



Humanized Immune System and NOG Platform Scientific Resource Guide

Interactive reference guide from
Taconic Biosciences

April 2026 (v1.0)



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Learn more about Taconic's Immunology
and Immuno-oncology Portfolio



Learn more about Humanized Immune
System Mice



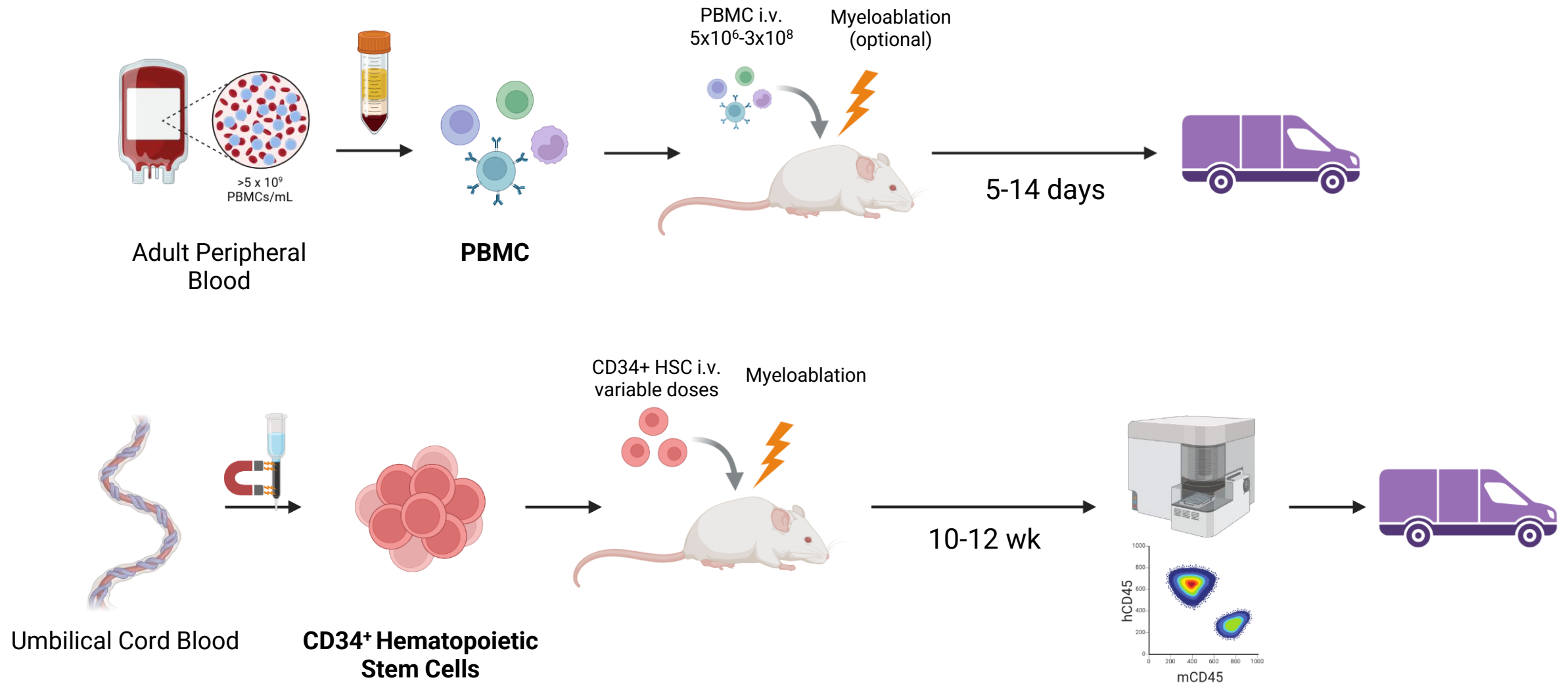
Explore Taconic Resources

Production of Humanized Immune System Mice

Section Contents: Production of Humanized Immune System Mice

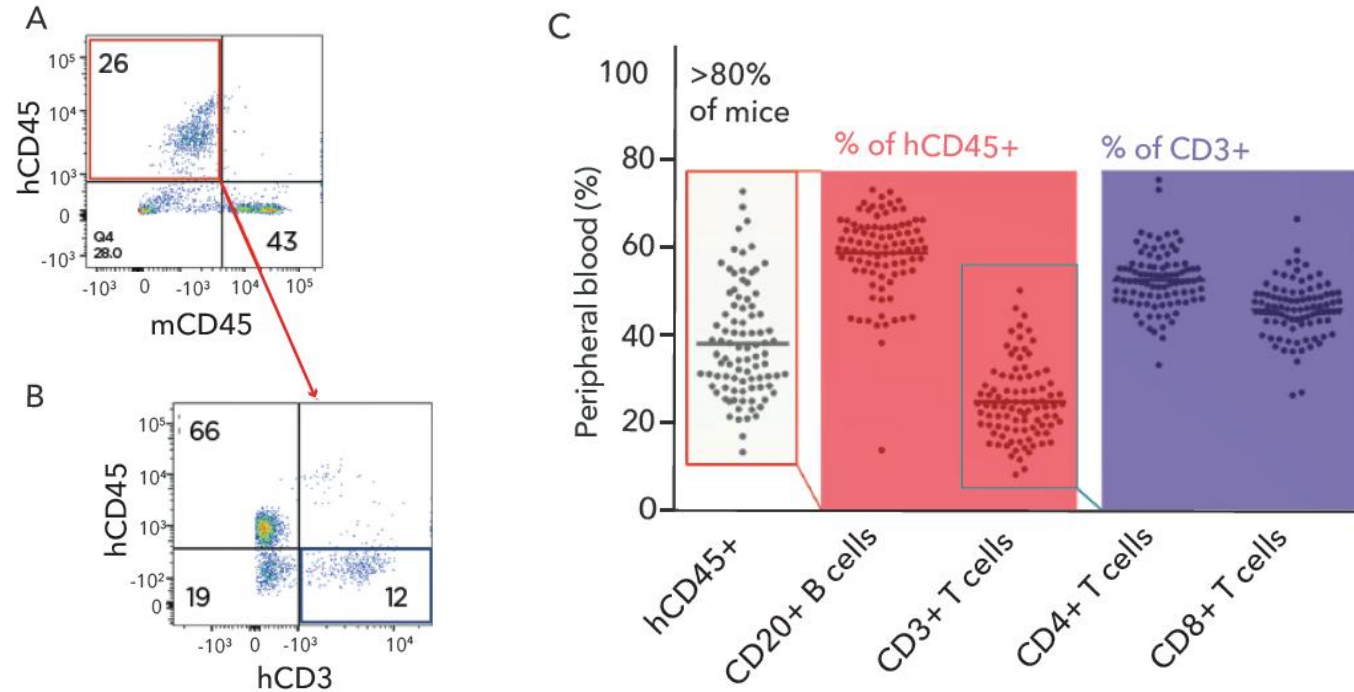
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Generating HIS Mice: PBMC vs. HSC Engraftment



Imaged created with BioRender

CD34⁺ Hematopoietic Stem Cell (HSC) Engraftment in NOG Mice



Learn about HSC-engrafted mice available at Taconic:



Navigate to huNOG section



Navigate to huNOG-EXL section



Navigate to hIL-6 NOG section



Navigate to FcResolv NOG section



Navigate to NeoThy section

Peripheral blood immunophenotyping of huNOG mice

A. Representative flow cytometry plot of the human (hCD45⁺) cell to mouse cell (mCD45⁺) ratio at 12 weeks post engraftment.

B. Relative percentage of human cells expressing the B cell marker CD20 vs the T cell marker CD3.

C. Consistent engraftment ratios of greater than 25% hCD45⁺ cells in over 80 percent of animals (n=91), with highly reproducible relative T cell and B cell enrichment levels. Each dot represents an individual mouse analyzed by flow cytometry 12 weeks post CD34⁺ HSC engraftment.

Taconic Internal Data



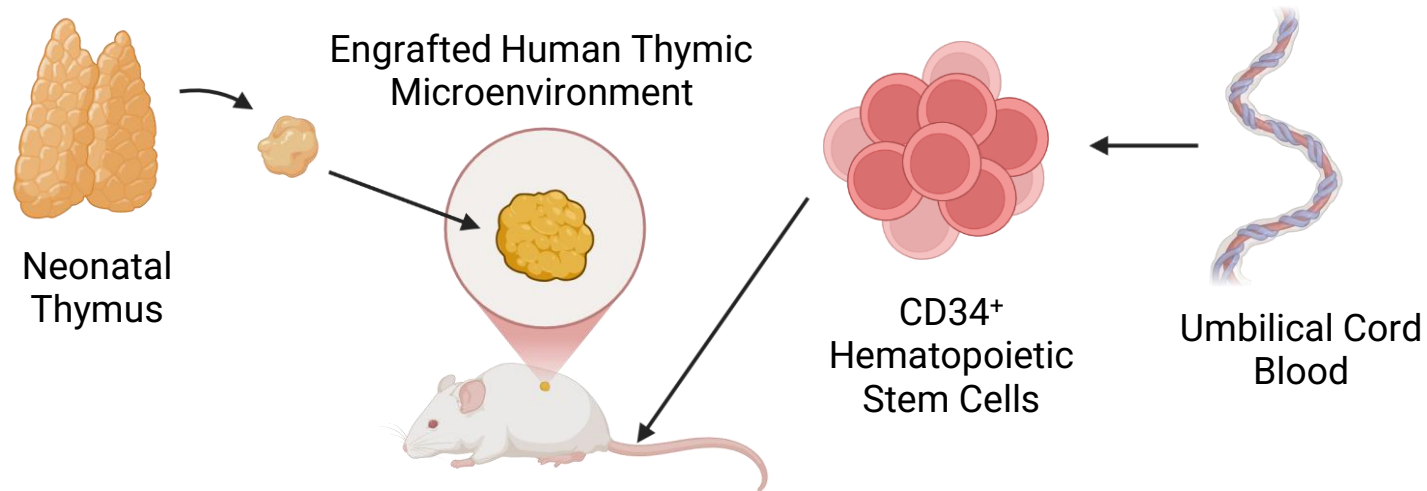
Learn more
about the
NeoThy™
Platform

NeoThy™ Human Immune Engraftment Platform

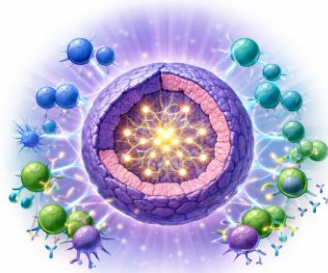
Human adaptive immunity in a controlled in vivo system



Navigate to
NeoThy
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Human thymic microenvironment-mediated HLA education enables functional adaptive (human) immunity



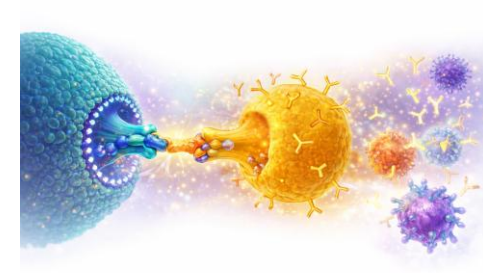
Human Thymus-Mediated T Cell Education

Engrafted human thymic fragments support HLA-restricted CD4⁺ and CD8⁺ T cell development.



HLA Class II-Restricted CD4⁺ T Cell Activation

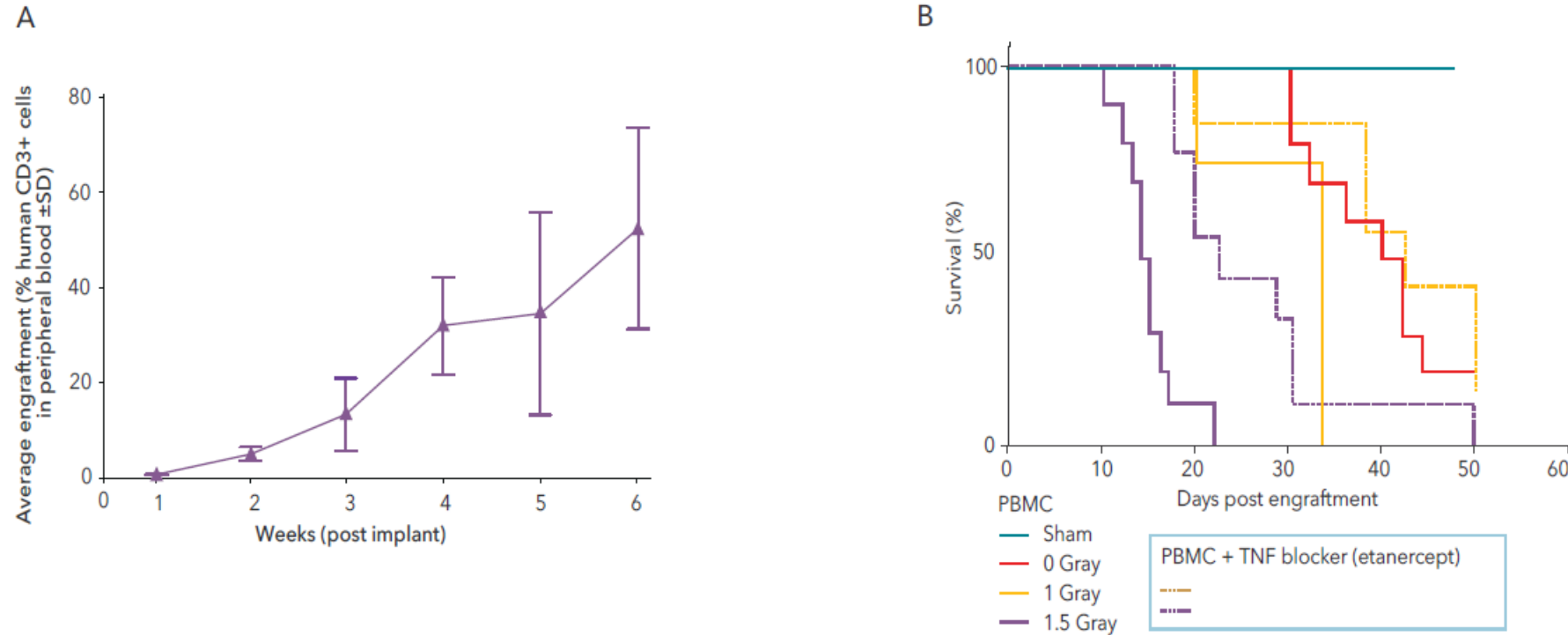
More robust helper T cell antigen specificity and activation.



T Cell-Dependent Humoral Immune Function

CD4⁺ T cell help enables B cell activation, plasma cell differentiation, and antigen-specific antibody production.

Efficient engraftment of human PBMCs without preconditioning in NOG mice



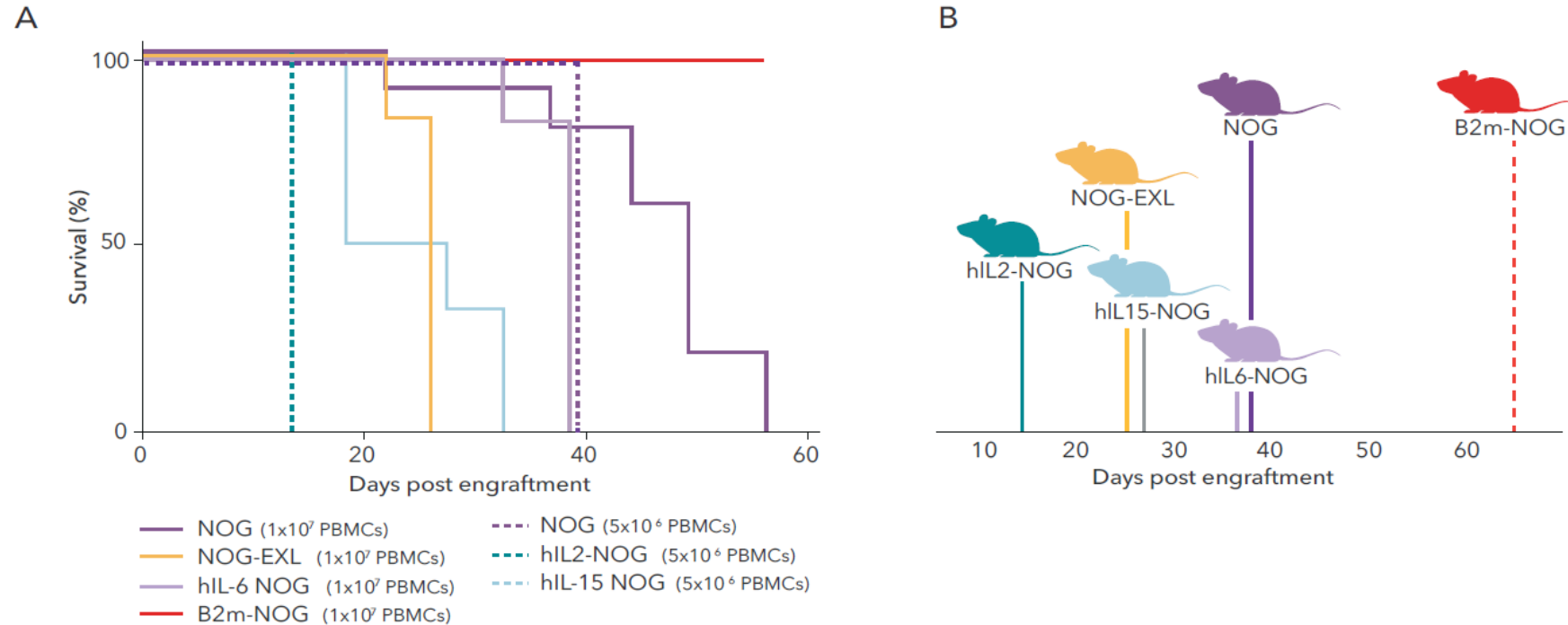
A. Following tail-vein injection of 1×10^7 human PBMCs, peripheral blood CD3+ cells were enumerated at weekly intervals by flow cytometry.

B. Survival curves for 1×10^7 human PBMC engrafted NOG mice at increasing levels of irradiation with or without anti-TNF blocking treatment (etanercept). Internal Taconic data.

