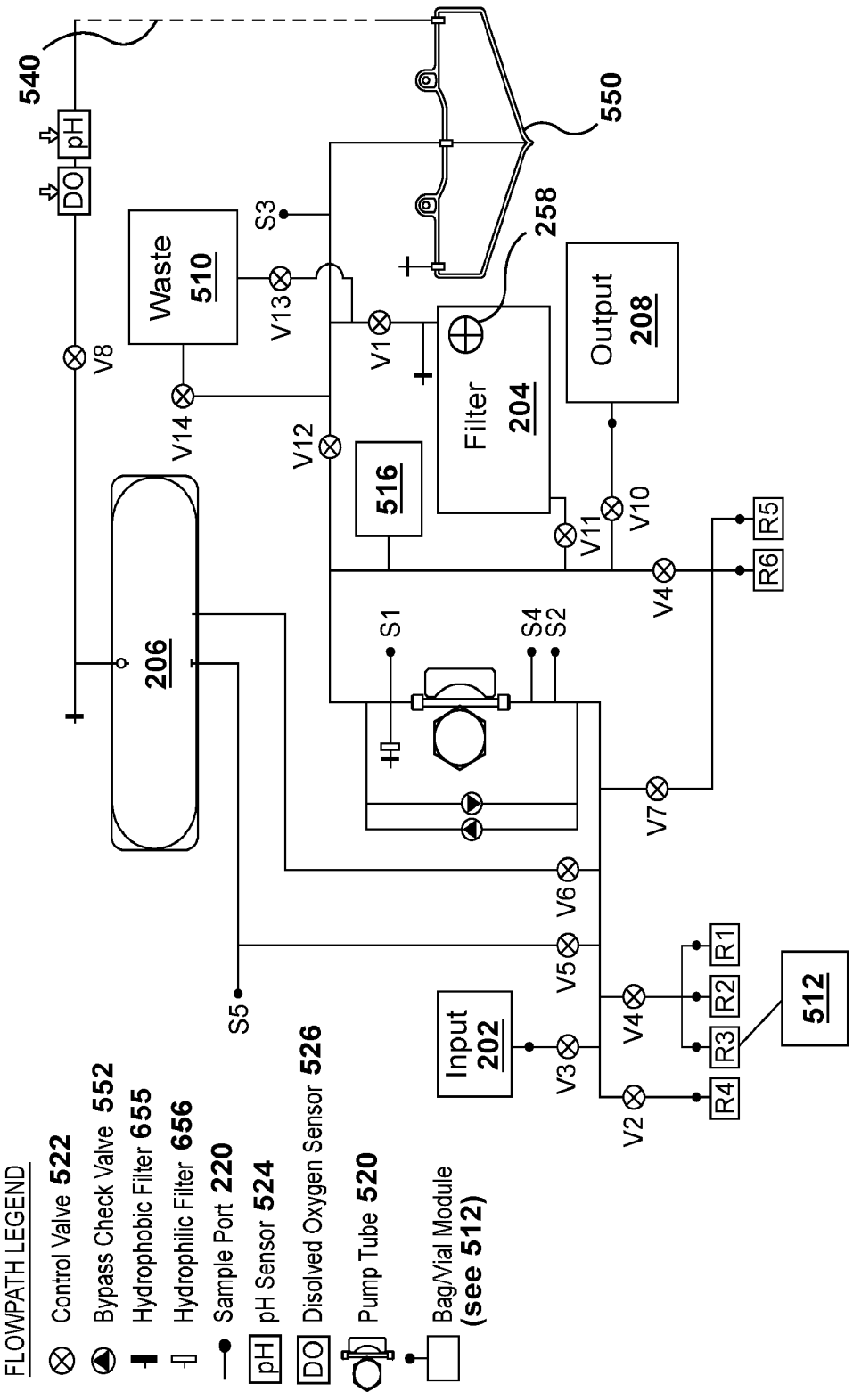

FLOWPATH LEGEND
Control Valve 522
Bypass Check Valve 552
Hydrophobic Filter 655
Hydrophilic Filter 656
Sample Port 220
pH Sensor 524
Disolved Oxygen Sensor 526
Pump Tube 520
Bag/Vial Module (see 512)
540
550
258
Waste 510
Output 208
Filter 204
516
206
Input 202
512
S1
S2
S3
S4
S5
V1
V2
V3
V4
V5
V6
V7
V8
V10
V11
V12
V13
V14
R1
R2
R3
R4
R5
R6
pH
DO

