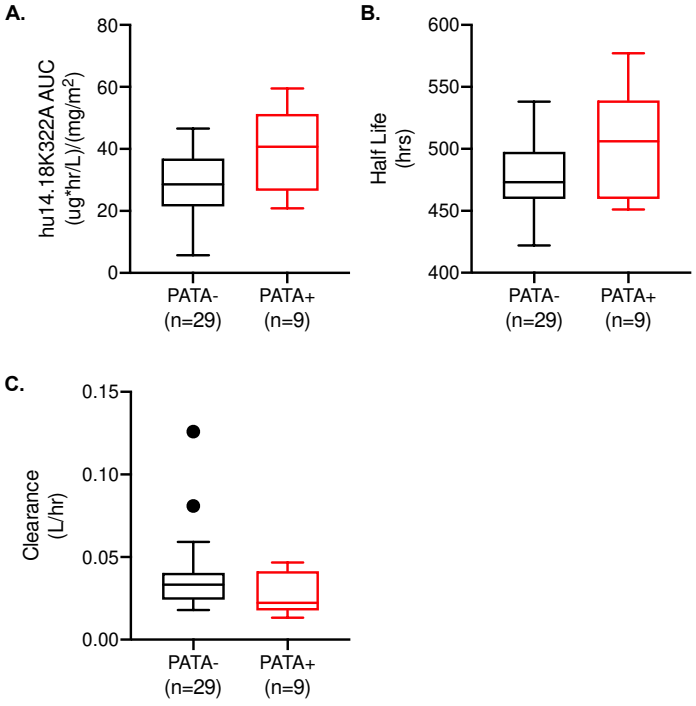
SUPPLEMENTAL MATERIALS

Supplemental Table 1. Patient characteristics and outcome. Disease burden (at study enrollment) was graded as: Class 1) elevated HVA and/or VMA and <10% bone marrow (BM) involvement only; Class 2) 10%-50% BM involvement and/or 1-2 MIBG avid sites and/or <1-3 cm CT lesion(s); Class 3) >50% BM involvement and/or 3-5 MIBG avid sites and/or >3-5 cm CT lesions; and Class 4) >5cm CT lesion(s) and/or >5 MIBG avid sites.

Demographics	**PATA- (n=29)**	**PATA+ (n=9)**	**p-value**
Age at study enrollment - Mean (years)	7.2	8.8	0.200
Sex (Male, Female)	17, 12	6,3	1.000
Race (Caucasian, Non-Caucasian)	19, 10	6, 3	1.000
Age at diagnosis - Mean (years)	4.8	5.0	0.815
Age at BMT - Mean (years)	5.7	6.1	0.709
Disease Burden at Study Enrollment	**PATA- (n=29)**	**PATA+ (n=9)**	**p-value**
Class 1	4	0	-
Class 2	7	4	-
Class 3	3	0	-
Class 4	15	5	-
Class 1 or 2 (low burden)	11	4	1.000
Class 3 or 4 (high burden)	18	5	1.000
Clinical Lab Values	**PATA- (n=29)**	**PATA+ (n=9)**	**p-value**
MYC-N Amplifiation (n=29 evaluable)	3 of 22	3 of 7	
Abnormal VMA and/or HVA	21	6	1.000
WBC (cells/mm^3)	3817	5944	0.064
ANC (cells/mm^3)	1931	3289	0.149
ALC (cells/mm^3)	1200	1698	0.073
AMC (cells/mm^3)	470	522	0.602
Prior mAb Therapy	**PATA- (n=29)**	**PATA+ (n=9)**	**p-value**
# of patients on prior mAb therapy	3	0	-
# of patients on prior anti-GD2 therapy	3	0	-
# of patients on prior I131-3F8	2	0	-
# of patients on prior hu14.18-IL2	1	0	-