Xenoreactive PBMC-mediated GvHD onset is dependent on mouse host strain

See the
full poster

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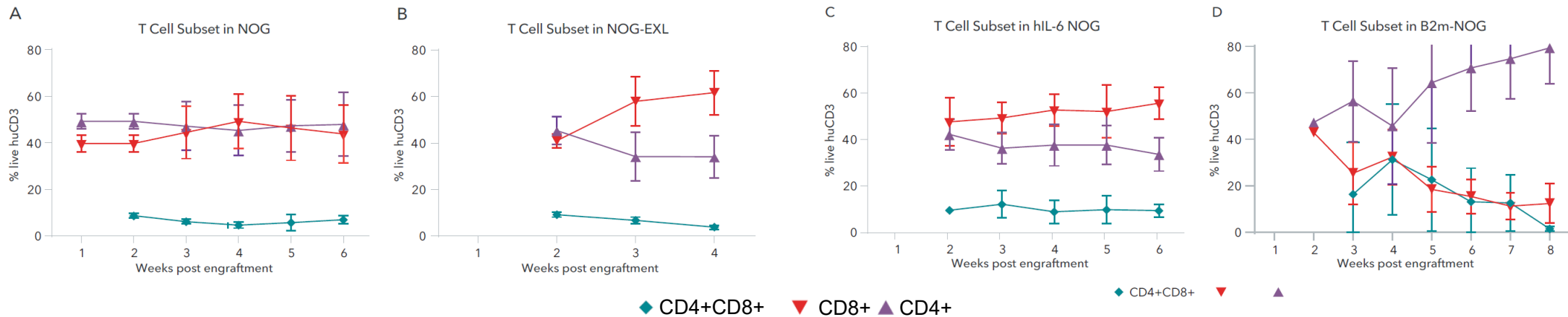


A. Kaplan-Meier plot for NOG Portfolio models engrafted with 5×10^6 or 1×10^7 PBMCs.

B. Graphical representation of terminal-stage GvHD onset in NOG Portfolio models.

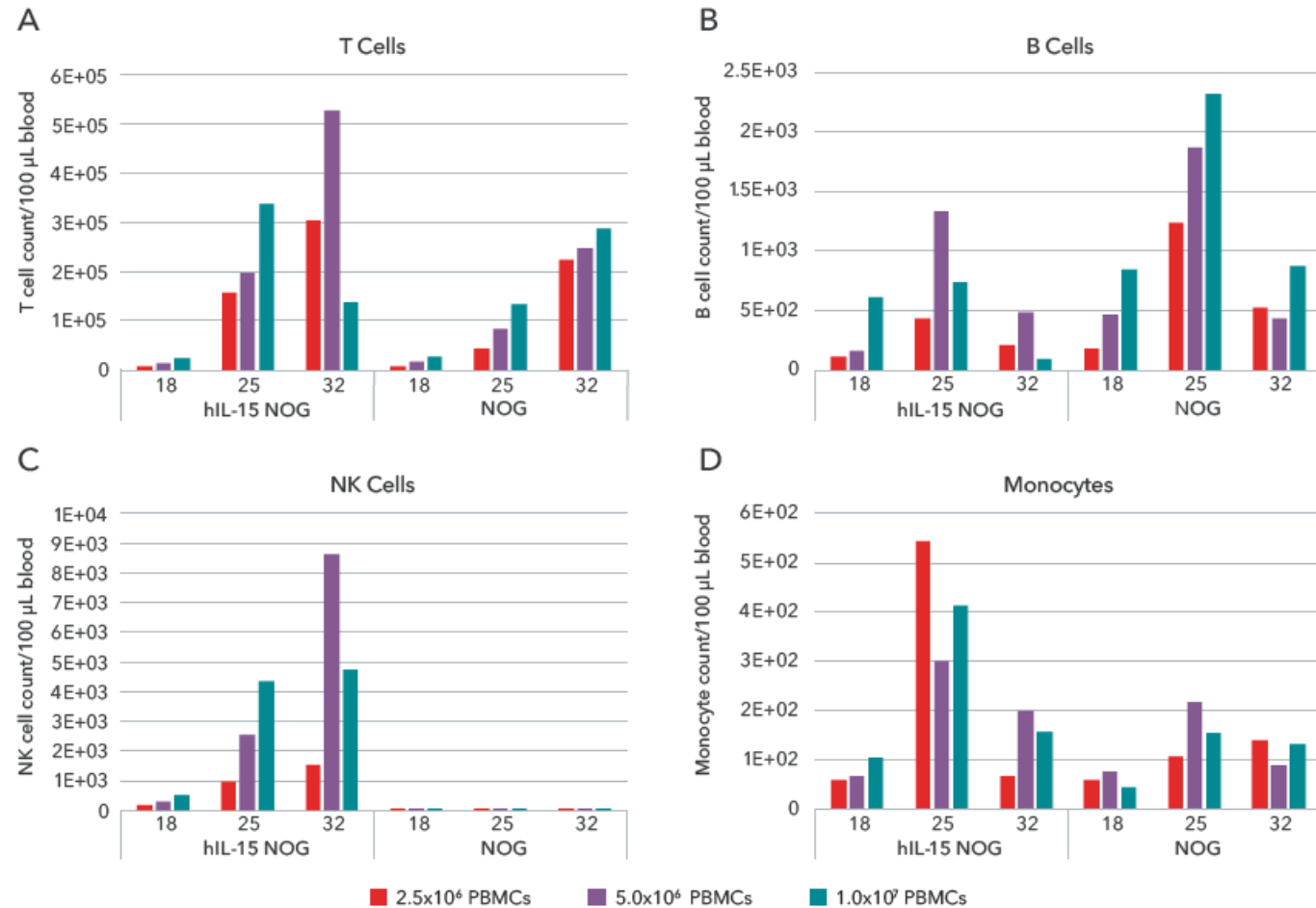
Figures adapted from Posters referenced on this slide

PBMC Engraftment: T cell subset engraftment kinetics is dependent on mouse host strain



T cell subset analysis of peripheral blood from NOG (A), NOG-EXL (B), hIL-6 NOG (C), and B2m-NOG (D). Mice implanted with 1×10^7 PBMC were bled weekly and immunophenotyped for T cells (CD3) and T cell subsets (CD4, CD8) to assess T cell subset development and kinetics. Flow cytometry was used to assess CD4 and CD8 T cell subsets across groups. Results represent the average $\pm$ SD (N=5-6/cohort). Enhanced CD8 expansion was observed in NOG-EXL and hIL-6 NOG, whereas increased CD4 expansion was observed in B2m-NOG.

Human PBMC engraftment in hIL-15 NOG vs. NOG mice



Data from peripheral blood analysis of human (A) T cells, (B) B cells, (C) NK cells, and (D) monocytes, performed at 18, 25, and 32 days post PBMC engraftment. Single donor's cells were engrafted into both models at the indicated cell doses. NOG: n=6 per group; hIL-15 NOG: n=5–6, 3–5, and 1–4 per group at day 18, 25, or 32 post engraftment, respectively.

Other Engraftment Applications



Navigate to
hIL-15 NOG
Section
For More
Information



Navigate to
hIL-2 NOG
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Humanized Immune System Models: Recommended Care & Resources



Access the linked document on the left for:

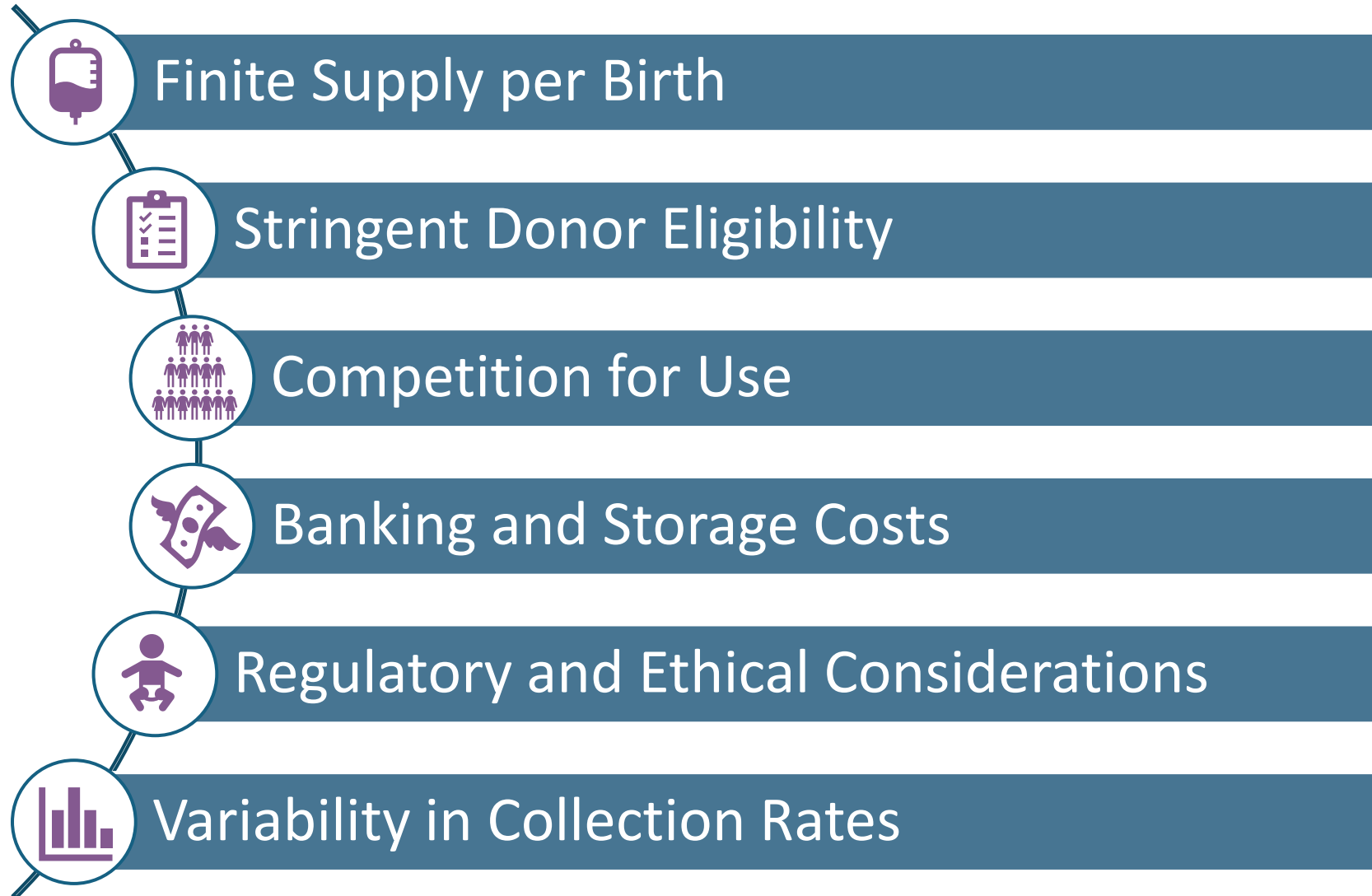
- Recommended care and housing for NOG Models including HIS mice
- Humanized immune system (HIS) mouse production practices and animal health
- Example flow cytometry protocol for human immune system engrafted models

huSelect™ Services for HIS Mice

Section Contents: huSelect™ Services for HIS Mice

- [CD34+ Donors are Finite Resources](#)
- [huSelect™ Services for HIS mice](#)
- [Human CD34+ Donors Engraft Variably and Can Confound Data](#)
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- [Return-to-Donor: Test and Reserve Donors for Later Use](#)
- [huNOG-EXL: Pre-Characterized HSC Donors Remove Experiment...](#)
- [Flow Cytometry Analysis of Humanized Mice](#)

CD34+ Donors are Finite Resources

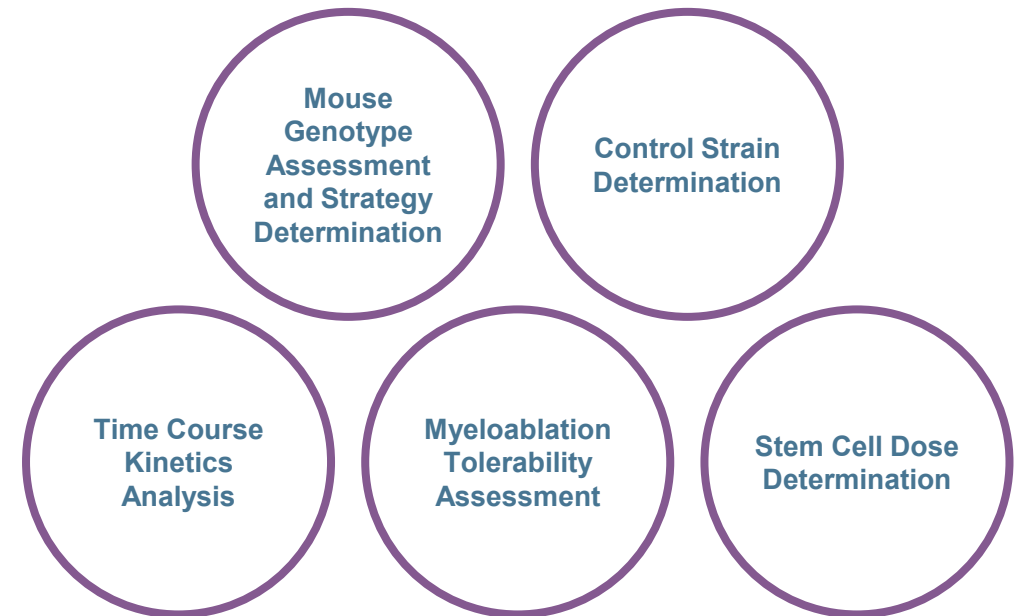


huSelect™ Services for HIS mice

huSelect Service	Description
Select CD34+ HSC donors based on one or more HLA criteria	Our extensive CD34+ HSC donor catalog supports a wide range of HLA types for to suit your study parameters.
Request a specific CD34+ HSC donor	Repeat studies using CD34+ donors from prior orders
Reserve CD34+ cells for future use	Ensure an ongoing supply of CD34+ cells from selected donors
Pre-characterized CD34+ HSC donors	A number of donors have been validated in huNOG-EXL mice and pre-characterized for human immune cell populations for four timepoints out to 30 weeks post-engraftment. Data available upon request.
On-demand analysis of immune cell characterization	Flow cytometry services for immune cell analysis of models prior to shipping or for customer-provided samples. A variety of panels are available.

huSelect™ Custom Immune Humanization

Develop and benchmark a customized immune humanization protocol using CD34+, PBMC, or NK cells to achieve consistent engraftment, reduce variability, and accelerate translational study success.



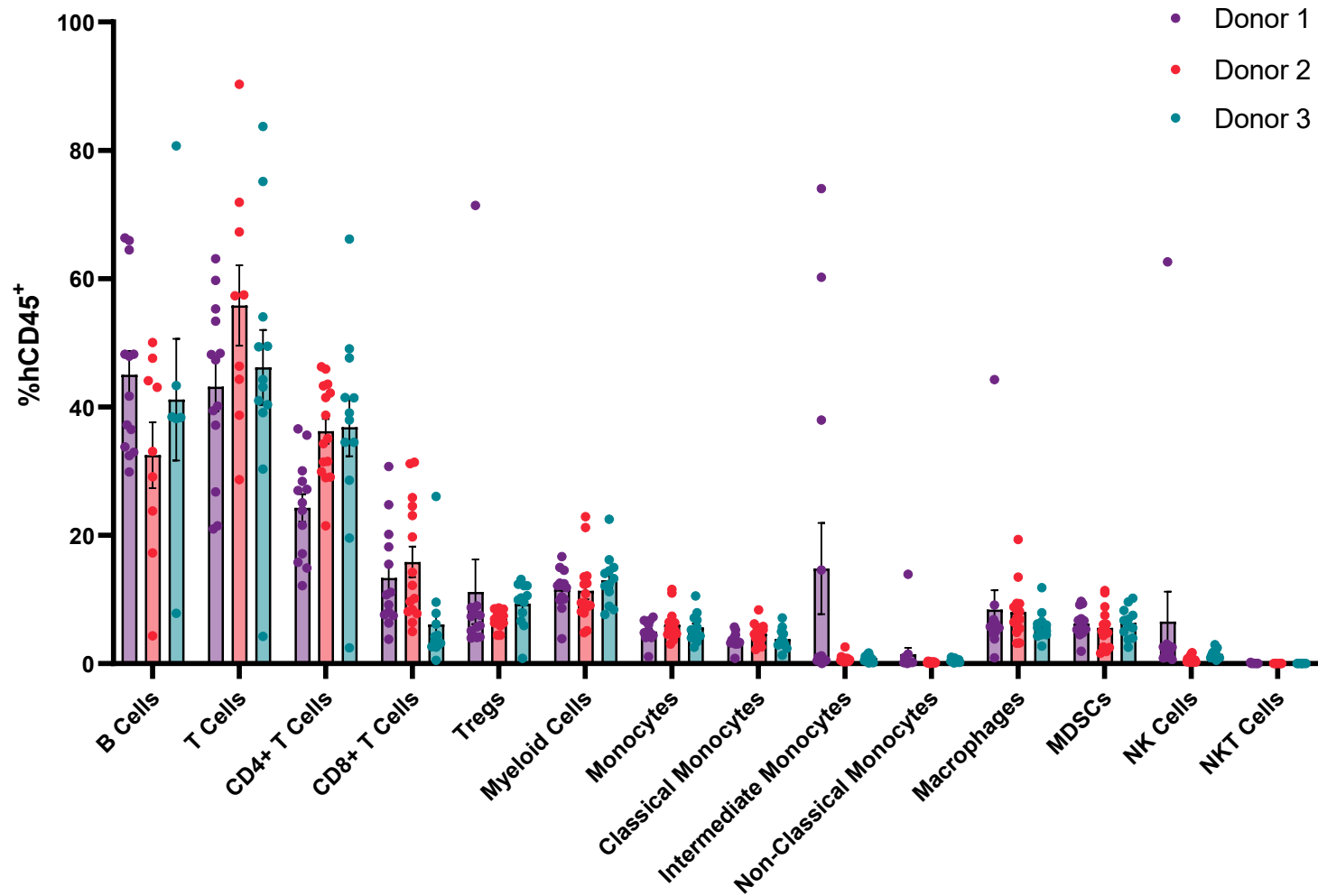


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about
huNOG-EXL



Human CD34+ Donors Engraft Variably and Can Confound Data

%hCD45⁺ Cells in Peripheral Blood 23 Weeks Post-Engraftment



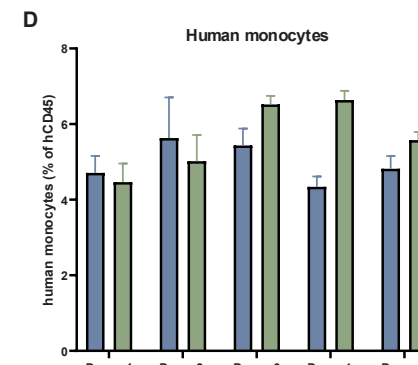
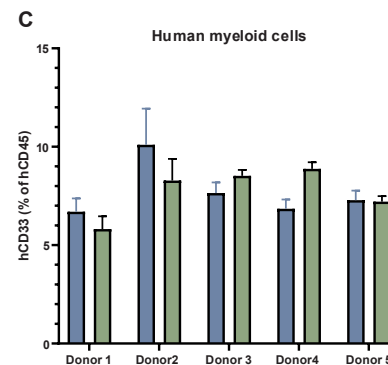
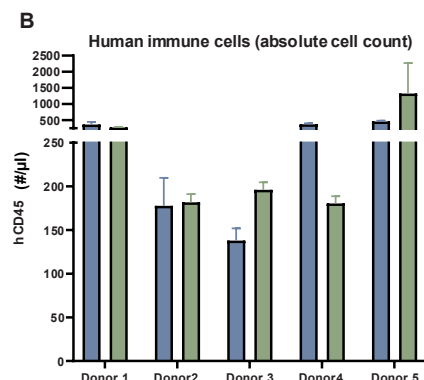
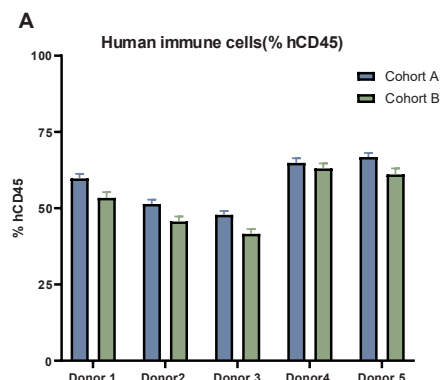
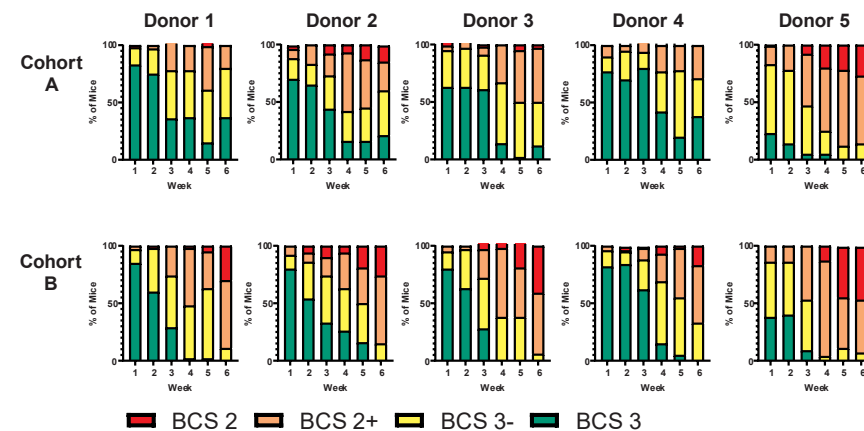
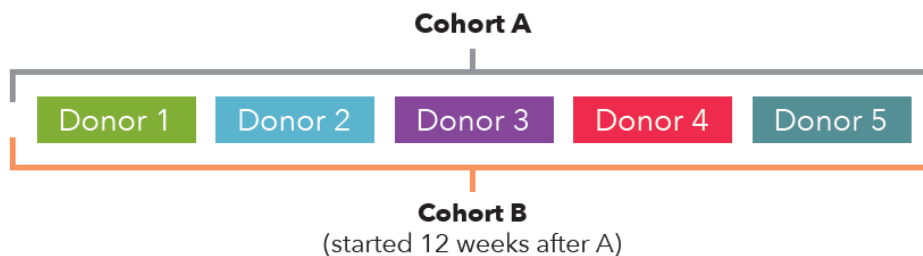
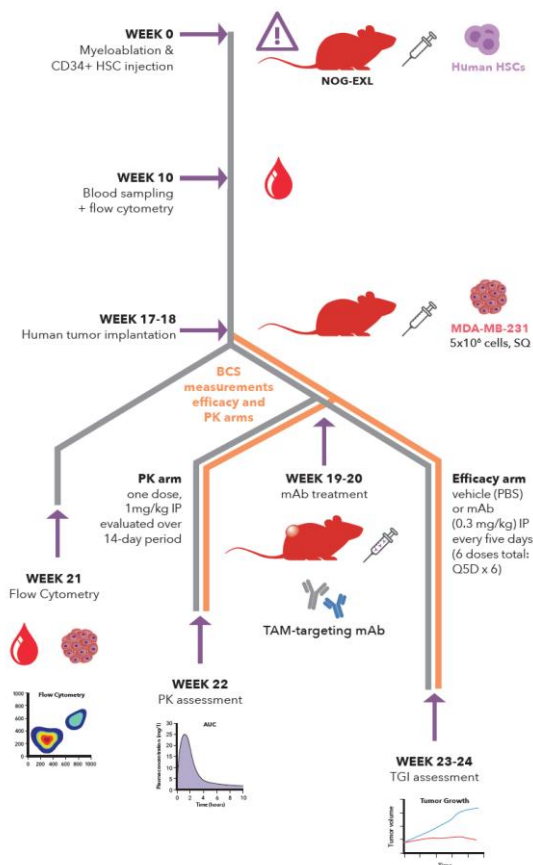