FIG. 5

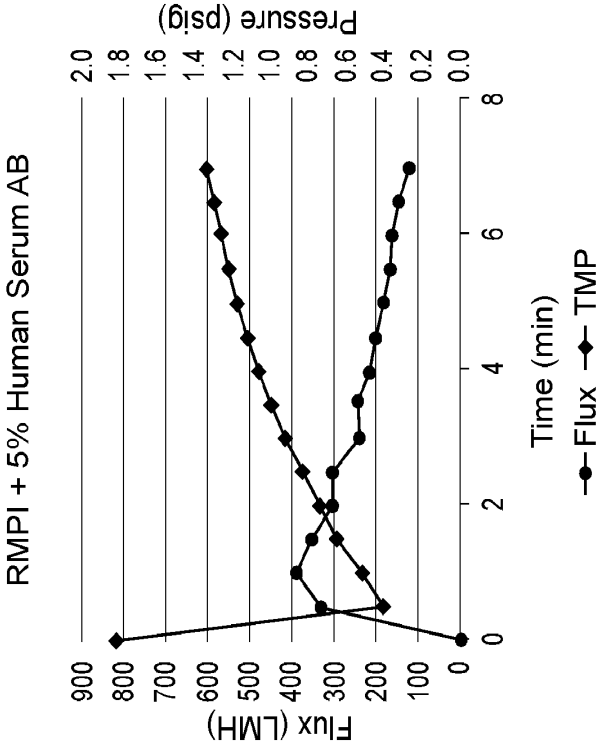

RMPI + 5% Human Serum AB
Flux (LMH)
Pressure (psig)
Time (min)
Flux
TMP

FIG. 6B

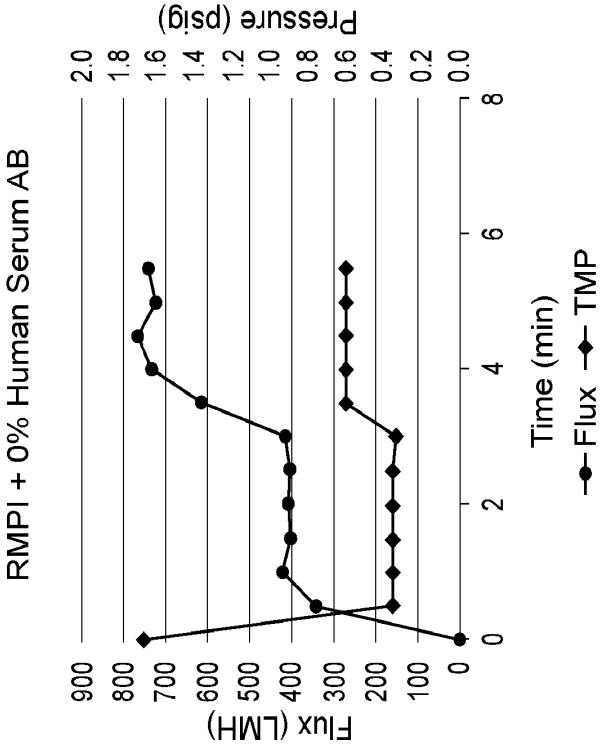

RMPI + 0% Human Serum AB
Flux (LMH)
Pressure (psig)
Time (min)
