T-cell expansion and adoptive transfer

The cells were grown in X-VIVO 15™ (Lonza Walkersville, Walkersville, MD) supplemented with 5% pooled human AB serum (Valley Biomedical, Winchester, VA). The cultures were maintained for up to 12 days prior to harvesting and preparation for reinfusion. All infused T-cell products were required to meet release criteria specified for T-cell phenotype, cell viability, pyrogenicity, and freedom from bead contamination. Culture samples were tested for bacteria and fungi two days prior to harvesting, and from the final cellular product. Testing of the final cellular product for bacterial endotoxin (Endosafe, Charles River) and cell phenotype by flow cytometry were also performed. Cell count, cell viability, and endotoxin testing were done to determine whether the final products met specified release criteria. In addition, the absolute number of cells with a plasma-cell immunophenotype in the preharvest or final product had to be less than or equal to the absolute number of cells of the same population in the post-wash/starting (apheresis) product. Plasma cells were identified by pre-gating on viable cells defined by ViaProbe (Becton Dickinson, San Jose, CA) and then collecting and analyzing $CD3^{-}/CD19^{-}/CD38^{+}/CD138^{+}$ cells on a Becton Dickinson FACSCalibur with CellQuest software. On the designated infusion date, the T cells were harvested. The beads were removed with a Baxter Fenwal Maxsep® magnetic separator, washed and concentrated with the Baxter Fenwal Harvester System, and resuspended in 100-500 mL 1:1 Plasmalyte A/Dextrose 5%, 0.45% NaCl containing 0.5-1% human serum albumin.

Table S1. Patient characteristics

	Range (Mean)	Arm A	Arm B	p-value
# of Patients	54	28	26	
Age	37~68 (55)	45 ~ 68 (55.6)	37 ~ 67 (54.3)	0.74
Race	White: 32 (59%) AA: 21(39%) Asian: 1 (2%)	White: 22 (78%) AA: 5 (18%) Asian: 1 (4%)	White: 10 (38%) AA: 16 (62%) Asian: 0	0.003
Gender	Male: 28 (52%) Female: 26 (48%)	Male: 16 (57%) Female: 12 (43%)	Male: 12 (46%) Female: 14 (54%)	0.59
Myeloma subtypes	IgA: 15 IgG: 35 Light chains: 4	IgA: 9 IgG: 15 Light chains: 4	IgA: 6 IgG: 20 Light chains: 0	0.08
Thal Maint (pts EFS>180days)*	Yes: 24 No: 22	Yes: 7 No: 17	Yes: 17 No: 5	0.003
Cytogenetics	Normal: 33 (61%) Abnormal: 21(39%)	Normal: 14 Abnormal: 14	Normal: 19 Abnormal: 7	0.14
# of prior therapies	One: 27 (50%) Two: 20 (37%) Three: 6 (11%) Four: 1 (2%)	One: 16 Two: 10 Three: 1 Four: 1	One: 11 Two: 10 Three: 5 Four: 0	0.18
Months of prior therapy	1 ~ 48 (6.8)	3 ~ 48 (7.5)	1~17 (6.0)	0.96
Type of prior therapy (R/T)	Yes: 43 (80%) No: 11 (20%)	Yes: 21 NO: 7	Yes: 22 NO: 4	0.59
Prior Bort	Yes: 18 (33%) NO: 36 (67%)	Yes: 8 NO: 20	Yes: 10 NO: 16	0.63
Time from diagnosis to transplant (days)	80 ~ 3433 (338)	134 ~ 3433 (382)	80 ~ 704 (289)	0.99
Monoclonal serum protein at diagnosis	0 ~ 10.5 (2.80)	0 ~ 10.5 (3.06)	0.3 ~ 7.3 (2.55)	0.89
% Plasma cells in bone marrow biopsy at diagnosis	10 ~ 98 (46)	10 ~ 98 (47)	12 ~ 96 (46)	0.68
% Plasma cells in bone marrow biopsy at EN	1 ~ 95 (27)	1 ~ 95 (32)	3 ~ 90 (20)	0.38
β-2 microglobulin levels at EN	0.87 ~ 4.13 (1.91)	0.87 ~ 3.33 (1.70)	0.93 ~4.13 (2.11)	0.03
Number of Tregs at EN*	0.079 ~ 88.3 (12.6)	0.97 ~ 35.4 (11.4)	0.079 ~ 88.3 (13.7)	0.85

Table S2. Correlations between immune parameters and improved EFS

immune parameter at timepoint	P value	improved EFS
CD4 at day 14	0.037	higher
CD4 at day 60	0.048	higher
CD4 at day 100	0.013	higher
CD4 at day 180	0.034	higher
CD4CD45RO at day 100	0.021	higher
CD4CD45RO at day 180	0.003	higher
CD4CCR7 at day 180	0.030	higher
CD4CD27 at day 100	0.012	higher
CD4CD27 at day 180	0.007	higher
CD4CD28 at day 100	0.011	higher
CD4CD28 at day 180	0.005	higher
% CD4CD28 at TCH	0.032	higher
CD8CD45RA at day 14	0.017	lower
CD8CD45RA at day 60	0.002	lower
CD8CD45RO at day 180	0.032	higher
CD8CCR7 at day 60	0.036	lower
CD8CD27 at day 14	0.005	lower
CD8CD27 at day 60	0.011	lower
CD8CD28 at day 14	0.020	lower
CD8CD28 at day 60	0.031	lower
% CD4 at day 14	0.034	higher
% CD4 at day 60	0.017	higher
% CD4 at day 100	0.033	higher
% CD8 at day 14	0.017	lower
% CD8 at day 60	0.015	lower
% CD8 at day 100	0.049	lower
% FOXP3+ at TCH	0.047	lower
% FOXP3+ at day 14	0.002	lower
% FOXP3+ at day 60	0.004	lower
% FOXP3+ at day 100	<0.001	lower
% FOXP3+ at day 180	<0.001	lower