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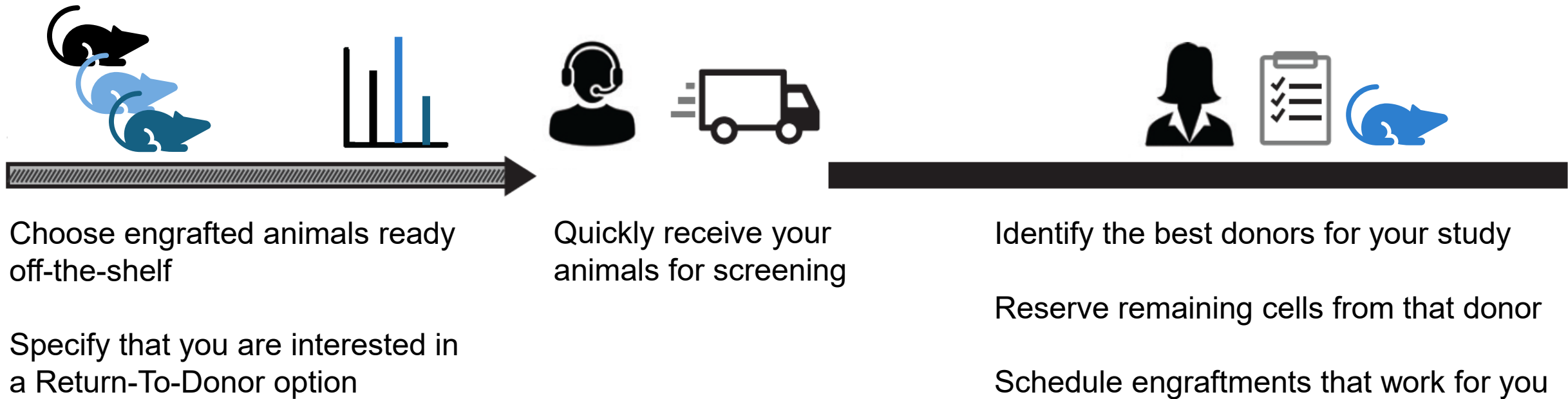


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huNOG-EXL

Within Donor Engraftment is Reproducible



Return-to-Donor: Test and Reserve Donors for Later Use



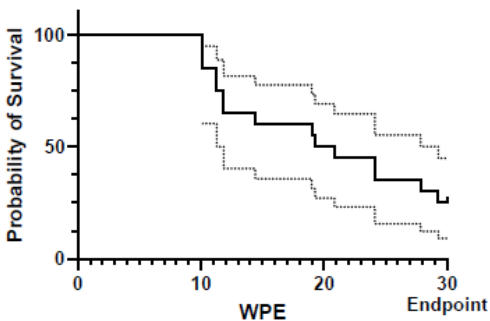


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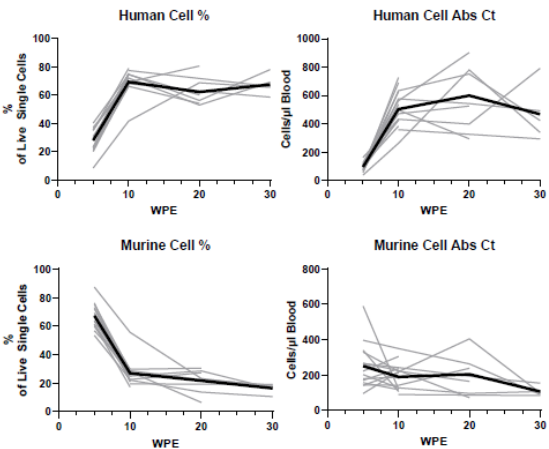
huNOG-EXL: Pre-Characterized HSC Donors Remove Experimental Unknowns

Survival

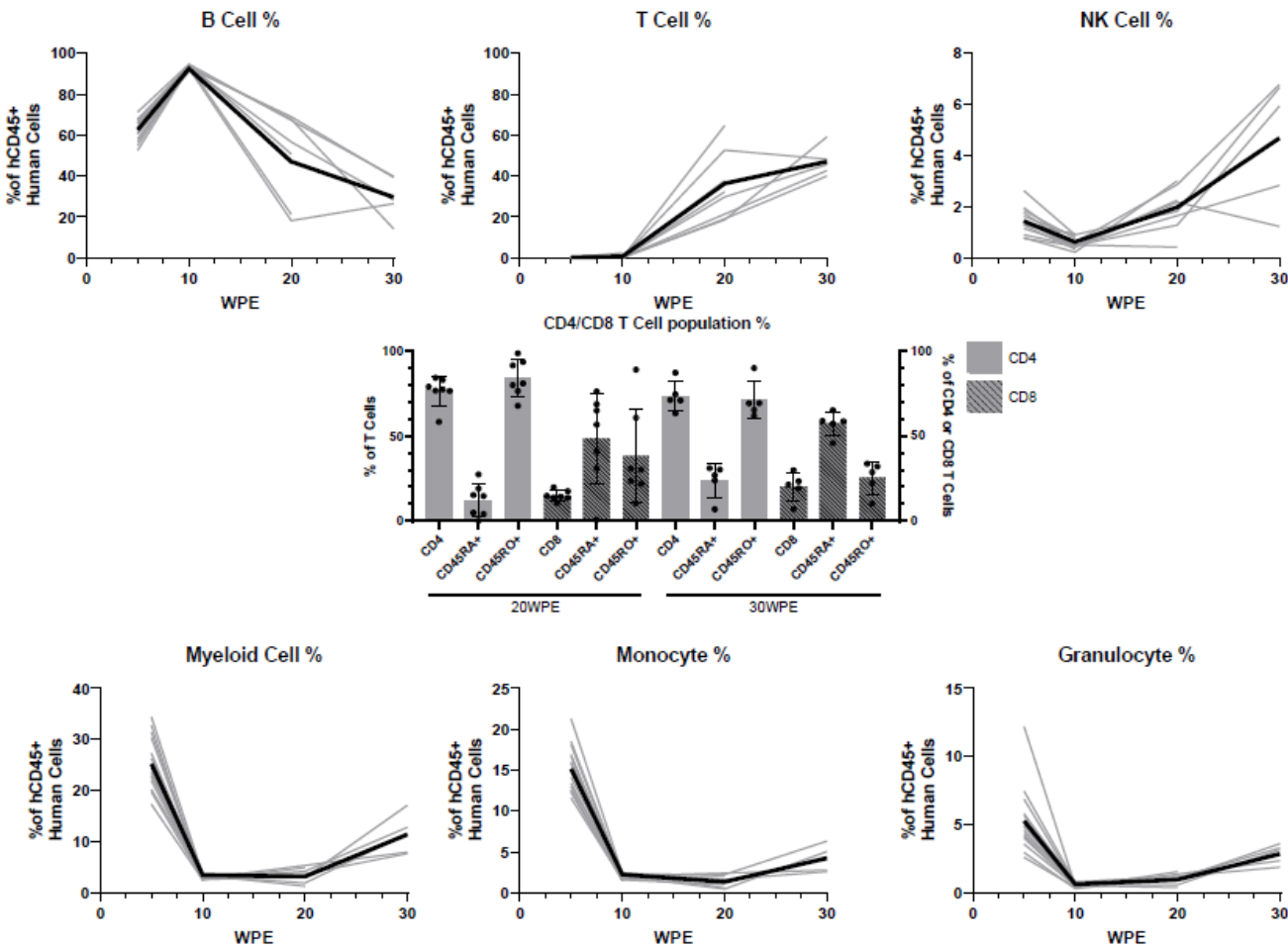


Median Survival: 20.07 WPE

Chimerism: 100% Pass Rate



Human Cell Populations





Learn more
about
huNOG-EXL

Utilizing Pre-validated HSC Donors for huNOG-EXL Engraftment

Donor ID #	HLA-A allele 1	HLA-A allele 2	HLA-B allele 1	HLA-B allele 2	HLA-C allele 1	HLA-C allele 2	DRB1 allele 1	DRB1 allele 2	DRB3 allele 1	DRB3 allele 2	DRB4 allele 1	DRB4 allele 2	DRB5 allele 1	DRB5 allele 2	DQB1 allele 1	DQB1 allele 2	DPB1 allele 1	DPB1 allele 2
2404090078	1.01	02.01	08.01	45.01	07.01	16.01	01.01	03.01	1.01	1.01					2.01	5.01	1.01	20.01
2404080069	24.02	24.02	07.02	35.03	07.02	12.03	11.01	15.01	2.02	2.02			1.01	1.01	3.01	6.02	4.01	26.01
2404050040	11.01	30.02	44.02	49.01	05.01	07.01	04.01	13.02	3.01	3.01	1.01	1.01			3.01	6.04	3.01	17.01
2404040034	2.01	11.01	39.14	40.01	03.04	07.02	04.04	04.04			1.01	1.01			3.02	3.02	4.02	6.01
2404030023	3.01	03.01	07.02	07.02	07.02	07.02	04.01	07.01			1.01	1.01			3.01	3.03	2.01	4.01
2403200112	2.01	34.02	07.02	44.03	04.01	12.03	14.01	15.03	2.02	2.02			1.01	1.01	5.03	6.02	2.01	4.01
2403190092	32.01	33.01	14.01	14.02	08.02	08.02	03.01	07.01	2.02	2.02	1.01	1.01			2.01	2.01	2.01	4.01
2403190091	11.01	11.01	40.06	46.01	01.02	08.01	08.03	14.01	2.02	2.02					5.02	6.01	5.01	5.01
2402220075	3.01	24.02	35.01	51.01	01.02	04.01	04.01	04.04			1.01	1.01			3.01	3.02	3.01	4.01
2402190062	3.01	24.03	07.02	18.01	07.02	12.03	11.04	15.01	2.02	2.02			1.01	1.01	3.01	6.02	4.01	4.02
2402140053	1.01	33.03	44.03	58.01	03.02	04.01	07.01	13.02	3.01	3.01	1.01	1.01			2.01	6.09	3.01	4.01
2402070027	26.01	31.01	07.02	35.12	04.01	07.02	01.03	08.02							3.01	5.01	2.01	4.02
2401310267	2.01	68.01	15.01	40.01	03.03	03.04	13.01	13.02	1.01	3.01					6.03	6.04	4.01	4.01
2401290256	02.01	11.01	51.01	52.01	12.02	15.02	03.01	15.02	1.01	1.01			1.02	1.02	2.01	6.01	14.01	90.01
2401090025	01.01	24.02	08.01	35.17	04.01	04.01	03.01	16.02	1.01	1.01			2.02	2.02	2.01	3.01	1.01	4.02
2311220087	01.01	02.01	15.01	51.01	01.02	14.02	14.06	1.01	1.01	1.01					3.01	3.01	4.02	4.02
2311210086	02.01	33.01	14.02	18.01	07.01	08.02	01.02	11.04	2.02	2.02					3.01	5.01	4.02	5.01
2311130048	02.01	33.01	14.02	44.02	5.01	8.02	7.01	12.01	2.02	2.02	1.01	1.01			2.01	3.01	4.01	11.01
2311020005	01.01	68.02	08.01	47.01	07.01	07.01	03.01	13.01	1.01	3.01					2.01	5.01	1.01	2.01
2310280196	02.01	66.01	15.01	41.02	01.02	17.01	08.02	13.03	1.01	1.01					3.01	4.02	4.02	17.01
2310270181	03.01	24.02	07.02	08.01	05.01	07.02	03.01	04.01	2.02	2.02	1.01	1.01			2.01	3.02	4.01	4.01
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2308250251	01.01	32.01	14.01	44.03	04.01	08.02	7.01	7.01			1.01	1.01			2.01		2.01	
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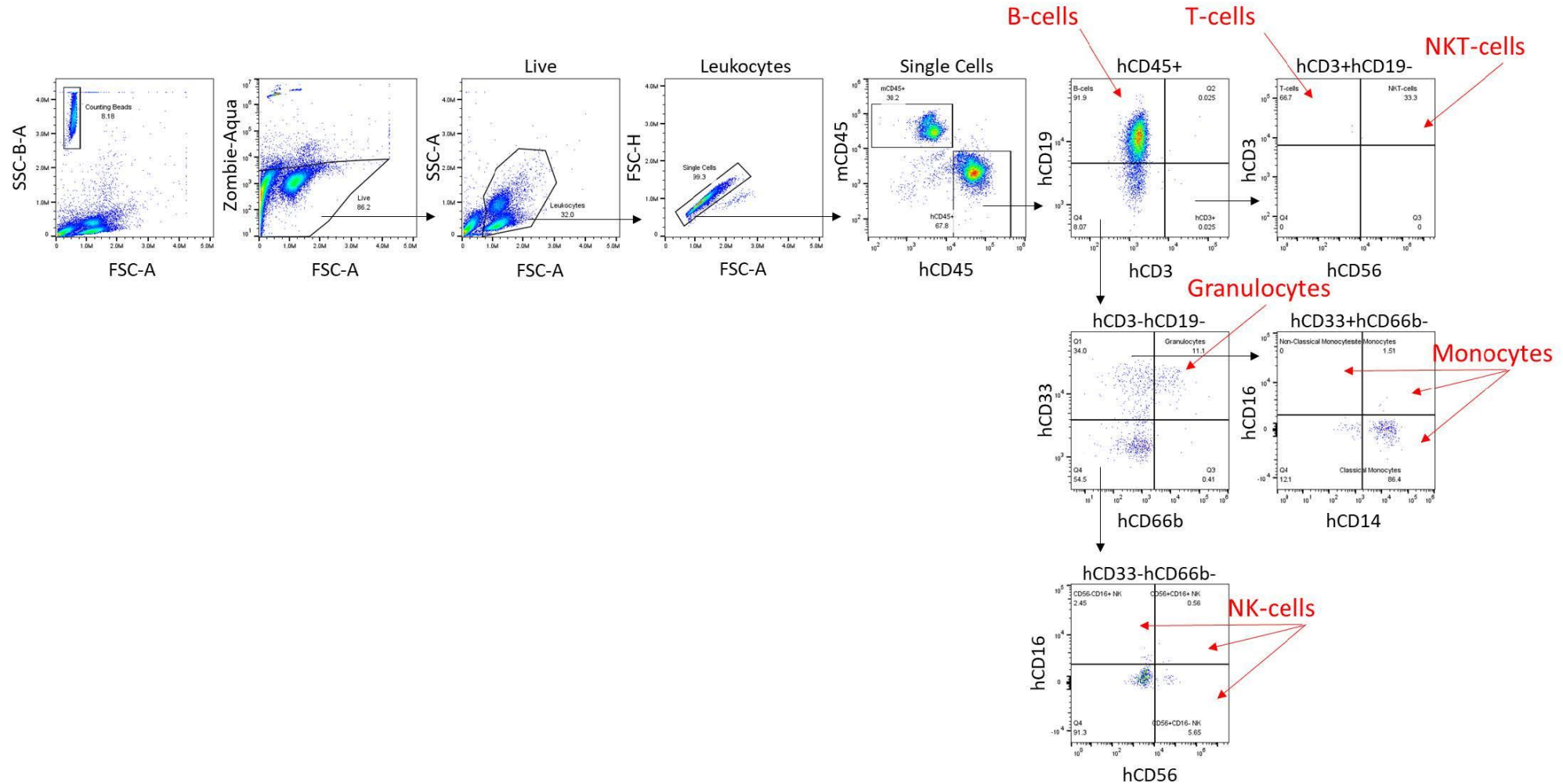
Taconic's CD34+ HSC Repository

400+ unique HSC donors:

- HLA A, B, C
- DRB1
- DRB3
- DRB4
- DRB5
- DQB1
- DPB1
- Sex
- Ethnicity

Flow Cytometry Analysis of Humanized Mice

Example Gating Strategy





View gating
strategy



Flow Cytometry Panels: Human Immune Cell Base Panel (T,B,M,NK)

Population	hCD45	mCD45	hCD19 / hCD20	hCD3	hCD56	hCD27	IgD	hCD38	hCD10	hCD4	hCD8	hCD45RA	hCD45RO	hCD197 (CCR7)	hCD95	hCD25	hCD127	hCD33	hCD16
Human cells	+	-																	
Murine cells	-	+																	
B cells	+	-	+	-															
Naïve B cells	+	-	+	-		-	+												
Class-switched memory	+	-	+	-		+	-												
Non-class switched memory	+	-	+	-		+	+												
Plasmablasts	+	-	+	-		+	+/-	+											
Transitional B cells	+	-	+	-		-	+/-		+										
T cells	+	-	-	+	-														
CD4 T cells	+	-	-	+	-					+	-								
CD4 Naïve T cells	+	-	-	+	-	+				+	-	+	-	+	-				
CD4 Stem cell memory T cells	+	-	-	+	-	+				+	-	+	-	+	+				
CD4 Central Memory T cells	+	-	-	+	-	+				+	-	-	+	+					
CD4 Transitional Memory T cells	+	-	-	+	-	+				+	-	-	+	-					
CD4 Effector Memory T cells	+	-	-	+	-	-				+	-	-	+	-					
CD4 Effector T cells	+	-	-	+	-	-				+	-	+	-	-	+				
CD4 TEMRA	+	-	-	+	-	-				+	-	+	-	-	-				
CD4 T-regulatory cells	+	-	-	+	-					+	-	+	-			+	low/-		
CD8 T cell	+	-	-	+	-					-	+								
CD8 Naïve T cells	+	-	-	+	-	+				-	+	+	-	+	-				
CD8 Stem cell memory T cells	+	-	-	+	-	+				-	+	+	-	+	+				
CD8 Central Memory T cells	+	-	-	+	-	+				-	+	-	+	+					
CD8 Transitional Memory T cells	+	-	-	+	-	+				-	+	-	+	-					
CD8 Effector Memory T cells	+	-	-	+	-	-				-	+	-	+	-					
CD8 Effector T cells	+	-	-	+	-	-				-	+	+	-	-	+				
CD8 TEMRA	+	-	-	+	-	-				-	+	+	-	-	-				
Myeloid Cells	+	-	-	-														+	
NK cells	+	-	-	-	+/-														+/-
NKT cells	+	-	-	+	+														

*All cells gated on Live single cells

+ = Positive

- = Negative

■ = Not Analyzed



View gating
strategy



Flow Cytometry Panels: Expanded Human T Cell Panel

Population	hCD45	mCD45	hCD19	hCD3	hCD56	hCD27	hCD4	hCD8	hCD45RA	hCD45RO	hCD197 (CCR7)	hCD95	hCD25	hCD127	hCD33	hCD16
Human cells	+	-														
Murine cells	-	+														
B cells	+	-	+	-												
T cells	+	-	-	+	-											
CD4 T cells	+	-	-	+	-		+	-								
CD4 Naïve T cells	+	-	-	+	-	+	+	-	+	-	+	-				
CD4 Stem cell memory T cells	+	-	-	+	-	+	+	-	+	-	+	+				
CD4 Central Memory T cells	+	-	-	+	-	+	+	-	-	+	+					
CD4 Transitional Memory T cells	+	-	-	+	-	+	+	-	-	+	-					
CD4 Effector Memory T cells	+	-	-	+	-	-	+	-	-	+	-					
CD4 Effector T cells	+	-	-	+	-	-	+	-	+	-	-	+				
CD4 TEMRA	+	-	-	+	-	-	+	-	+	-	-	-				
CD4 T-regulatory cells	+	-	-	+	-		+	-	+	-			+	low/-		
CD8 T cell	+	-	-	+	-		-	+								
CD8 Naïve T cells	+	-	-	+	-	+	-	+	+	-	+	-				
CD8 Stem cell memory T cells	+	-	-	+	-	+	-	+	+	-	+	+				
CD8 Central Memory T cells	+	-	-	+	-	+	-	+	-	+	+					
CD8 Transitional Memory T cells	+	-	-	+	-	+	-	+	-	+	-					
CD8 Effector Memory T cells	+	-	-	+	-	-	-	+	-	+	-					
CD8 Effector T cells	+	-	-	+	-	-	-	+	+	-	-	+				
CD8 TEMRA	+	-	-	+	-	-	-	+	+	-	-	-				
Myeloid Cells	+	-	-	-											+	
NK cells	+	-	-	-	+/-											+/-
NKT cells	+	-	-	+	+											

*All cells gated on Live single cells + = Positive - = Negative ■ = Not Analyzed



View gating
strategy



Flow Cytometry Panels: Expanded Human B Cell Panel

Population	hCD45	mCD45	hCD19 / hCD20	hCD3	hCD56	hCD27	IgD	hCD38	hCD10	hCD33	hCD16
Human cells	+	-									
Murine cells	-	+									
B cells	+	-	+	-							
Naïve B cells	+	-	+	-		-	+				
Class-switched memory	+	-	+	-		+	-				
Non-class switched memory	+	-	+	-		+	+				
Plasmablasts	+	-	+	-		+	+/-	+			
Transitional B cells	+	-	+	-		-	+/-		+		
T cells	+	-	-	+	-						
Myeloid Cells	+	-	-	-						+	
NK cells	+	-	-	-	+/-						+/-
NKT cells	+	-	-	+	+						