Flux
TMP

FIG. 6A

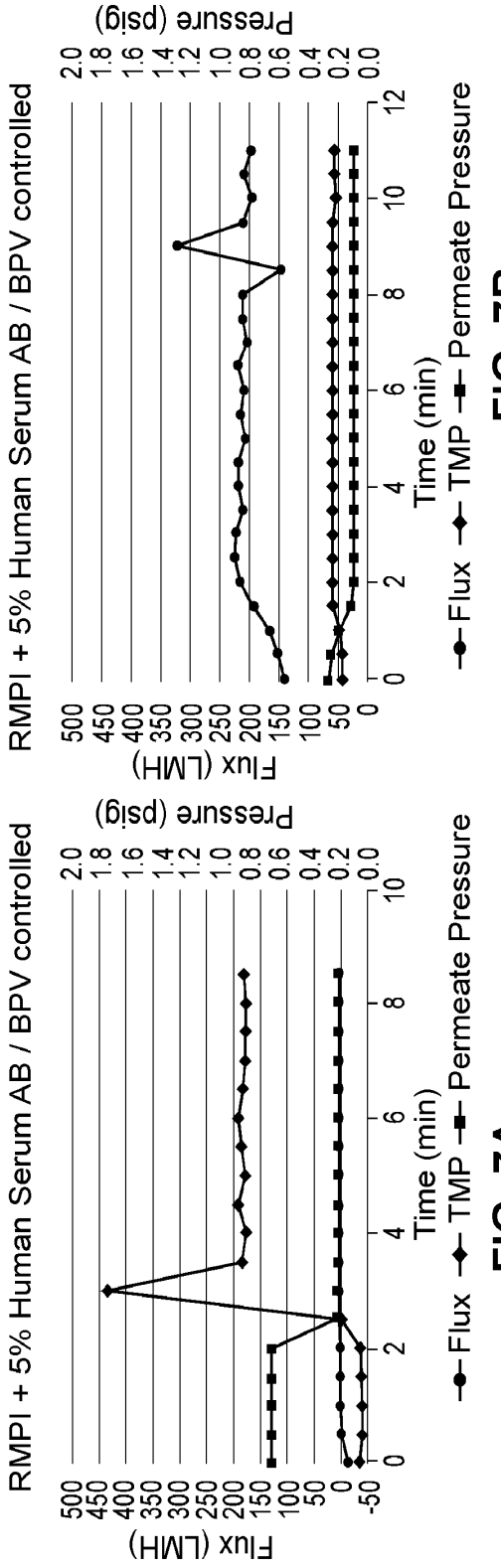


FIG. 7A

FIG. 7B

FIG. 7C

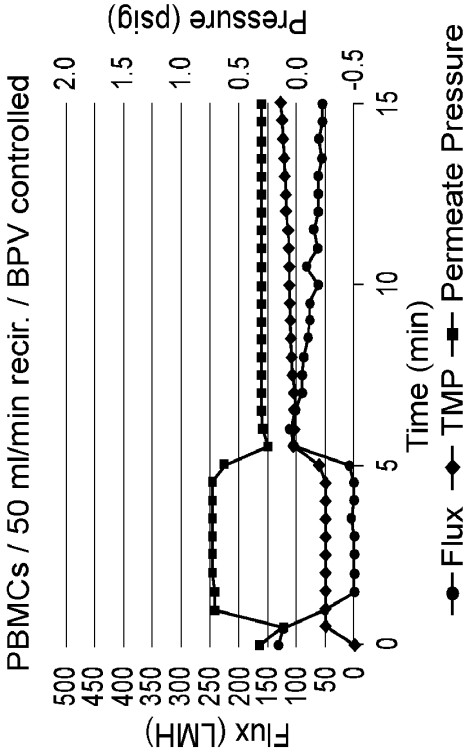

PBMCs / 50 ml/min recir. / BPV controlled
Flux (LMH)
Pressure (psig)
Time (min)
Flux
TMP
Permeate Pressure