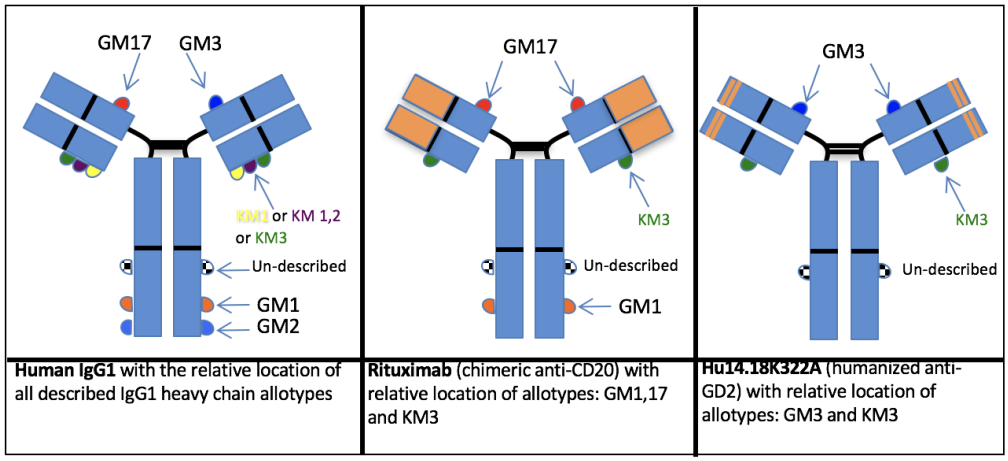
Supplemental Figure 1: **PK data for hu14.18K322A in PATA+ vs. PATA- patients.**

A) PATA+ patients show a trend for increased levels of AUC of hu14.18K322A as compared to PATA- patients (p=0.068), **B)** as well as increased half-life of the antibody, but this difference was not significant (p=0.196). **C)** Consistent with the slightly elevated AUC and half-life, the clearance of hu14.18K322A was slightly decreased in PATA+ patients as compared to PATA- patients, but these differences were not significant (p=0.277). The Mann Whitney test was used for all comparisons in this supplemental figure.



Supplemental Figure 2: **Schematic representation of the serologically identified allotypes on IgG1, rituximab, and hu14.18K322A.**

Relative location of the well described human IgG1 heavy chain allotypes (GM1, GM2, GM3, GM17), kappa light chain allotypes (KM1, KM1,2, and KM3), and the allotypes on rituximab and Hu14.18K322A. Rituximab and hu14.18K322A do not have a common, well-described allotype on their heavy chains. A putative, relatively un-described IgG1 heavy chain allotype, distinct from GM1, GM2, GM3, GM17, consistent with the data presented here, is pictured as an "un-described" allotype.



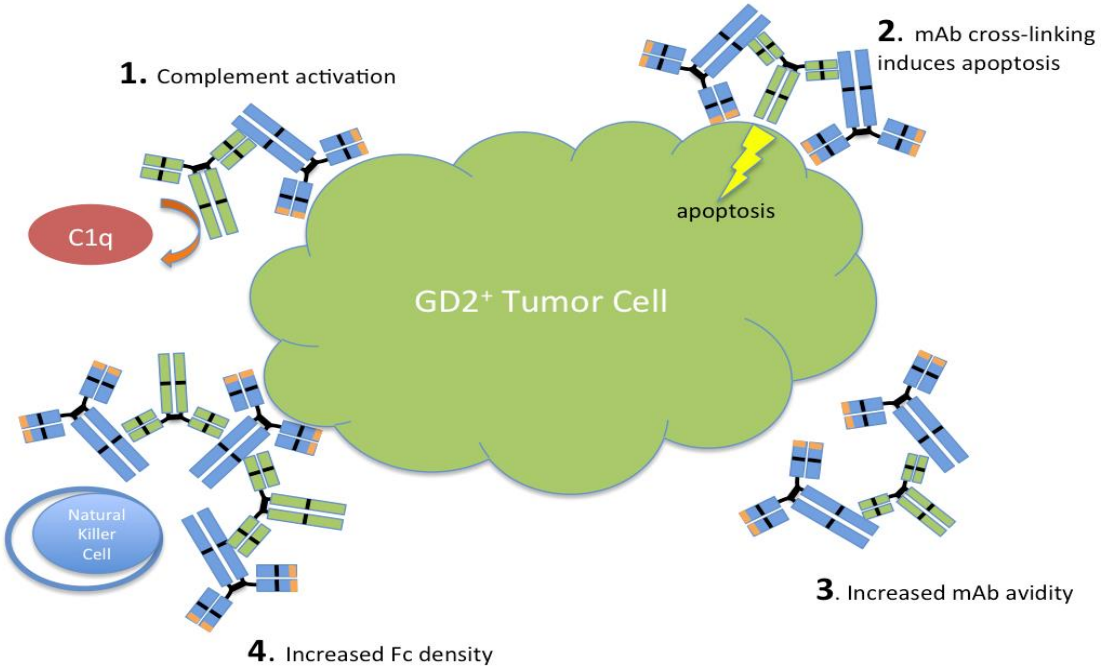
Human IgG1 with the relative location of all described IgG1 heavy chain allotypes