*All cells gated on Live single cells + = Positive - = Negative ■ = Not Analyzed



View gating
strategy



Flow Cytometry Panels: Expanded Human T and B Cell Panel

Population	hCD45	mCD45	hCD19 / hCD20	hCD3	hCD56	hCD27	IgD	hCD38	hCD10	hCD4	hCD8	hCD45RA	hCD45RO	hCD197 (CCR7)	hCD95	hCD25	hCD127	hCD33	hCD16
Human cells	+	-																	
Murine cells	-	+																	
B cells	+	-	+	-															
Naïve B cells	+	-	+	-		-	+												
Class-switched memory	+	-	+	-		+	-												
Non-class switched memory	+	-	+	-		+	+												
Plasmablasts	+	-	+	-		+	+/-	+											
Transitional B cells	+	-	+	-		-	+/-		+										
T cells	+	-	-	+	-														
CD4 T cells	+	-	-	+	-					+	-								
CD4 Naïve T cells	+	-	-	+	-	+				+	-	+	-	+	-				
CD4 Stem cell memory T cells	+	-	-	+	-	+				+	-	+	-	+	+				
CD4 Central Memory T cells	+	-	-	+	-	+				+	-	-	+	+					
CD4 Transitional Memory T cells	+	-	-	+	-	+				+	-	-	+	-					
CD4 Effector Memory T cells	+	-	-	+	-	-				+	-	-	+	-					
CD4 Effector T cells	+	-	-	+	-	-				+	-	+	-	-	+				
CD4 TEMRA	+	-	-	+	-	-				+	-	+	-	-	-				
CD4 T-regulatory cells	+	-	-	+	-					+	-	+	-			+	low/-		
CD8 T cell	+	-	-	+	-					-	+								
CD8 Naïve T cells	+	-	-	+	-	+				-	+	+	-	+	-				
CD8 Stem cell memory T cells	+	-	-	+	-	+				-	+	+	-	+	+				
CD8 Central Memory T cells	+	-	-	+	-	+				-	+	-	+	+					
CD8 Transitional Memory T cells	+	-	-	+	-	+				-	+	-	+	-					
CD8 Effector Memory T cells	+	-	-	+	-	-				-	+	-	+	-					
CD8 Effector T cells	+	-	-	+	-	-				-	+	+	-	-	+				
CD8 TEMRA	+	-	-	+	-	-				-	+	+	-	-	-				
Myeloid Cells	+	-	-	-														+	
NK cells	+	-	-	-	+/-														+/-
NKT cells	+	-	-	+	+														

*All cells gated on Live single cells + = Positive - = Negative ■ = Not Analyzed



View gating
strategy



Flow Cytometry Panels: Human Myeloid Panel

Population	hCD45	mCD45	hCD19	hCD3	hCD33	hCD14	hCD16	hCD56	hCD66b	hCD15	hFcεR1α	hCD117	HLA-DR	hCD123	hCD11c	hSiglec-8
Human cells	+	-														
Murine cells	-	+														
Granulocytes	+	-	-	-	+				+							
Eosinophils	+	-	-	-	+				+	+						+
Neutrophils	+	-	-	-	+				+	+						-
Basophils	+	-	-	-	+				-	-	+					
Monocytes	+	-	-	-	+	+/-	+/-		-							
Mast Cells	+	-	-	-							+	+				
Classical Dendritic Cells	+	-	-	-		-							+	-	+	
Plasmacytoid Dendritic Cells	+	-	-	-		-							+	+	low/-	
B cells	+	-	+	-												
T cells	+	-	-	+												
NK T cells	+	-	-	+				+								
NK cells	+	-	-	-	-		+/-	+/-								

*All cells gated on Live single cells + = Positive - = Negative ■ = Not Analyzed



View gating
strategy



Flow Cytometry Panels: Murine Immune Base Panel

Population	mCD45	mB220	mCD3	mCD4	mCD8	mCD11b	mLy6C	mLy6G	MHC-II	mF4/80	mCD11c	mNK1.1
Murine cells	+											
B cells	+	+									-	
T cells	+	-	+								-	-
CD4+ T cells	+	-	+	+	-						-	-
CD8+ T cells	+	-	+	-	+						-	-
Monocytes	+					+	+	-	+	+		
Neutrophils	+					+	-	+	-	-		
Dendritic Cells	+	-				+					+	
NK cells	+		-									+
NKT cells	+	-	+								-	+

*All cells gated on Live single cells

+ = Positive

- = Negative

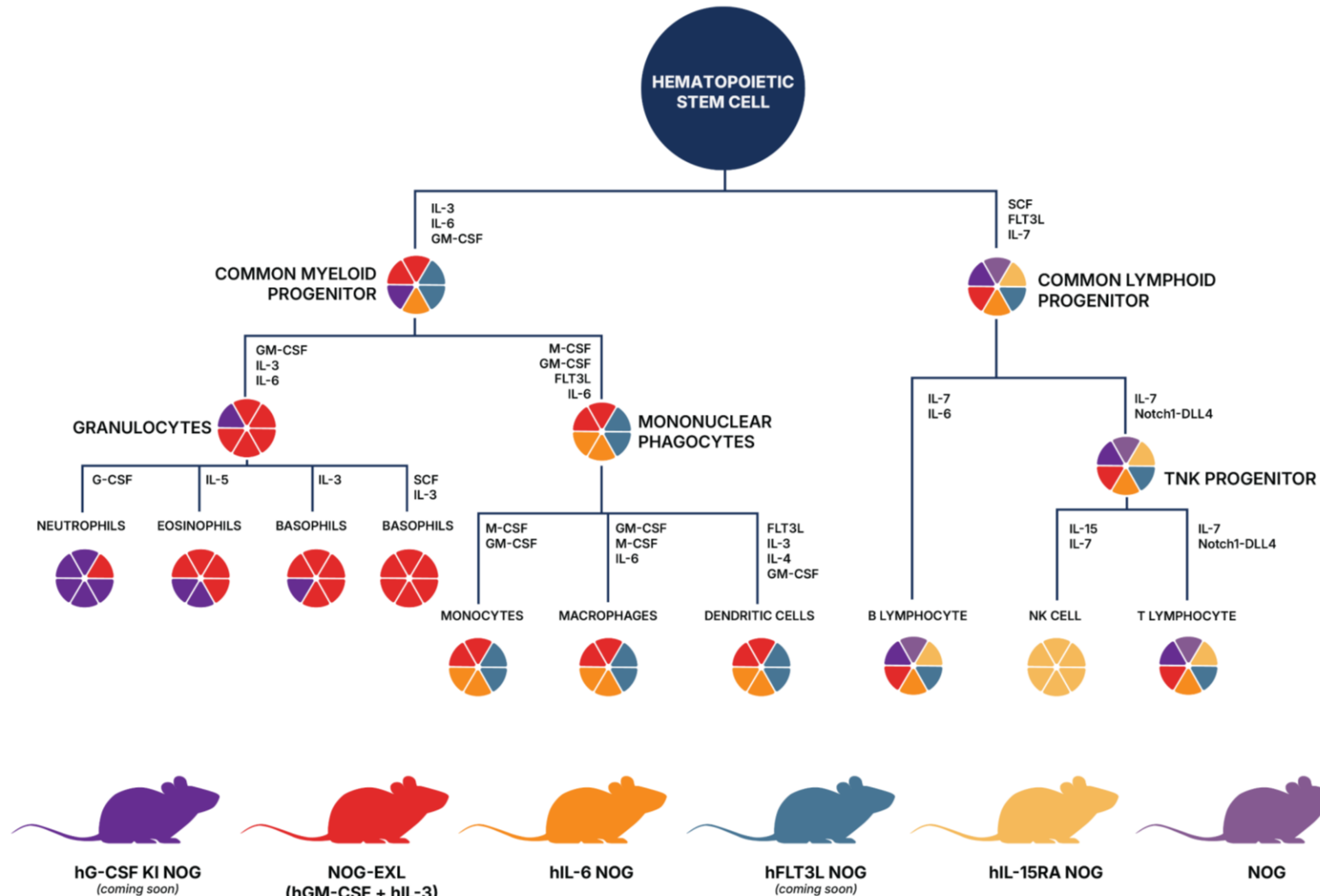
■ = Not Analyzed

NOG Portfolio

Section Contents: NOG Portfolio

- [Transgenic NOG Strains Supporting Human Immune Cell Linea...](#)
- [NOG](#)
- [NOG-EXL](#)
- [hIL-15 NOG](#)
- [hIL-2 NOG](#)
- [NOG Models Coming Soon](#)

Transgenic NOG Strains Supporting Human Immune Cell Lineage Engraftment

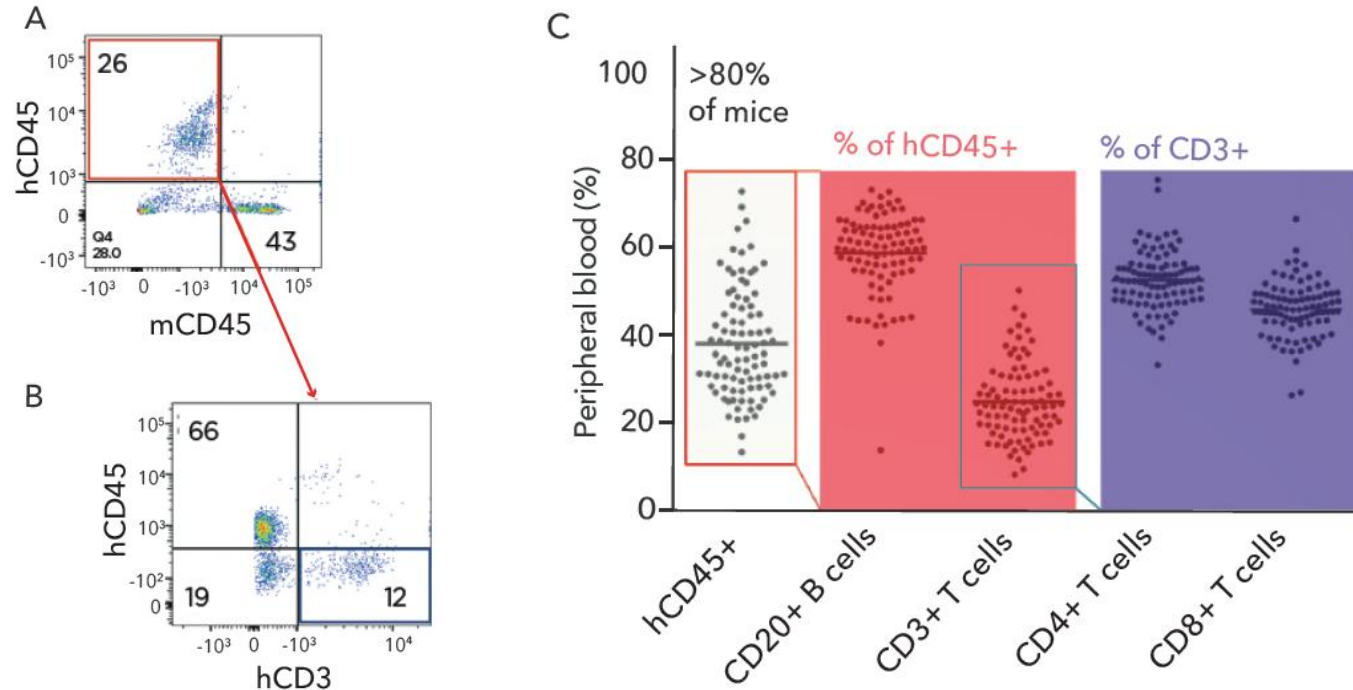


NOG

CD34⁺ Hematopoietic Stem Cell Engraftment in NOG Mice



HSC-engrafted
huNOG mice
available



Peripheral blood immunophenotyping of huNOG mice

A. Representative flow cytometry plot of the human (hCD45+) cell to mouse cell (mCD45+) ratio at 12 weeks post engraftment.

B. Relative percentage of human cells expressing the B cell marker CD20 vs the T cell marker CD3.

C. Consistent engraftment ratios of greater than 25% hCD45+ cells in over 80 percent of animals (n=91), with highly reproducible relative T cell and B cell enrichment levels. Each dot represents an individual mouse analyzed by flow cytometry 12 weeks post CD34⁺ HSC engraftment.

[Source material link.](#)

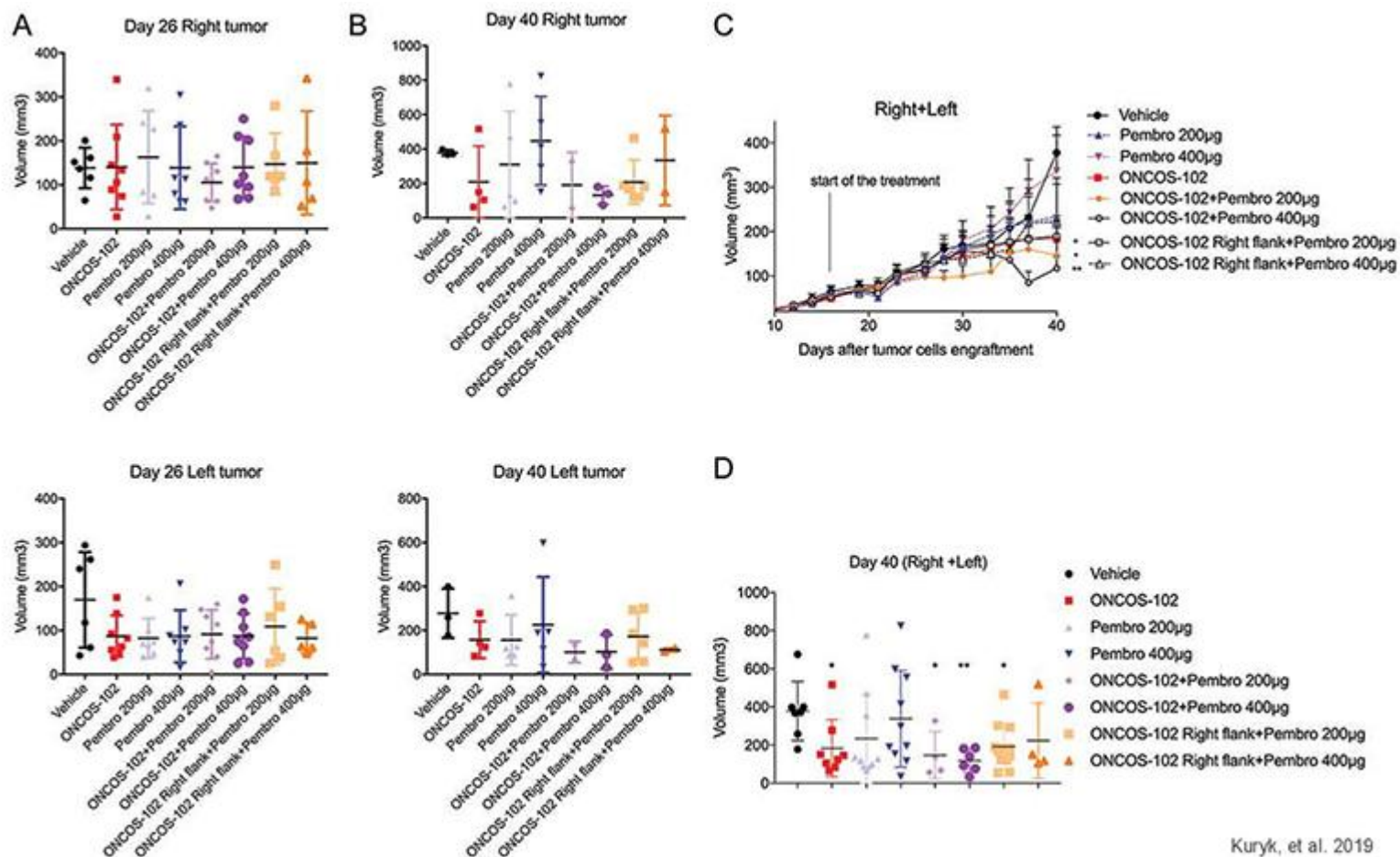


View paper



Oncology & Immunotherapy Research with huNOG Mice

Combinatory treatment of oncolytic adenovirus with anti PD-1 shows synergistic anti-tumor effect in huNOG tumor model



Effect of ONCOS-102 and pembrolizumab on tumor volume of A2058 engrafted huNOG mice.

- (a) Tumor volume on day 26 for right and left tumor.
- (b) Tumor volume on day 40 for right and left tumor.
- (c) Tumor volume throughout the treatment (pooled for right and left tumors).
- (d) Tumor volume on day 40 (pooled for right and left tumors).

Adapted from [Kuryk, et al. 2019](#) under Creative Commons Attribution License CC-BY-NC-ND.

Kuryk, et al. 2019

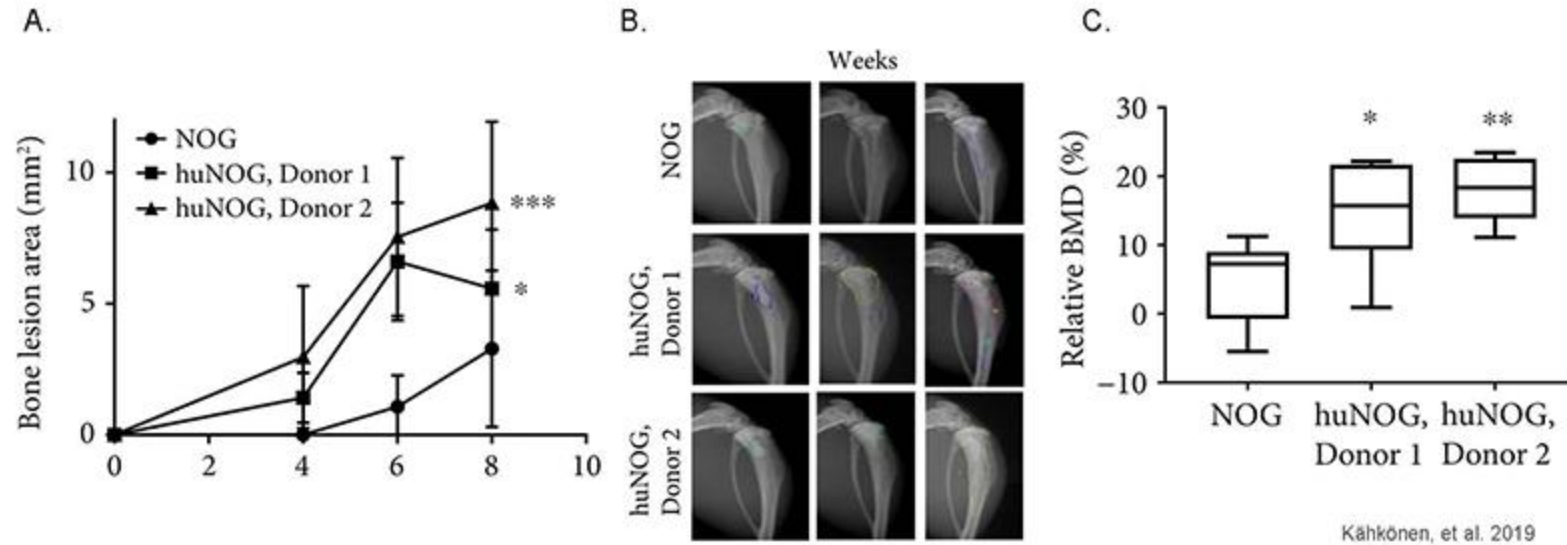


[View paper](#)



Human immune system increases breast cancer-induced osteoblastic bone growth in huNOG mice

Tumor-induced bone changes in NOG and huNOG mice



(a) Quantification of the bone lesion area from X-ray imaging (b) at 4, 6, and 8 weeks after cancer cell inoculation. (c) BMD in the tumor-bearing tibia relative to BMD in the healthy tibia.

Adapted from [Kähkönen, et al. 2019](#) under Creative Commons Attribution License CC-BY.