FIG. 8B

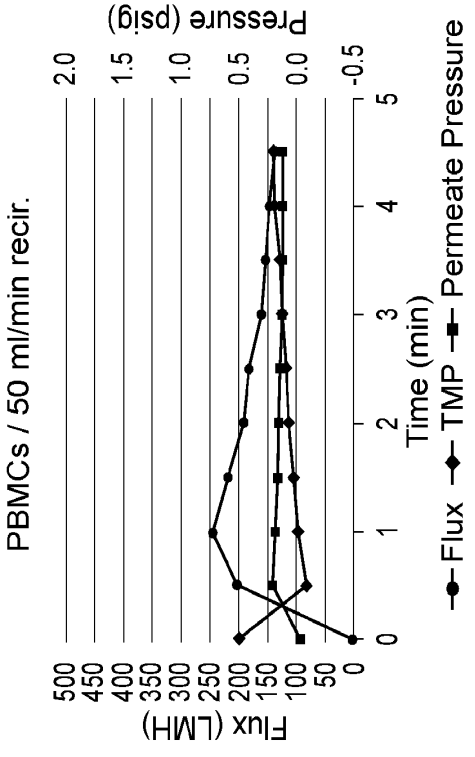

PBMCs / 50 ml/min recir.
Flux (LMH)
Pressure (psig)
Time (min)
Flux
TMP
Permeate Pressure