Rituximab (chimeric anti-CD20) with relative location of allotypes: GM1,17 and KM3

Hu14.18K322A (humanized anti-GD2) with relative location of allotypes: GM3 and KM3

Supplemental Figure 3: Potential Mechanisms of Action of PATA.

1) PATA may activate complement (after binding anti-GD2 mAb) causing tumor cytotoxicity. **2)** PATA may cross-link anti-GD2 mAb on the cell surface resulting in an apoptotic signal. **3)** PATA may increase the valency of the anti-GD2 mAb allowing it to bind tumor more avidly. **4)** PATA may increase Fc receptor density in proximity to tumor cell surface, augmenting ADCC and/or CDC. **5)** PATA may change the pharmacokinetics of the therapeutic mAb in some advantageous way (not pictured).



Supplemental Methods:

HAHA ELISA protocol – ELISA plates are coated with hu14.18K322A, and treated with a standard dilution of patient's serum to allow any anti-hu14.18K322A antibody to bind. Plates are treated with biotinylated- hu14.18K322A followed by detection with avidin-linked enzyme colorimetric signal, measured as optical density (OD) (4). We have used this system for trials of several 14.18-based anti-GD2 mAbs, including the mouse 14.G2a (2), ch14.18 (3, 8, 18), hu14.18-IL2 immunocytokine (16, 17), and hu14.18K322A (12) mAb. In the studies described in this report, based on the distribution of low OD values for pretreatment samples, we designated OD values $\leq$0.7 as negative and values >0.7 as positive.

IgM ELISA protocol – ELISA plates coated with hu14.18K322A (2 μg/mL in sodium carbonate buffer) overnight at 4^{o}C were washed and blocked with 5% BSA in PBS for 4 hours. With washes between all subsequent steps (PBS with 0.05% Tween-20 and 0.02% sodium azide), samples diluted 1:125 wereincubated overnight at 4^{o}C. Anti-human IgM+peroxidase antibody (Sigma A-0420; 1:100,000) was incubated 3 hours at room-temperature. TMB substrate (Sigma cat# T-0440) was applied for 10 minutes at room-temperature, and reactions were stopped with 2N sulfuric acid. OD was determined at 450nm (570nm reference). Samples with $\leq$10% variation between duplicates were considered valid.

Other Reagents – Pooled rheumatoid factor (RF) (1,050 IU/mL), was obtained from MyBioSource (Cat# MBS318024, Lot 3B05114). Pooled serum from never-transfused male donors was obtained from Pel-Freez (code 340131 lot 2875). Hu14.18K322A was produced at the Children's GMP, LLC facility (Memphis, TN). Rituximab and panitumumab were obtained

from the UW Carbone Cancer Center. Dinutuximab, 14.G2a murine mAb and hu14.18-IL2 immunocytokine were provided by the NCI-Biologics Resources Branch Biorepository (Frederick, MD). 1A7 mAb was provided by Titan Pharmaceuticals (San Francisco CA). Murine IgG1, IgG2a, anti-murine IgG, and anti-human kappa chain preparations were from Sigma (Cat# M9269, M9144, A2554, and K3502, respectively).