NOG-EXL



View NOG-EXL
model webpage



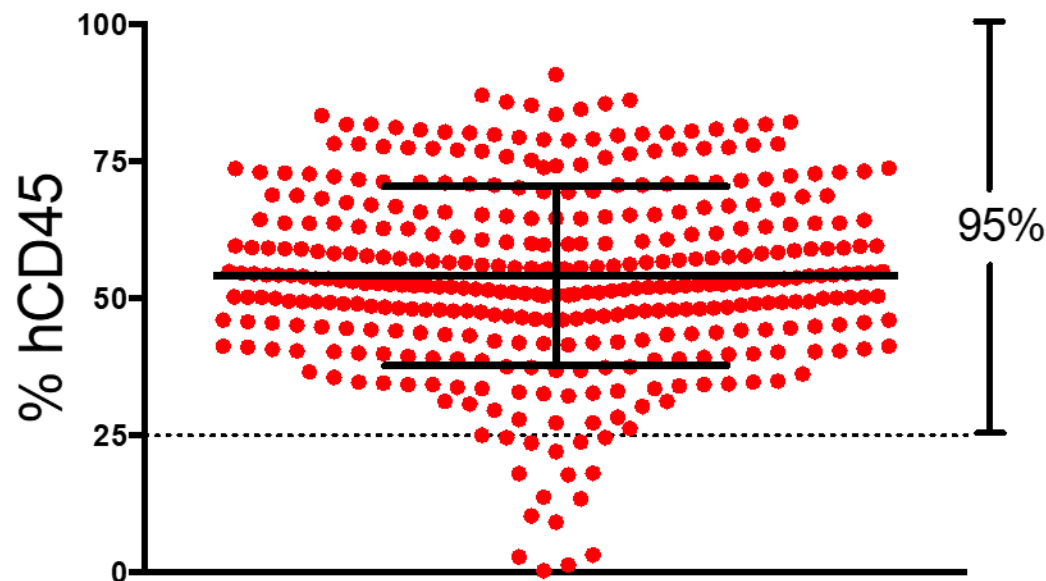
High Engraftment Efficiency in huNOG-EXL



HSC-engrafted
huNOG-EXL mice
available
(standard access)



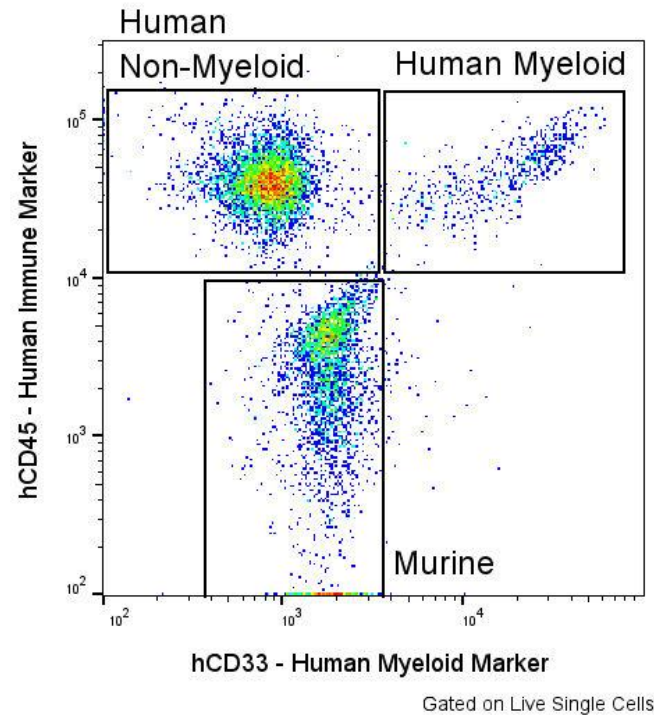
HSC-engrafted
huNOG mice
available
(early access)



Data from multiple combined lots/donors. N=371, mean = 54%, SD = 16%, Average n/lot size=43. Internal data.

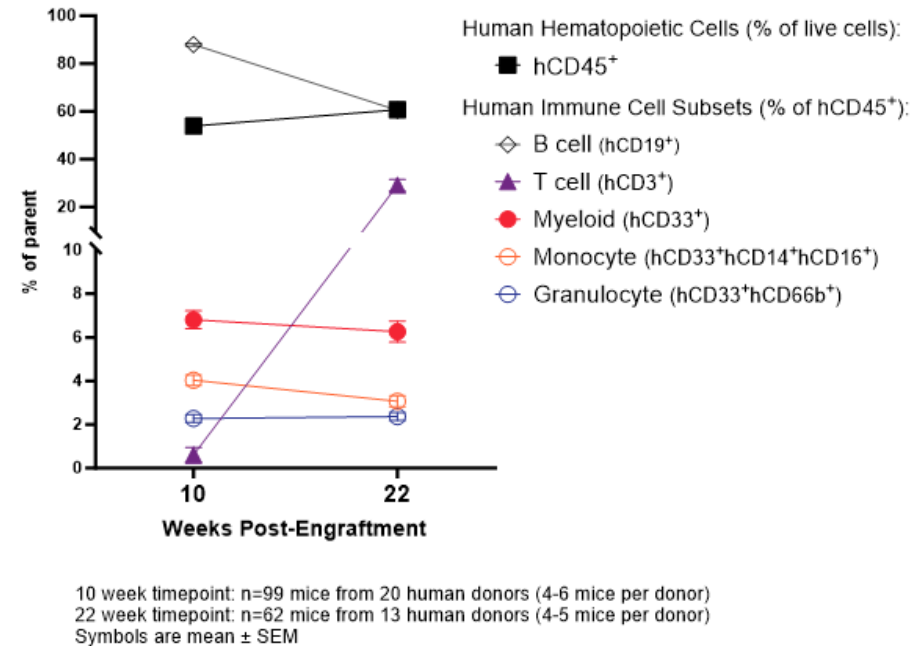
Myeloid Cell Reconstitution in huNOG-EXL

huNOG-EXL Mice Have Human Myeloid Cells



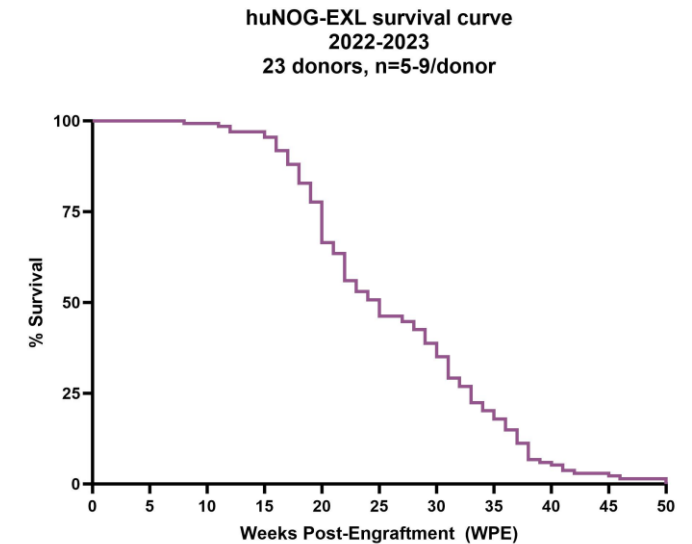
Flow cytometry of peripheral blood from a representative huNOG-EXL mouse at 10 weeks-post engraftment demonstrates the presence of human myeloid cells (hCD45⁺hCD33⁺).

Human Immune Cell Reconstitution in huNOG-EXL



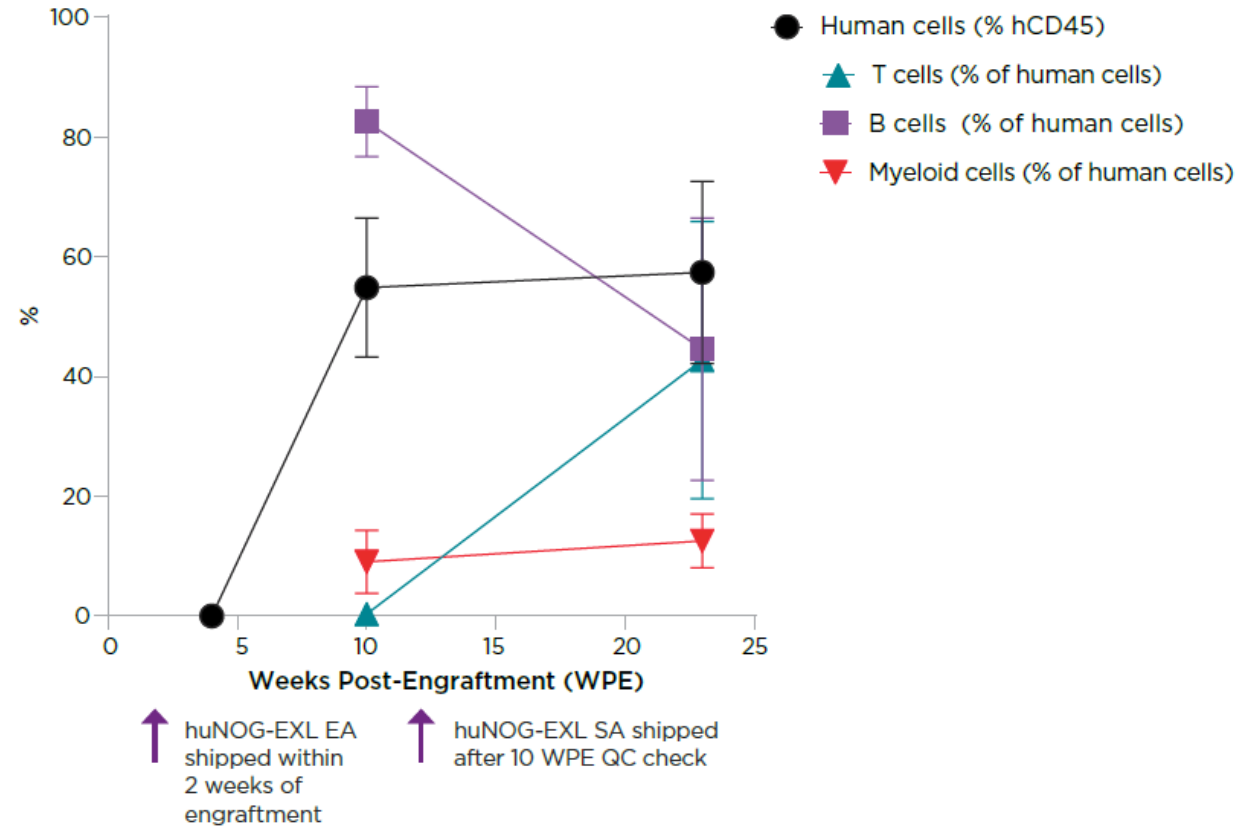
Kinetics of human immune cell reconstitution in huNOG-EXL (peripheral blood). huNOG-EXL mice support high levels of human immune cells in peripheral blood (chimerism) and develop both myeloid and lymphoid cells. huNOG-EXL EA mice are shipped shortly after engraftment, prior to reconstitution of significant numbers of human immune cells in peripheral blood. huNOG-EXL SA mice are shipped after a QC step to confirm that each mouse has ≥25% human cells in peripheral blood at 10 weeks post-engraftment.

huNOG-EXL Survival



Survival curve for huNOG-EXL mice across 23 donors (n=5-9 per donor), generated in the Taconic Biosciences humanization core during 2022-2023. All myeloid-supportive HIS mice have limited lifespans due to a range of outcomes including anemia, thrombocytopenia and myeloid cell hyperactivation syndrome. huNOG-EXL has the longest demonstrated lifespan compared to competing models; this varies by donor and can be impacted by environmental and experimental factors. Internal Taconic data.

Early vs. Standard Access huNOG-EXL

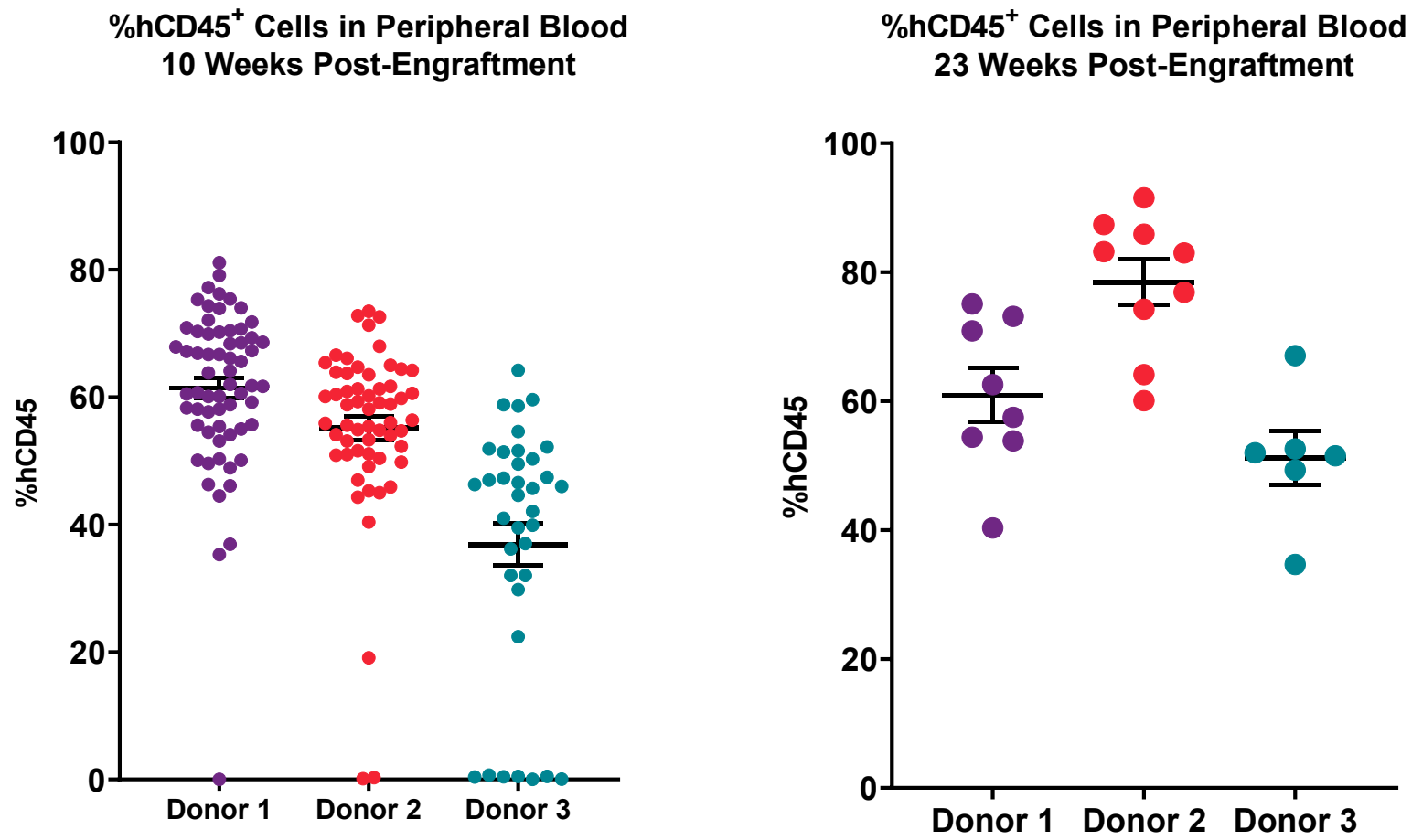



HSC-engrafted
huNOG-EXL mice
available
(standard access)


HSC-engrafted
huNOG mice
available
(early access)

huNOG-EXL: Characterization - Taconic Internal Study

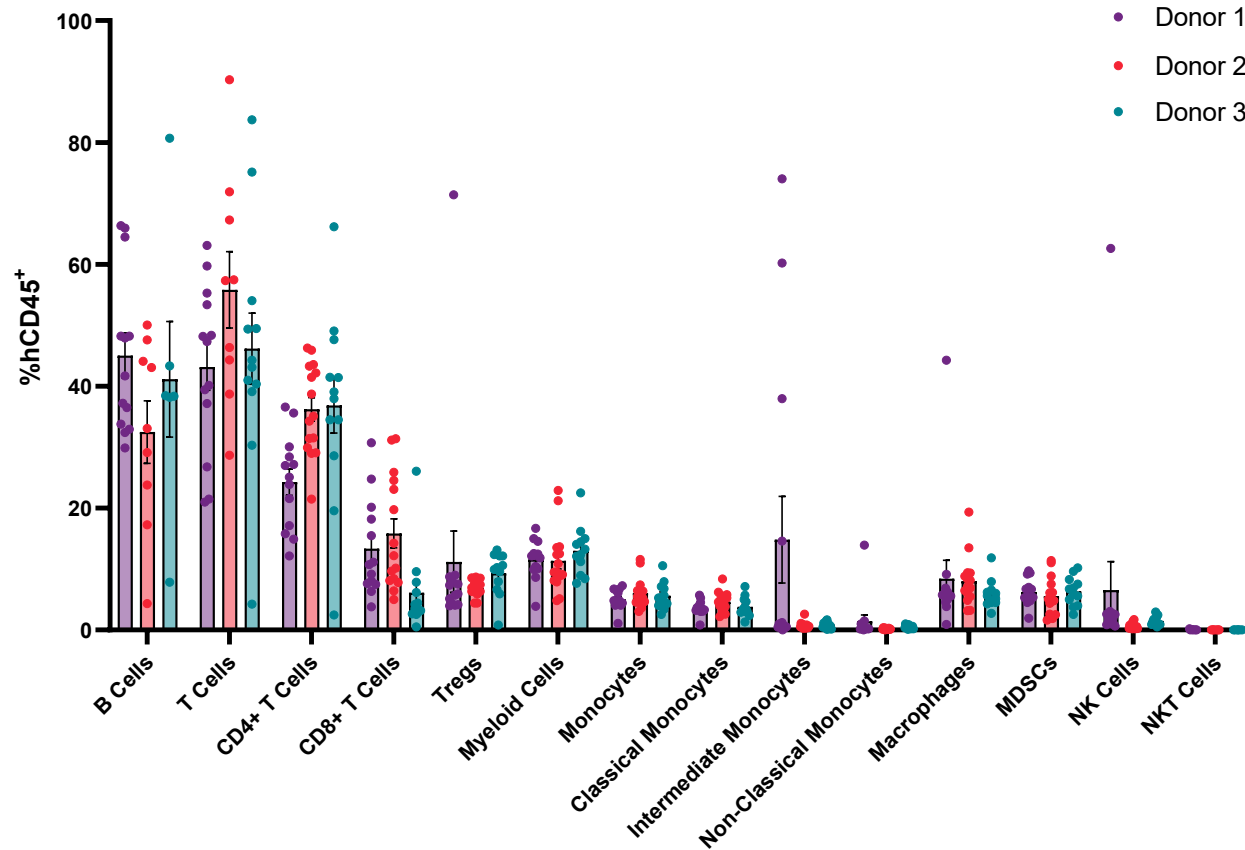
Engraftment (peripheral blood)



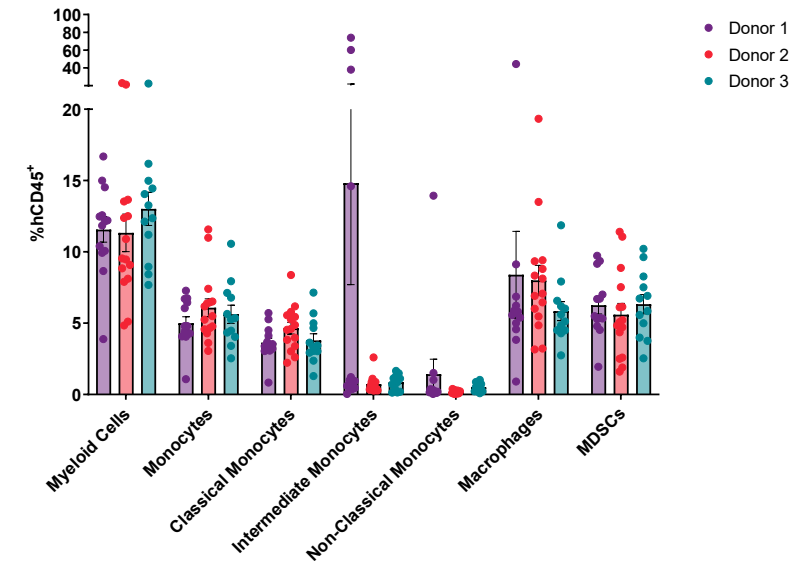
huNOG-EXL: Characterization - Taconic Internal Study

Immune cell profile (peripheral blood) at 23 WPE

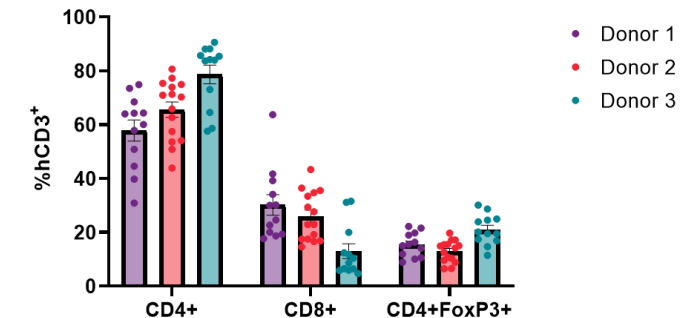
%hCD45⁺ Cells in Peripheral Blood 23 Weeks Post-Engraftment