FIG. 8A

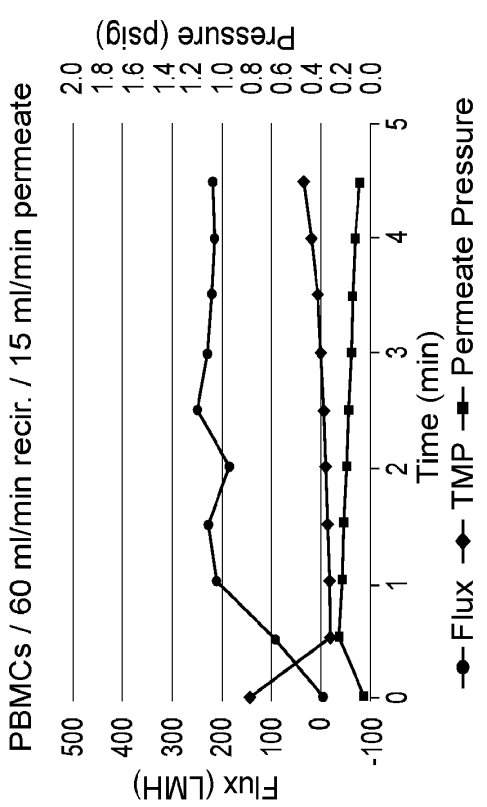


FIG. 9B

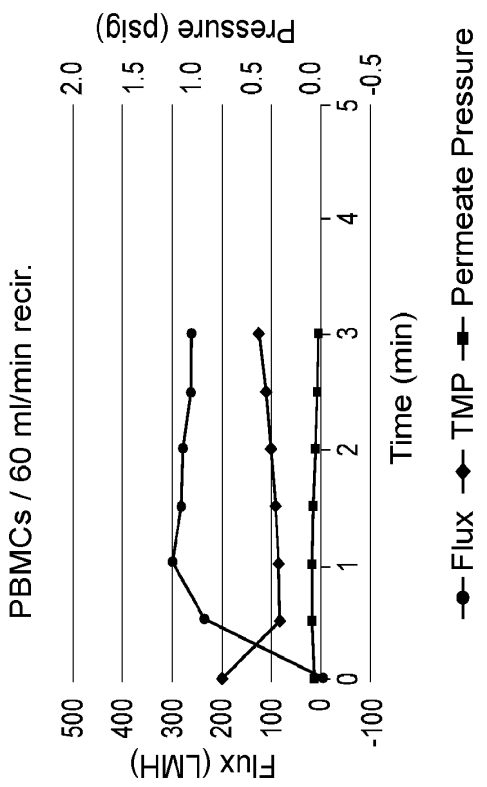


FIG. 9A

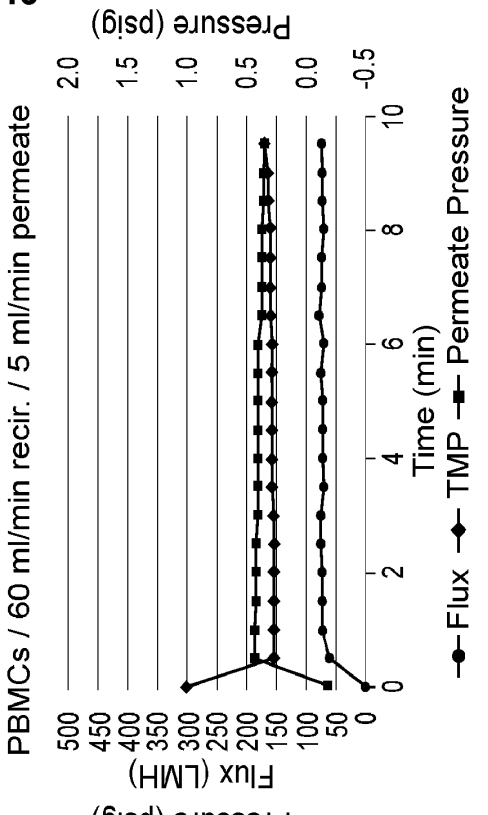


FIG. 9D

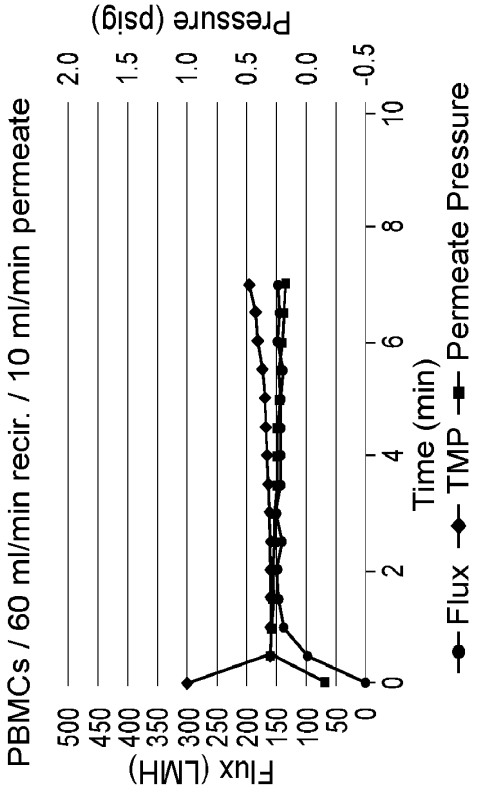


FIG. 9C

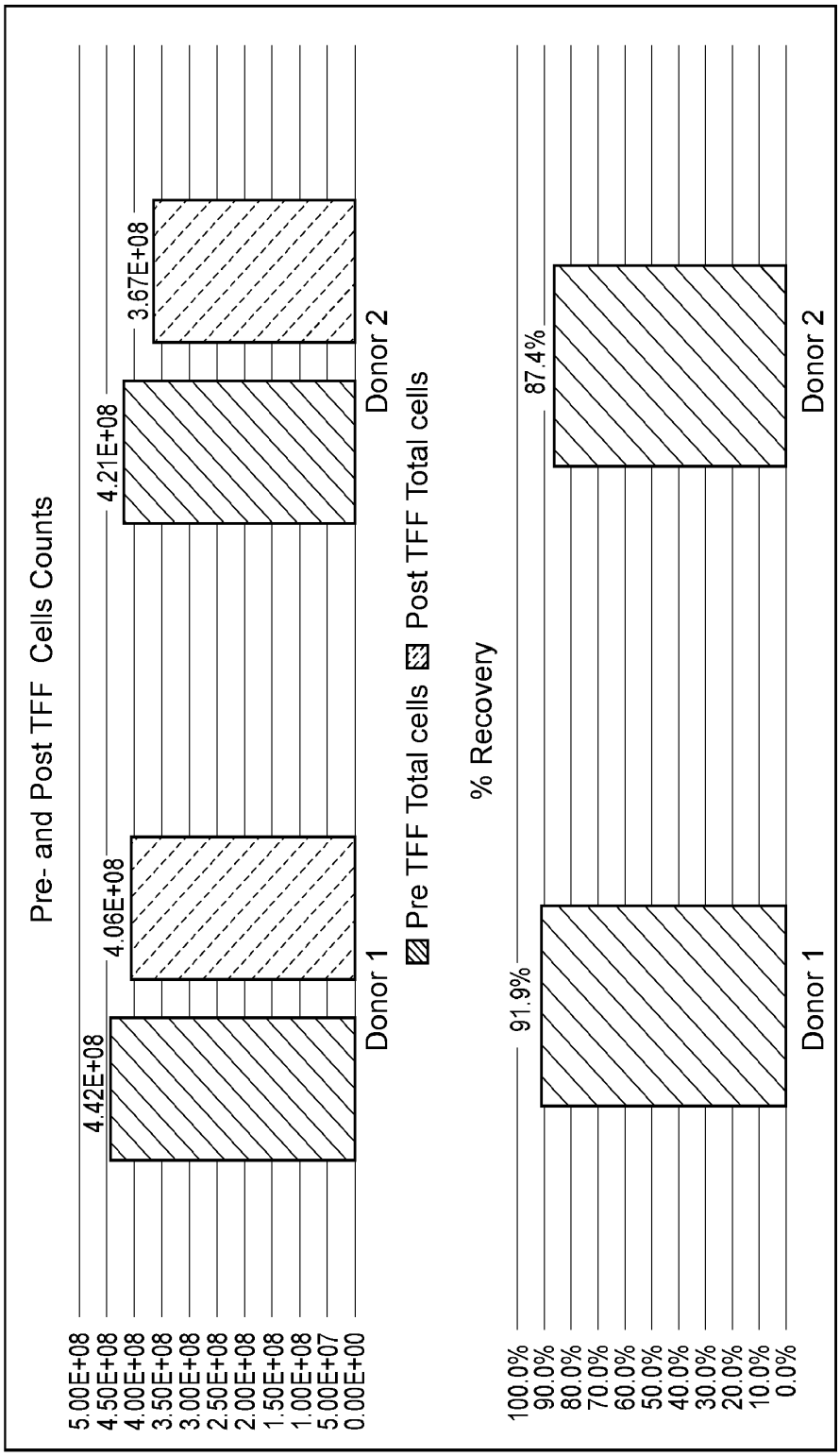

Pre- and Post TFF Cells Counts
5.00E+08
4.50E+08
4.00E+08
3.50E+08
3.00E+08
2.50E+08
2.00E+08
1.50E+08
1.00E+08
5.00E+07
0.00E+00
4.42E+08
4.06E+08
4.21E+08
3.67E+08
Donor 1
Donor 2
Pre TFF Total cells
Post TFF Total cells
% Recovery
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
91.9%
87.4%
Donor 1
Donor 2