Myeloid Cells Only

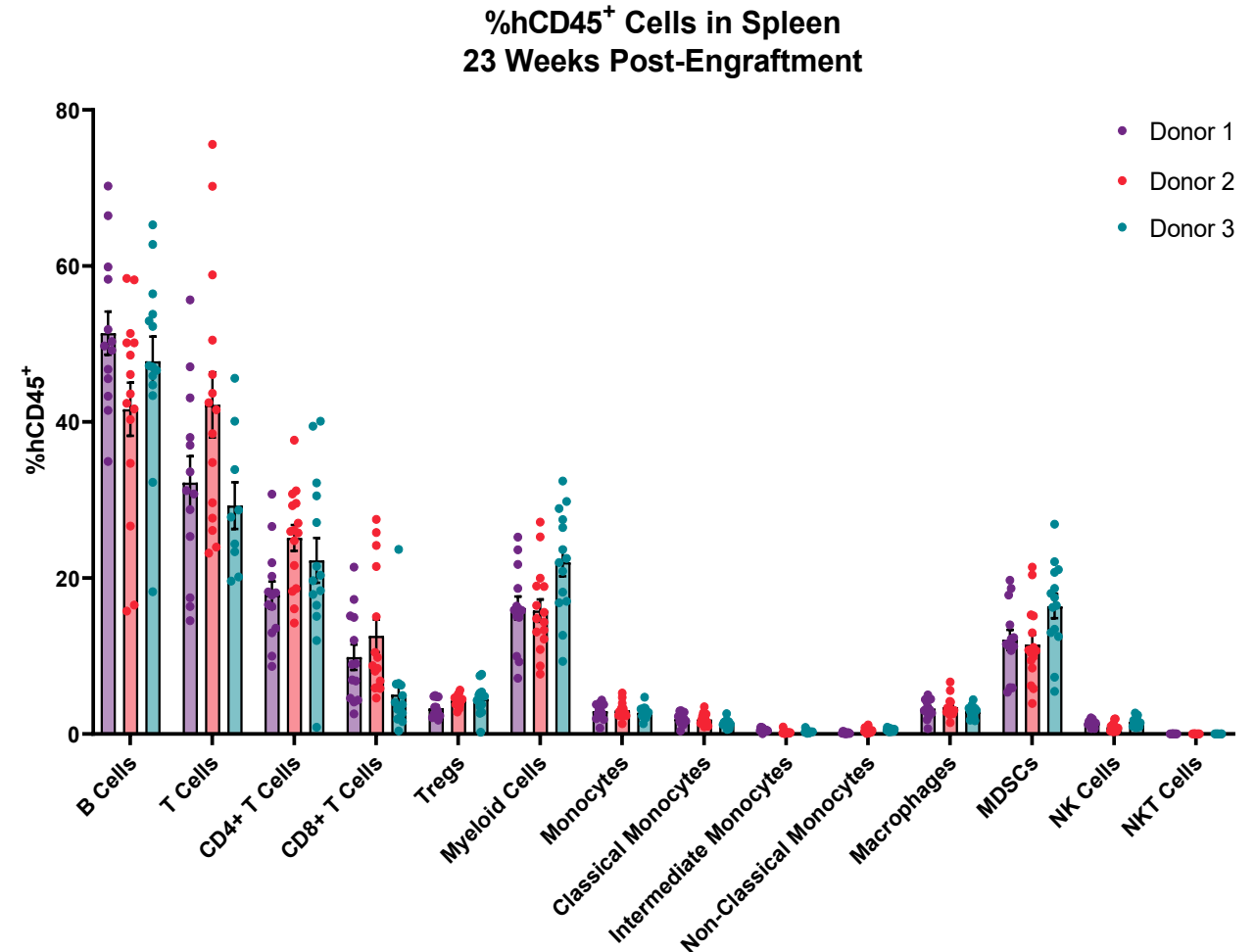
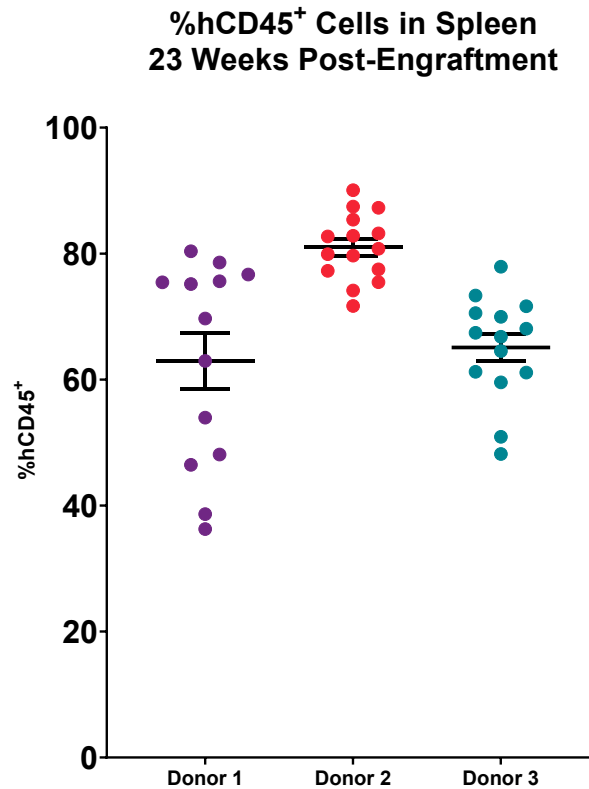


T cells only



huNOG-EXL: Characterization - Taconic Internal Study

Immune cell profile (spleen) at 23 WPE

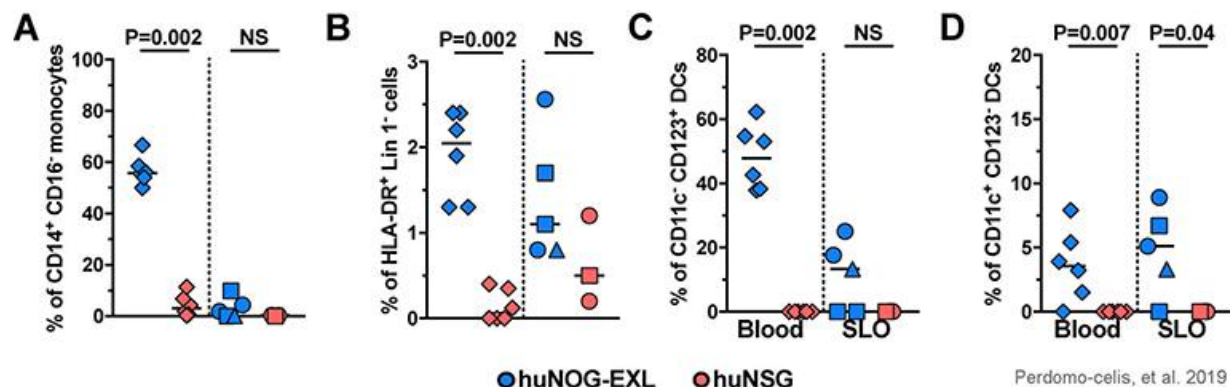




View paper

Immune Characteristics of HSC-Engrafted NOG-EXL vs. NSG Mice

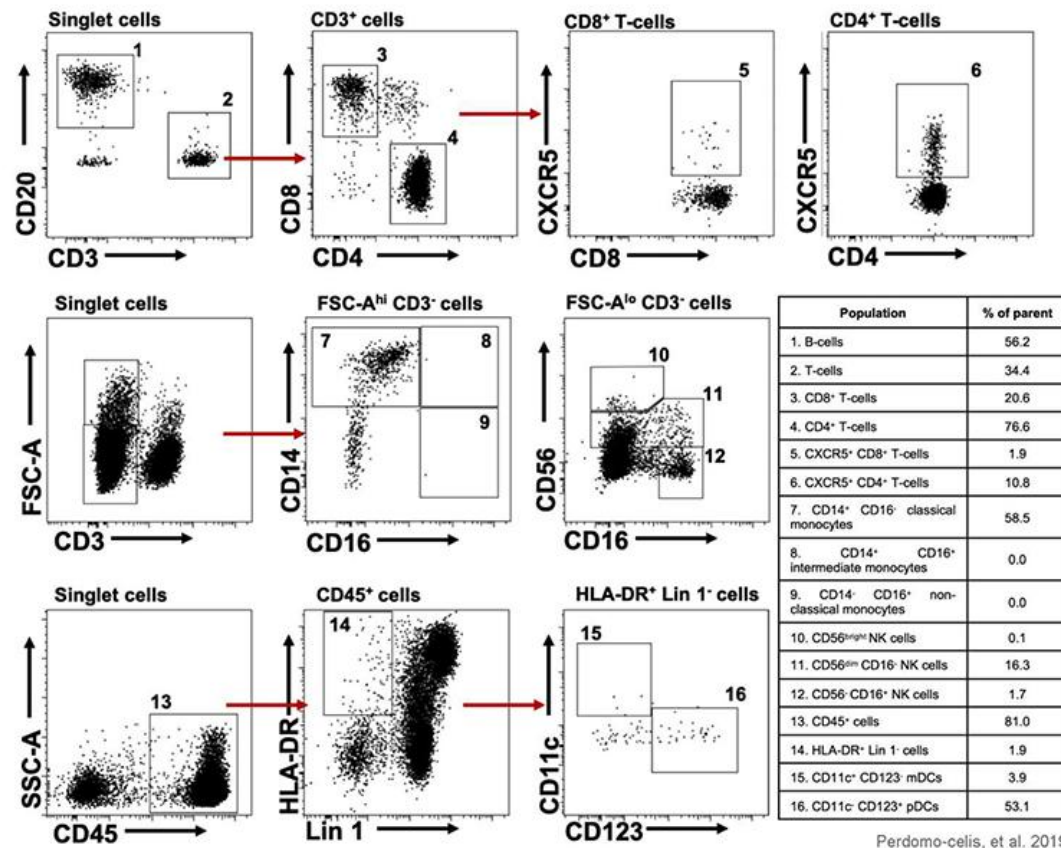
Engraftment of myeloid populations in NOG-EXL vs NSG mice



Frequencies of CD14⁺ CD16⁻ (classical) monocytes from FSC-A^{hi} CD3⁻ cells (a), HLA-DR⁺ Lin 1⁻ cells from CD45⁺ cells (b), CD11c⁺ CD123⁺ plasmacytoid dendritic cells (c), and CD11c⁺ CD123⁻ myeloid dendritic cells (d), the latter from HLA-DR⁺ Lin 1⁻ cells, in blood (diamonds) and secondary lymphoid organs (SLO; spleen: circles; axillary lymph node: squares; mesenteric lymph node: triangles) from HSC-engrafted NOG-EXL and NSG mice. NS: Not statistically significant.

Adapted from [Perdomo-celis, et al. 2019](#). Licensed under Creative Commons CC-BY.

Human immune cell subsets in HSC-engrafted NOG-EXL mice

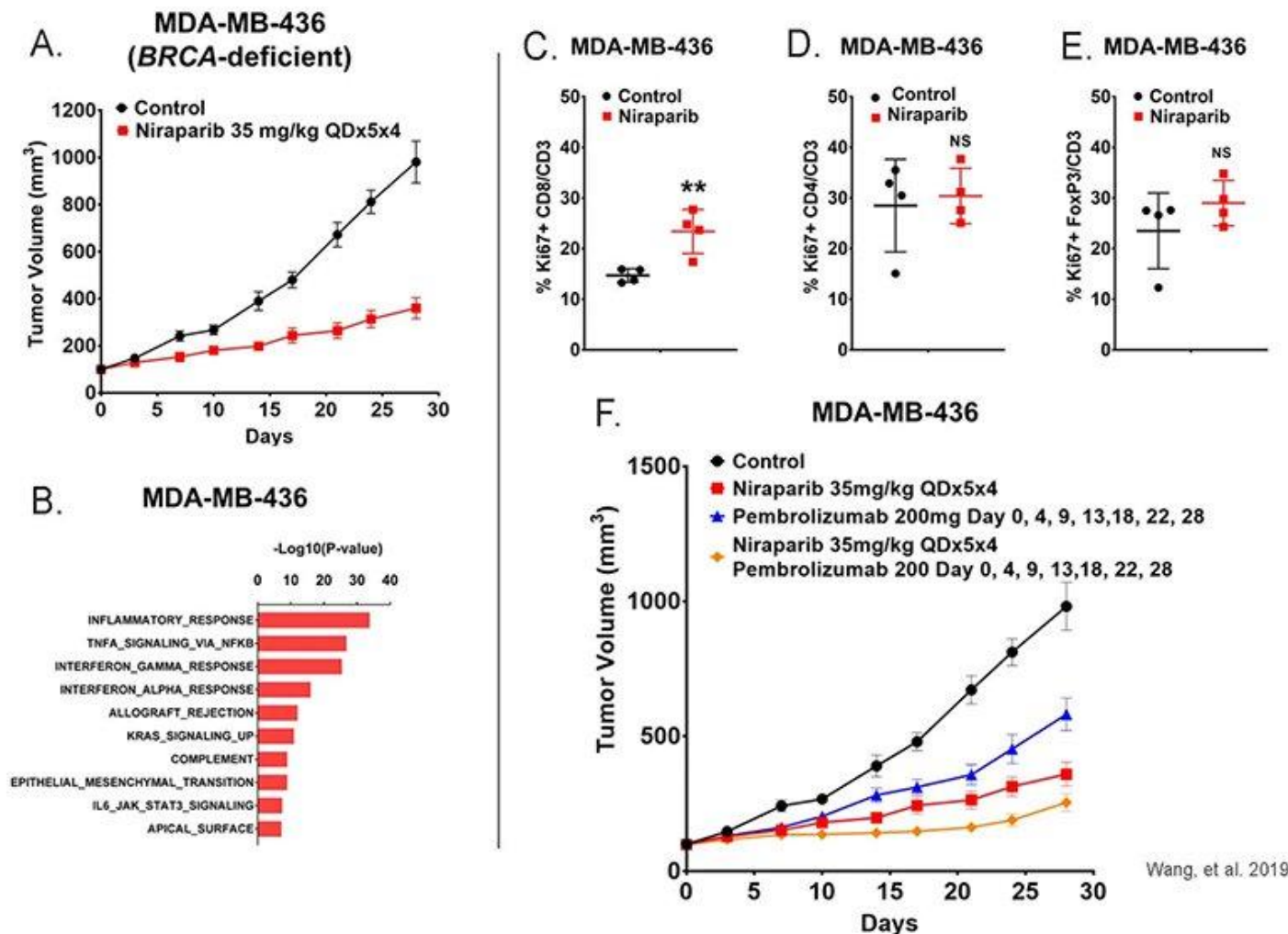


Representative gating strategy from blood cells for the identification of the cell populations evaluated. The number next to the gates represents the respective cell subset found in the adjacent table.

Adapted from [Perdomo-celis, et al. 2019](#). Licensed under Creative Commons CC-BY.



Tumor Xenograft Models and Immunotherapy Research with huNOG-EXL



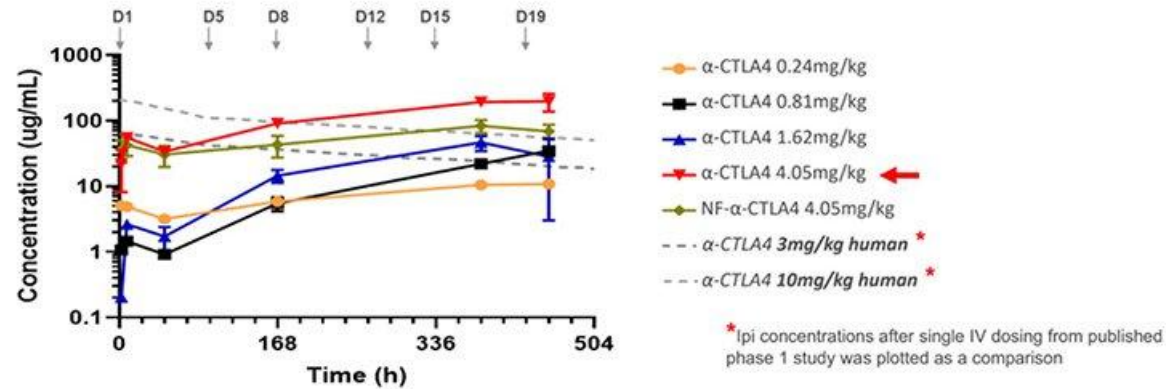
Durable anti-tumor response to combination therapy in huNOG-EXL BRCA-deficient tumor model

- (a) Tumor growth curve for the MDA-MB-436 NOG-EXL humanized model treated with control or 35 mg/kg niraparib daily for 5 days on and 2 days off for 4 weeks (QD × 5 × 4).
- (b) Significantly upregulated genes identified with a two-sample t test ($p \leq 0.05$, fold change ≥ 1.5) were subjected to enrichment analysis of pathway gene sets and demonstrated a significant enrichment of interferon gamma signature and interferon alpha signature genes in niraparib-treated samples.
- (c-e) Niraparib promoted tumor immune cell infiltration in BRCA-deficient MDA-MB-436 huNOG-EXL humanized tumor model. (f) Tumor growth in the BRCA-deficient MDA-MB-436 model in huNOG-EXL mice treated with 200 mg anti-PD-1 (pembrolizumab) on days 0, 4, 9, 13, 18, 22, and 28; 35 mg/kg niraparib daily for 5 days on and 2 days off for 4 weeks; and the combination of these agents.

Adapted from [Wang, et al. 2019](#) under Creative Commons Attribution CC-BY.

Immunophenotyping and anti-CTLA4 human immune response in huNOG-EXL mice

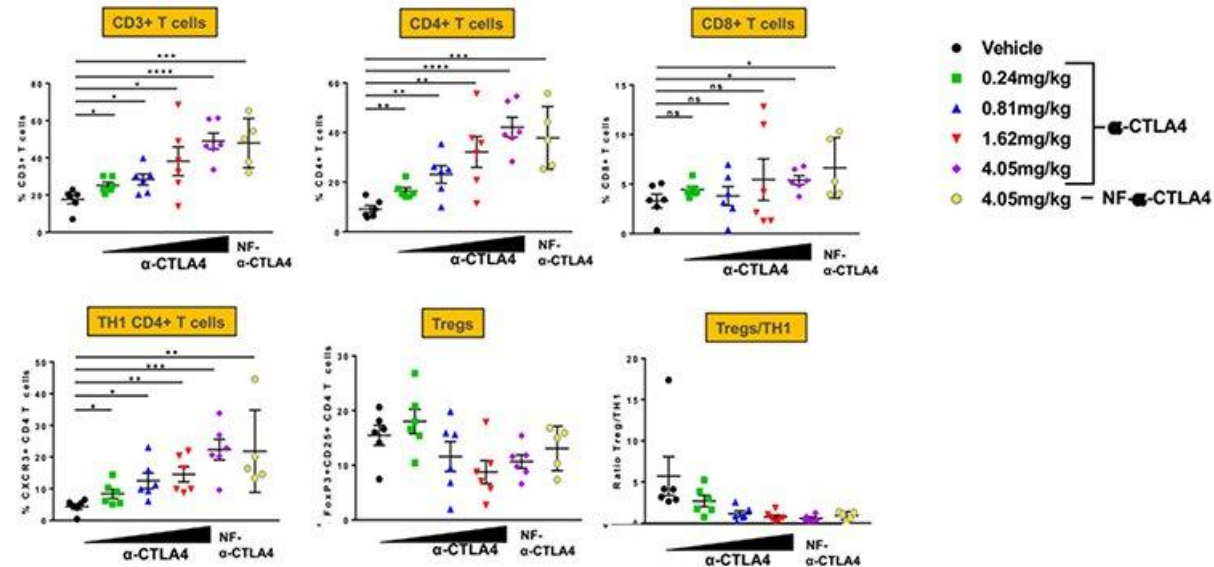
A



(a) Anti-CTLA4 antibody pharmacokinetics in huNOG-EXL mice.

(b) Splenic immunophenotyping of huNOG-EXL mice treated with anti-CTLA4 antibodies. NF: nonfucosylated.

B

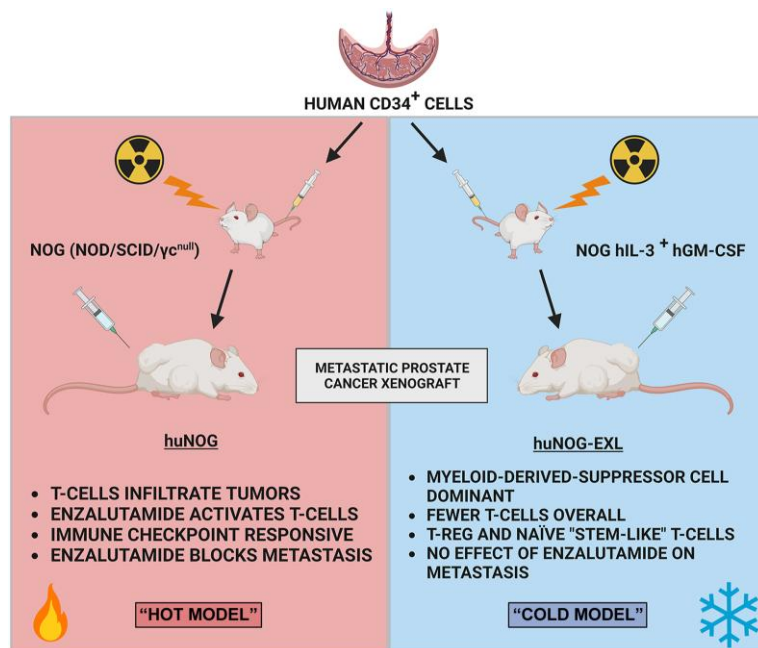


Data provided by Dr. Kathryn Fraser, Takeda.