FIG. 10A

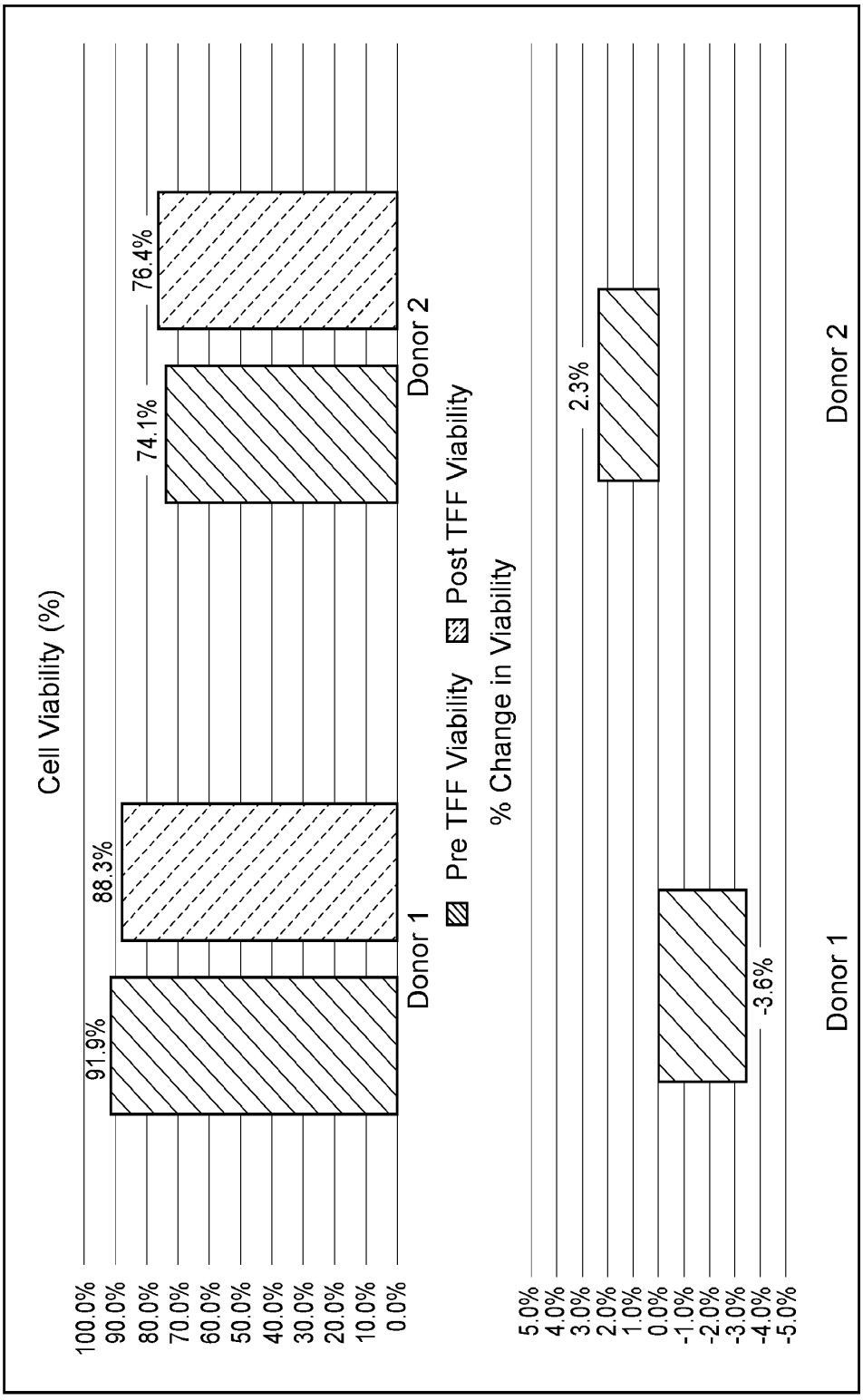

Cell Viability (%)
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
91.9%
88.3%
74.1%
76.4%
Donor 1
Donor 2
Pre TFF Viability
Post TFF Viability
% Change in Viability
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
-1.0%
-2.0%
-3.0%
-4.0%
-5.0%
-3.6%
2.3%
Donor 1
Donor 2

FIG. 10B

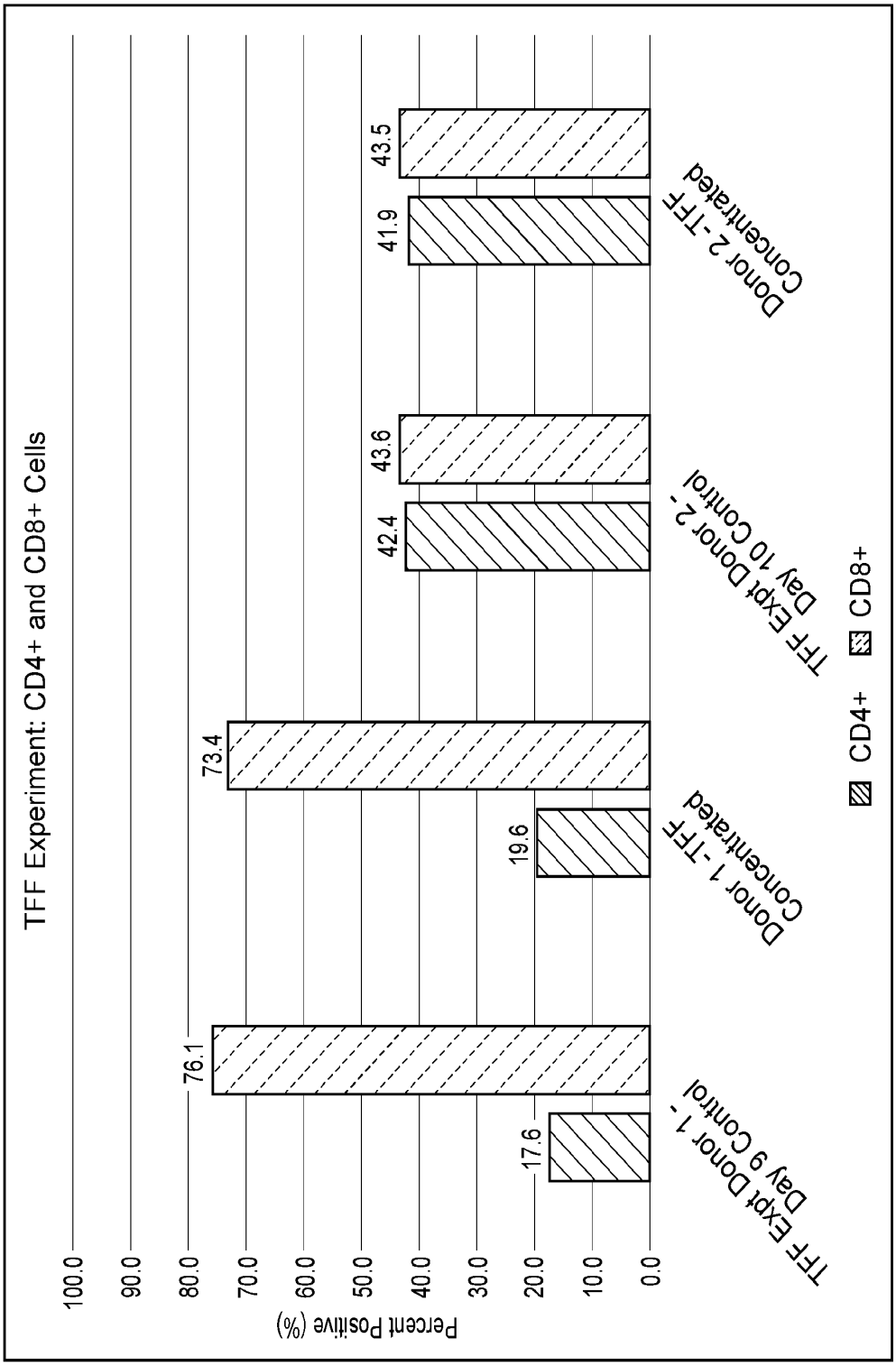

TFF Experiment: CD4+ and CD8+ Cells
Percent Positive (%)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
CD4+
CD8+
TFF Expt Donor 1 - Day 9 Control
17.6
76.1
Donor 1 -TFF Concentrated
19.6
73.4
TFF Expt Donor 2 - Day 10 Control
42.4
43.6
Donor 2 -TFF Concentrated
41.9
43.5

FIG. 11