View paper

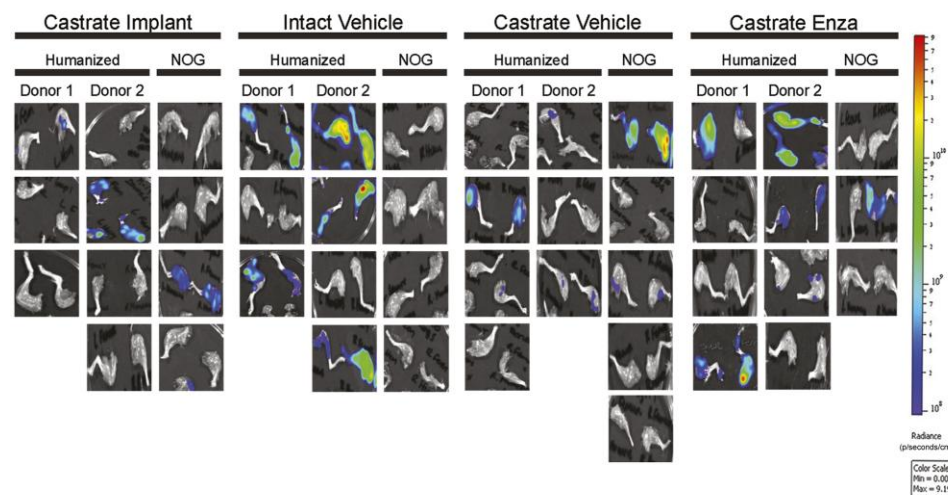
Modelling Clinically Relevant Metastatic Prostate Cancer in Humanized Mouse Models to Facilitate Therapeutic Evaluation



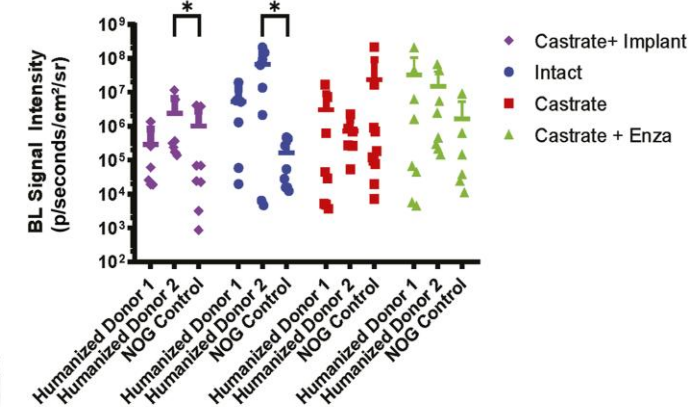
Metastasis by 22Rv1 to clinically relevant organs in huNOG-EXL mice

A

Femur huNOG-EXL



B



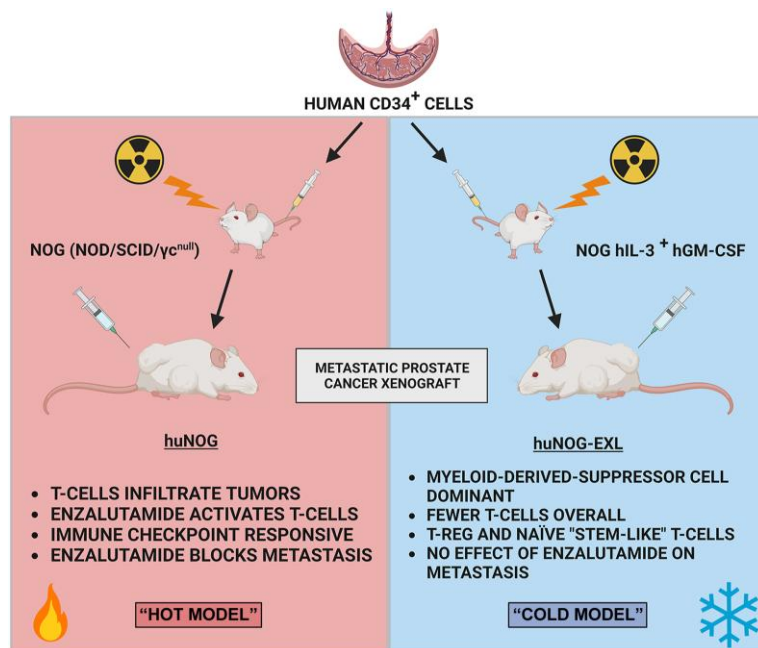
Continued →

From Kostlan et al. Mol Cancer Res. 2024 Sep 4;22(9):826-839. doi: 10.1158/1541-7786.MCR-23-0904. Licensed under CC-BY

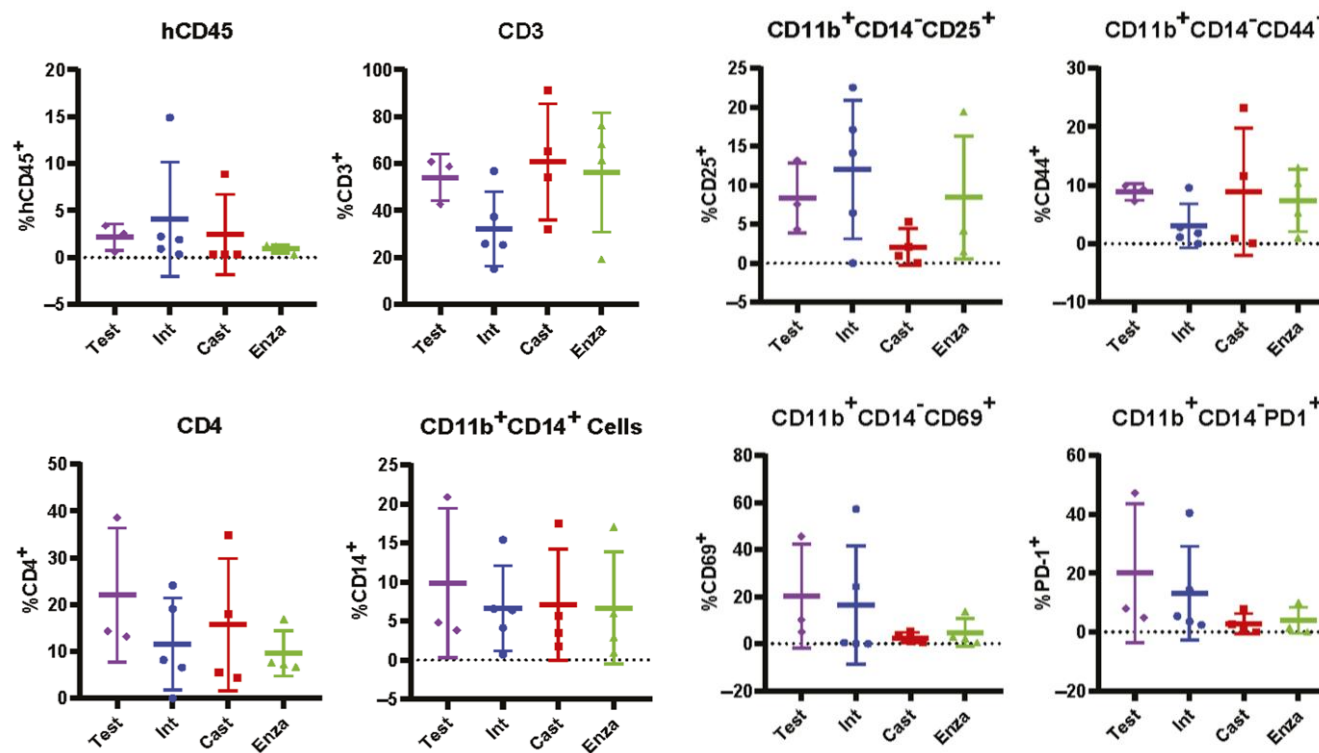


View paper

Modelling Clinically Relevant Metastatic Prostate Cancer in Humanized Mouse Models to Facilitate Therapeutic Evaluation



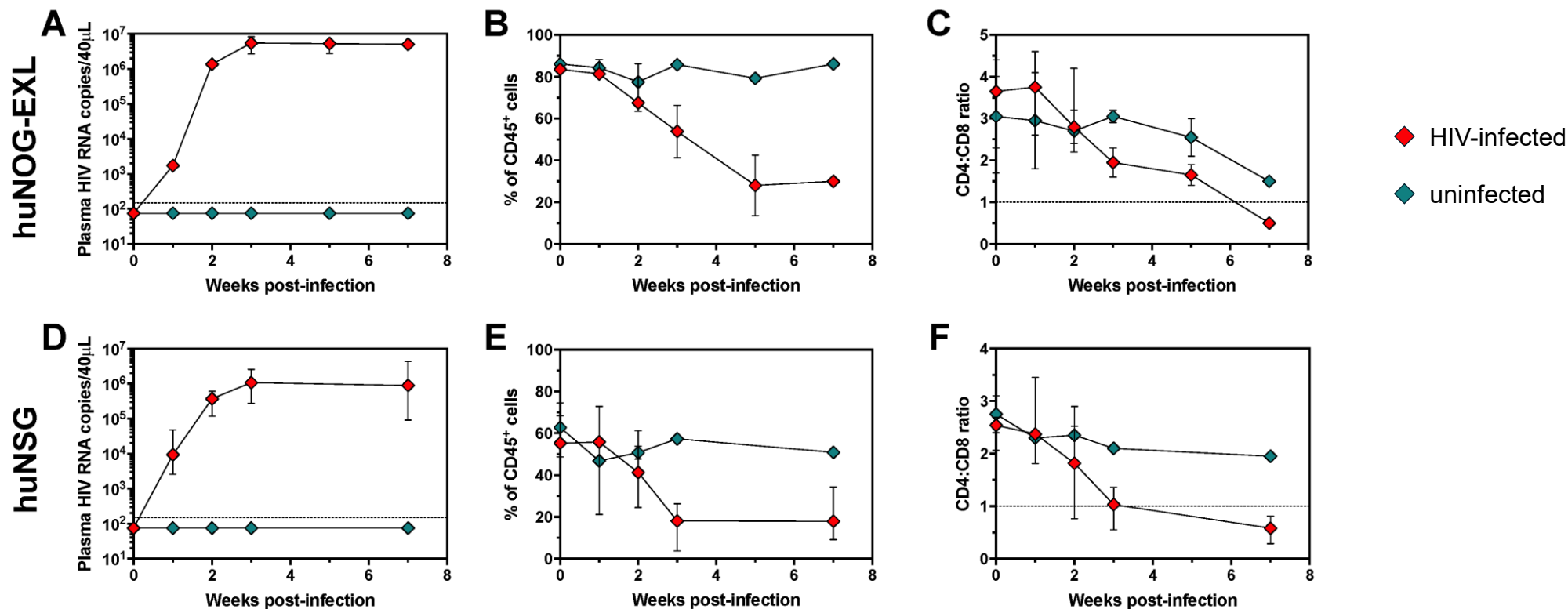
Myeloid-support exhibits immuno-dampened profile in huNOG-EXL 22Rv1 xenograft tumors.



From Kostlan et al. Mol Cancer Res. 2024 Sep 4;22(9):826-839. doi: 10.1158/1541-7786.MCR-23-0904. Licensed under CC-BY



Infectious Disease Research with huNOG-EXL



huNOG-EXL mice support the replication of HIV, with the consequent decrease in the level of engraftment and inversion of the CD4:CD8 ratio. Viral load (A,D), blood frequencies of CD45⁺ cells (B,E), and blood CD4:CD8 ratio (C,F) in huNOG-EXL (A–C) and huNSG (D–F) mice after infection with HIV (green diamonds: uninfected mice; red diamonds: HIV-infected mice). In A and D, the dashed lines indicate the limit of detection of the assay. In C and F, the dashed lines indicate the CD4:CD8 ratio = 1.

Adapted from [Perdomo-celis, et al. 2019](#). Licensed under Creative Commons CC-BY.

hIL-6 NOG

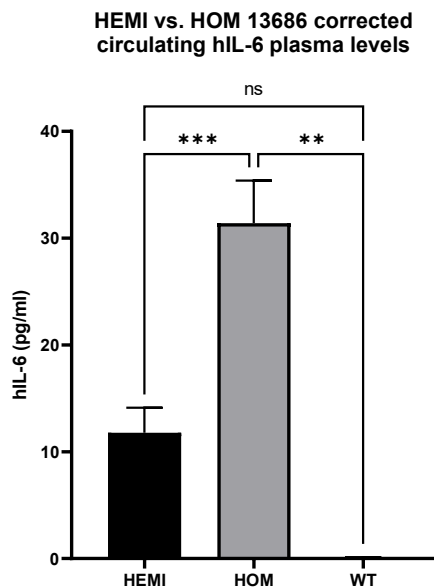


[View paper](#) [View hIL-6 NOG Model Page](#)



HSC Engraftment in hIL-6 NOG Mice

hIL-6 Levels in hIL-6 NOG Mice

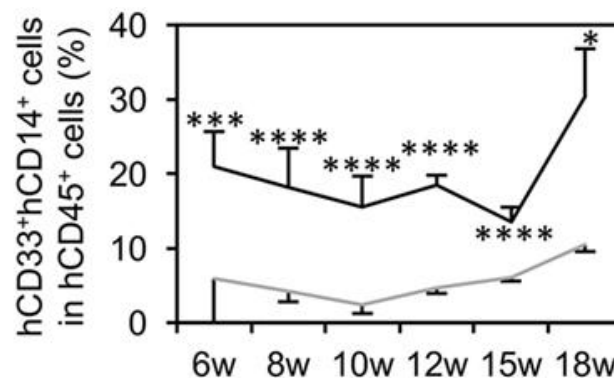


Baseline hIL-6 plasma levels in non-engrafted hemizygous (HEMI), homozygous (HOM) hIL-6 NOG mice and wildtype (WT) controls.

Taconic Internal Data

Enhanced Monocyte Engraftment in hIL-6 NOG Mice

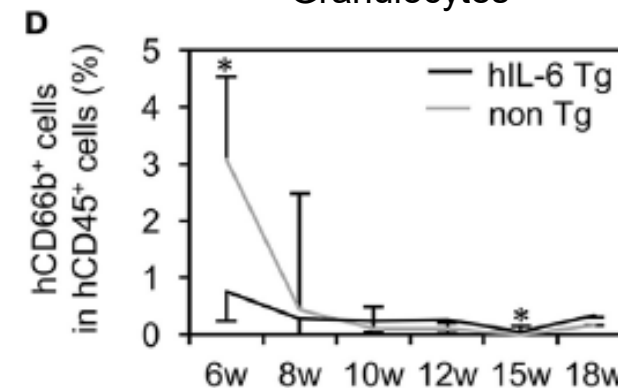
Monocytes/macrophages



Circulating monocytes (left) and granulocytes (right) in HSC-engrafted hIL-6 NOG (hIL-6 Tg) and wildtype NOG (non Tg) mice; shown in weeks (w) post-engraftment.

Adapted from [Hanazawa, et al. 2018](#) under Creative Commons Attribution CC-BY.

Granulocytes



HSC-engrafted
hIL-6 NOG Mice
Available

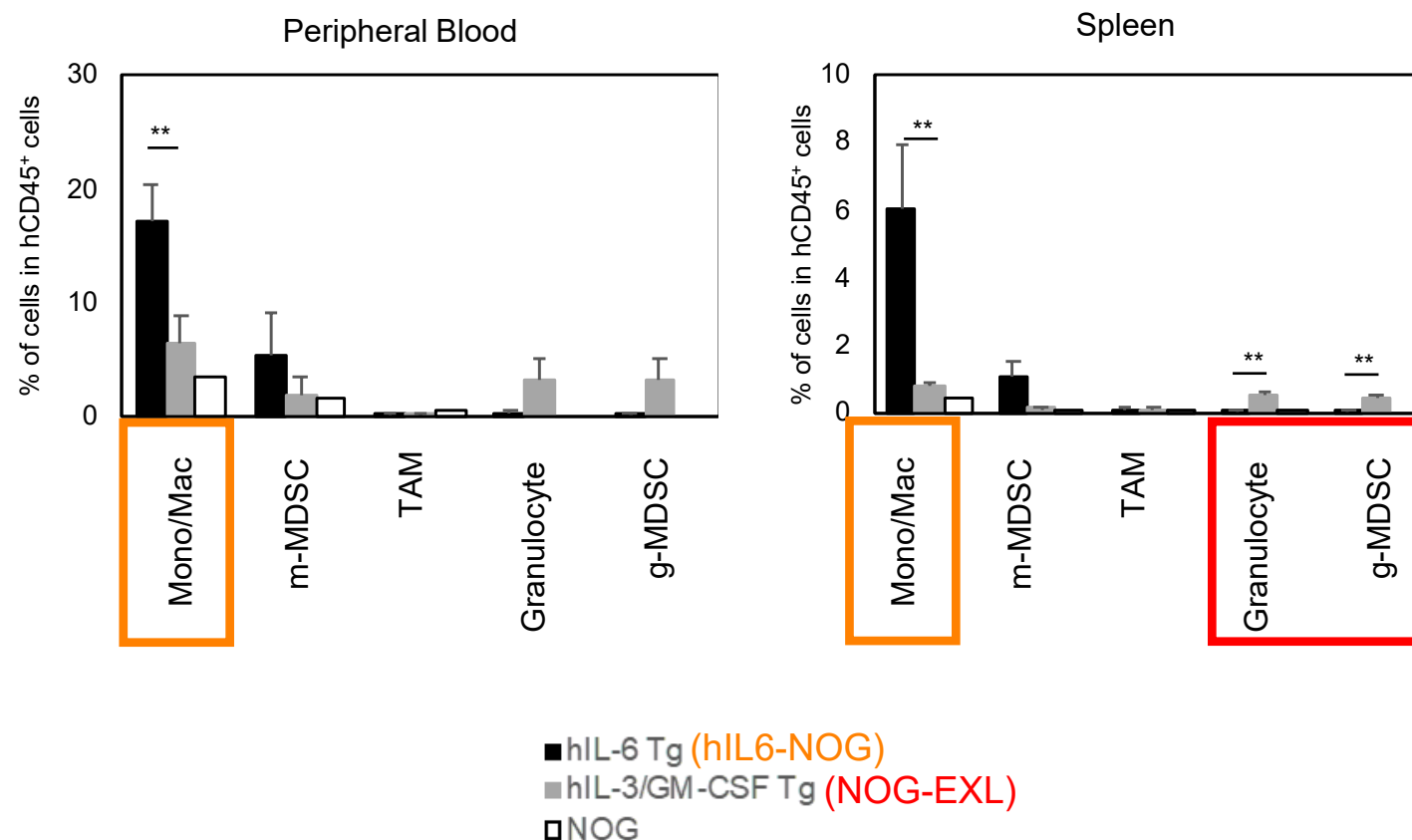


NeoThy Engrafted
hIL-6 NOG Mice
Available



HSC Engraftment in hIL-6 NOG vs NOG-EXL Mice

hIL-6 NOG Promotes Monocyte Skewing and NOG-EXL Promotes Granulocyte Skewing



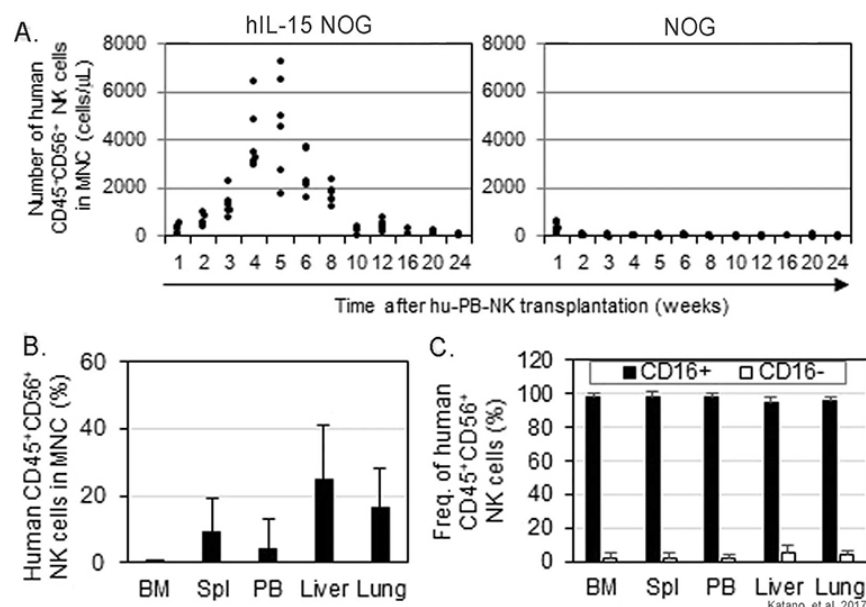
Adapted from [Hanazawa, et al. 2018](#) under Creative Commons Attribution CC-BY.

hIL-15 NOG



Human NK-Cells Engraft in hIL-15 NOG Mice

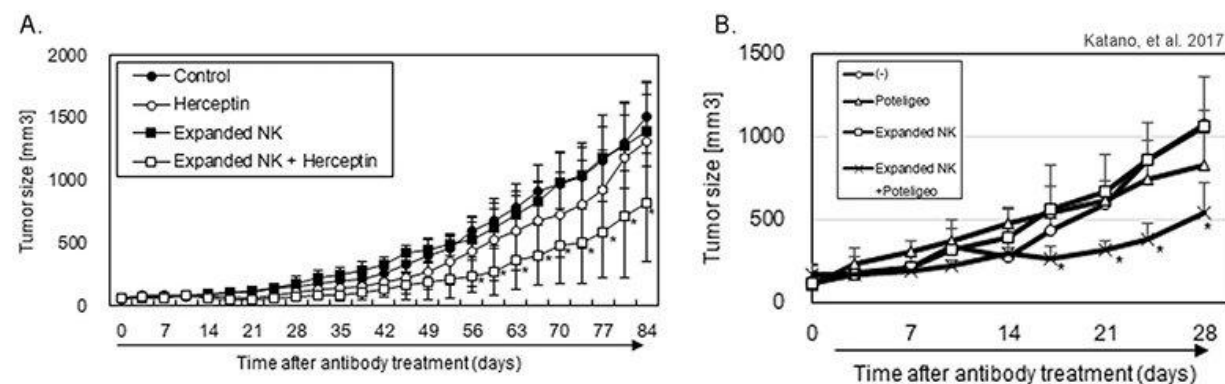
Distribution of long-term engrafting human NK cells in hIL-15 transgenic NOG mice



- (a) Expansion of transferred human NK cells in NOG mice expressing human IL-15. X-irradiated NOG and hIL-15 NOG mice received human NK cells from peripheral blood magnetic cell sorting. Blood was collected and analyzed by FACS every week for 24 weeks after transfer. The absolute numbers of human NK cells in mouse peripheral blood are shown. (n = 6 for NOG and hIL-15 NOG mice).
- (b) Means $\pm$ SD of the human NK-cell frequencies in each tissue are shown (n = 6). (c) Frequencies of CD56dimCD16⁺ and CD56hiCD16⁻ subpopulations in total CD56⁺ NK cells are shown (n = 6 for bone marrow (BM), spleen, and PB; n = 3 for liver and lung).

Adapted from [Katano, et al. 2017](#) under Creative Commons Attribution License.

In vivo antibody-dependent cell-mediated cytotoxicity (ADCC) activity human NK-cell engrafted hIL-15 transgenic NOG



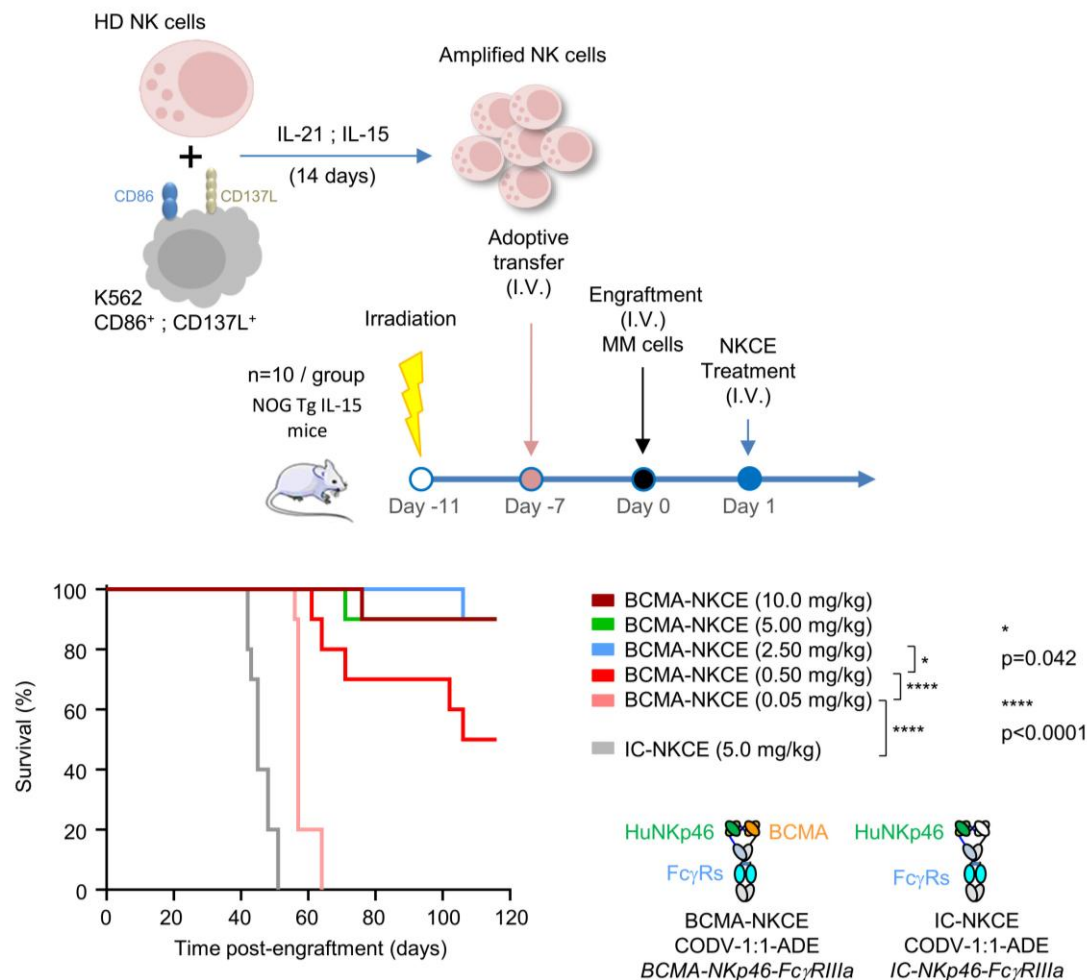
- (a) Tumor suppression by in vitro-expanded human peripheral blood NK cells and anti-Her2 treatment. Her2-positive NCI-N87 cells, a gastric-cancer cell line, were inoculated into X-irradiated hIL-15 NOG mice. Human peripheral blood NK cells, expanded in vitro, were transplanted with or without anti-Her2 antibody.
- (b) Tumor suppression by in vitro-expanded human NK cells and anti-CCR4 treatment. X-irradiated hIL-15 NOG mice were subsequently inoculated with L428 Hodgkin lymphoma cells. In vitro-expanded human peripheral blood NK cells were transplanted 1 week after tumor inoculation and administration of anti-CCR4 antibody or control antibody was started.

Adapted from [Katano, et al. 2017](#) under Creative Commons Attribution License.



Testing NK Cell Engagers in hIL-15 NOG Mice

C



SAR'514 outperforms mediates dose-dependent anti-MM activity *in vivo* in hIL-15 NOG mice

(Upper) Experimental setup. Human NK cells were purified and amplified *in vitro* for 14 days in the presence of K562 cells engineered to express CD86 and 4-1BB ligand, IL-15 (50 U/mL), and IL-21 (100 U/mL). Expanded NK cells were adoptively transferred into irradiated NOG-IL-15-Tg mice (n = 10 per group) 7 days before MM1.R HMCL engraftment (day 0). Mice were treated once on day 1 with BCMA-NKp46-FcγRIIIa NKCE at doses of 0.05, 0.5, 2.5, 5, and 10 mg/kg, or with the IC-NKp46-FcγRIIIa NKCE control molecule at 5 mg/kg.

(Lower) Kaplan-Meier survival curves of treated mice. Endpoint significance was calculated in a log rank (Mantle-Cox) test. n = 10/group. *p < 0.05, ****p < 0.0001.

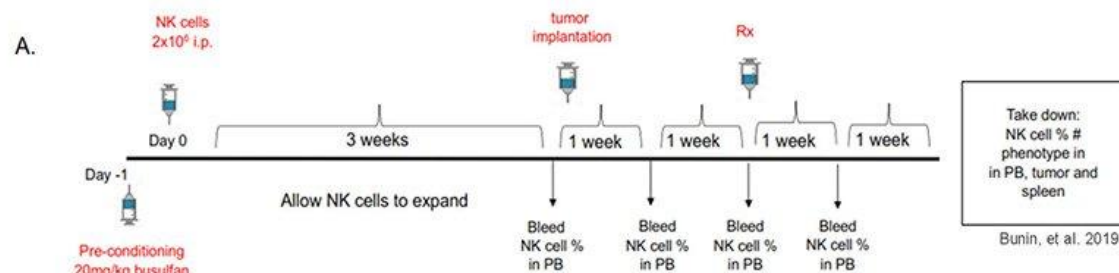
From: Tang et al., Targeting BCMA in multiple myeloma with a trifunctional NK cell engager. [Cell Rep Med. 2026 Mar 17;7\(3\):102628](https://doi.org/10.1016/j.xcrm.2026.102628). doi:10.1016/j.xcrm.2026.102628.

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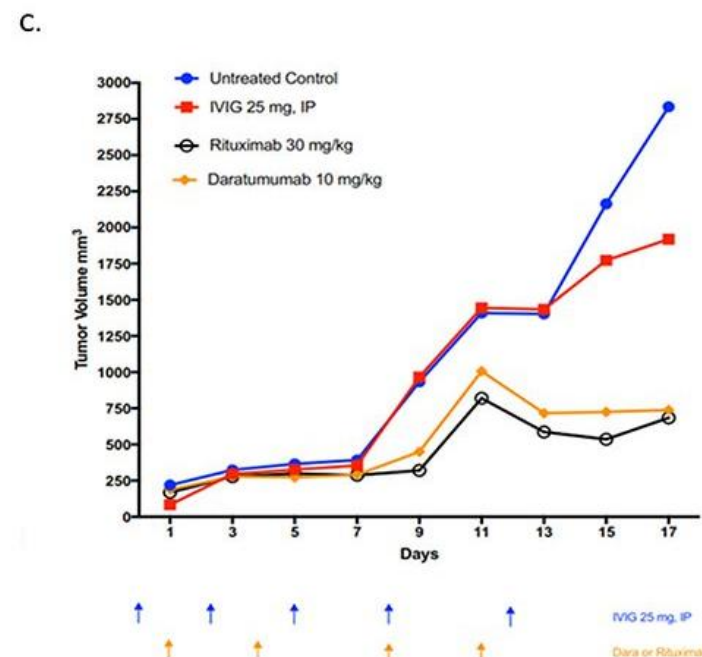
Human NK-cell engrafted hIL-15 NOG as a model for antibody-mediated NK cell depletion and ADCC

View hIL-15 NOG
Model Page

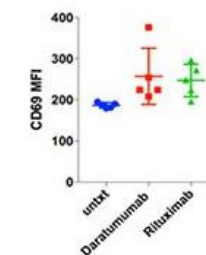


B.

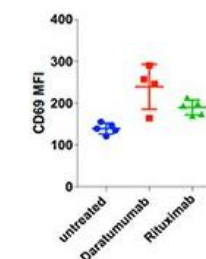
Group #	# of animals	Preconditioning & Engraftment	RAJI (Matrigel)	Treatment
1	10	2×10^6 NK i.p.	5×10^6 s.c.	--
2	10	2×10^6 NK i.p.	5×10^6 s.c.	human Ivig 3mg/kg, s.c.
3	10	2×10^6 NK i.p.	5×10^6 s.c.	Daratumumab 10 mg/kg, s.c.
4	10	2×10^6 NK i.p.	5×10^6 s.c.	Rituximab 30 mg/kg, s.c.



CD69 MFI on NK cells in the blood week 5 post engraftment



CD69 MFI on NK cells in tumor tissue



(a) Experimental timeline and (b) study groups. (c) Dynamics of absolute NK cell numbers per microliter of blood over the course of the study. (d) NK cell staining with viability dye Zombie Violet. (e) Raji tumor growth kinetics and CD69 activation marker on peripheral blood (f) and tumor infiltrating (g) human NK cells.

Adapted from [Bunin, et al. 2019](#).

hIL-2 NOG

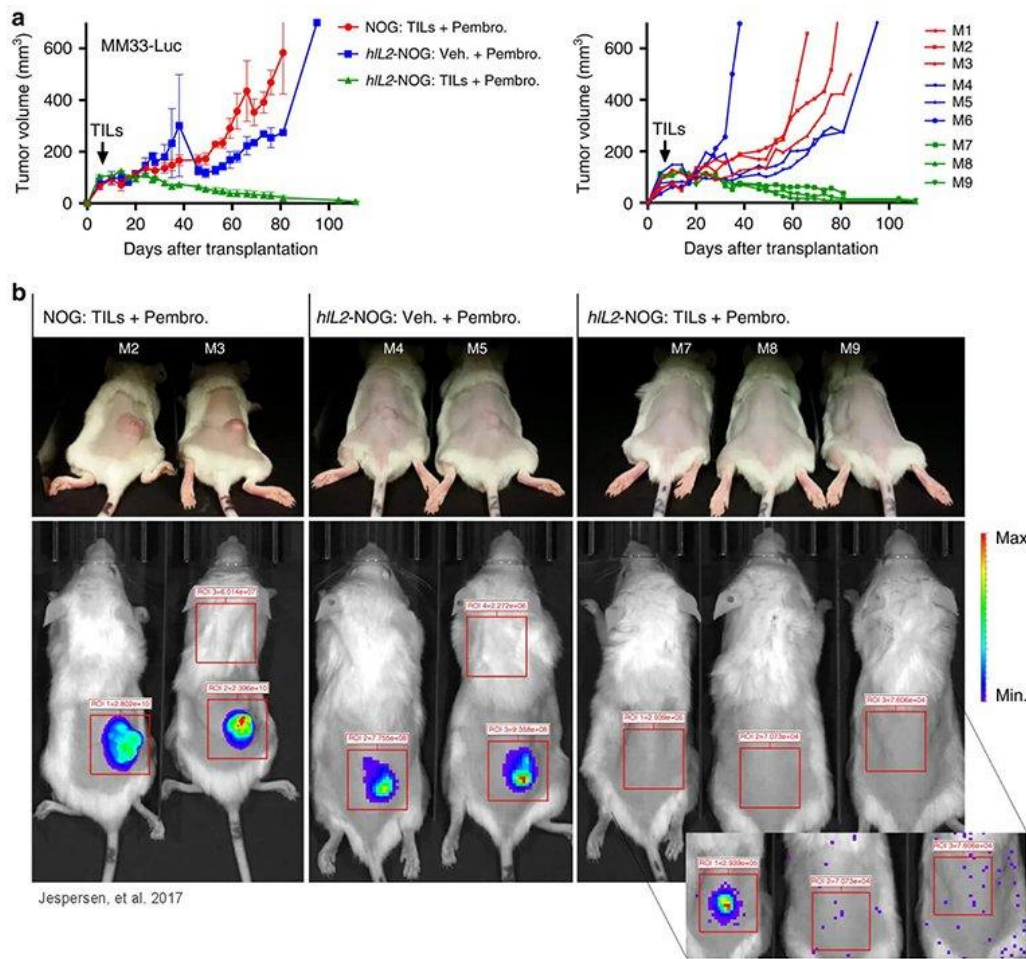


View paper



Improved Human T-Cell Function & Immunotherapy Modeling with hIL-2 NOG Mice

Transgenic expression of human IL2 enables TIL-mediated tumor eradication in NOG mice



Transgenic expression of human IL2 enables TIL-mediated tumor eradication in NOG mice.

- (a) Six hIL-2 NOG transgenic mice and three NOG mice were transplanted with luciferase labeled MM33 tumor cells. After tumor growth had been confirmed by IVIS imaging, all NOG mice, and three of the hIL-2 NOG mice, were injected with autologous REP TILs and tumor growth was measured with calipers. Shown to the right are individual mice.
- (b) IVIS imaging to investigate if mice are disease free. Inset, very prolonged exposure yielding mostly spark signals from static electricity.

Adapted from [Jespersen, et al. 2017](#) under Creative Commons Attribution License.

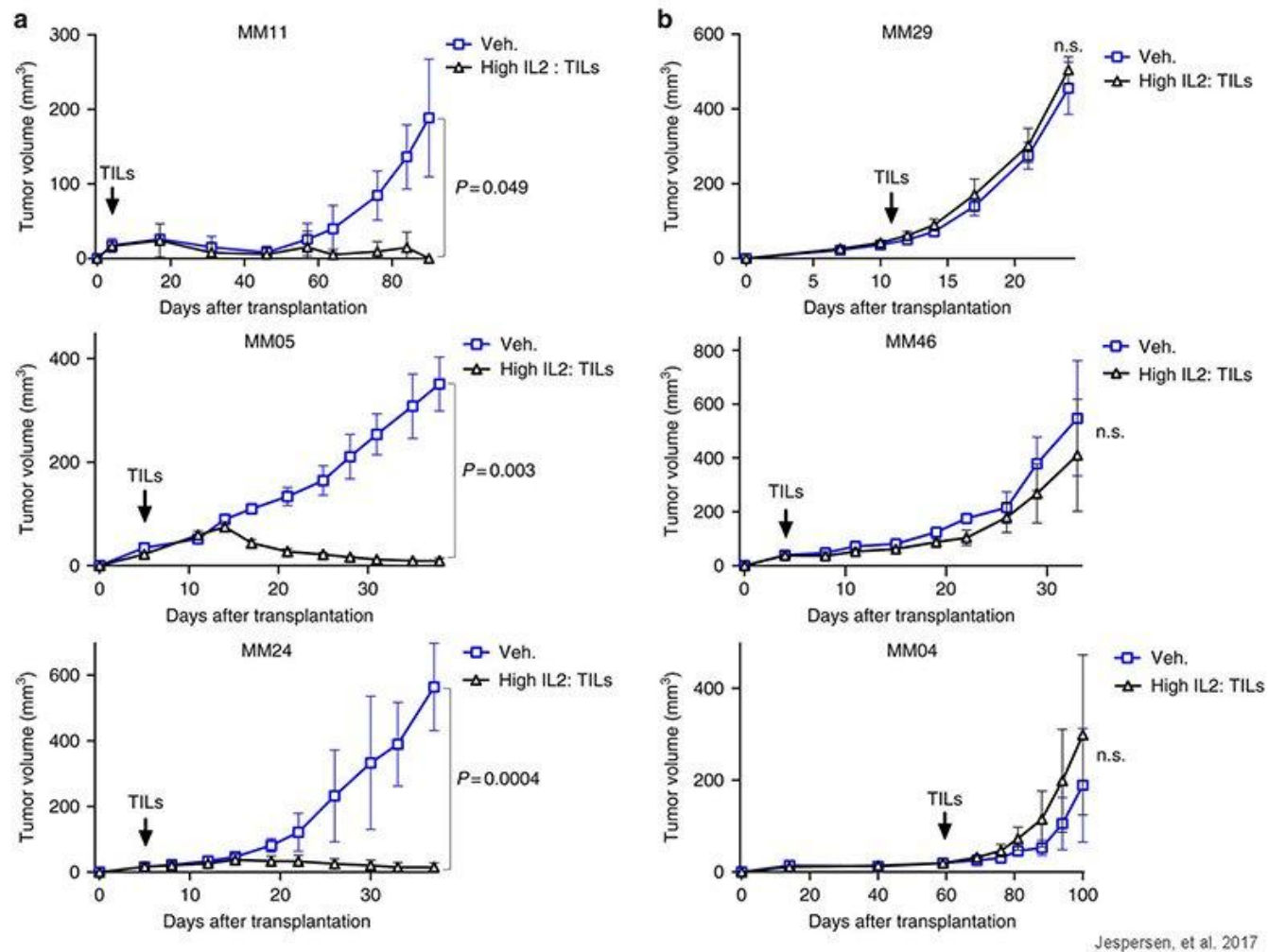


Learn more about
hIL-2 NOG



Improved Human T-Cell Function & Immunotherapy Modeling with hIL-2 NOG Mice

Adoptive cell transfer in hIL-2 NOG mice correlates with response in patients



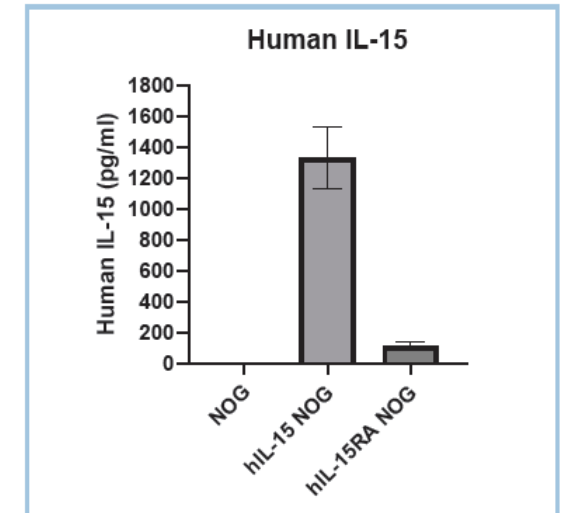
Tumor growth curves of cells from three responders in the clinic (a: MM11, MM24 and MM05) and from two non-responders (b: MM04, MM46 and MM29) in hIL-2 NOG mice with high levels of hIL-2 treated either with PBS or TILs.

Adapted from [Jespersen, et al. 2017](#) under Creative Commons Attribution License.

NOG Models Coming Soon

Creation of a HIS model that can sustain T, B and NK cells

	hIL-15 NOG	hIL-15RA NOG
Gene editing method	Transgenic	Bacterial artificial chromosome (BAC) transgenic
Transgenes	hIL-15 + hIL-2 signal peptide	hIL-15, hIL-15R α
Promoter	CMV	hIL-15 and hIL-15R α regulatory elements
HSC engraftment suitability	Cell damage observed; long term engraftment not feasible	Long-term engraftment feasible

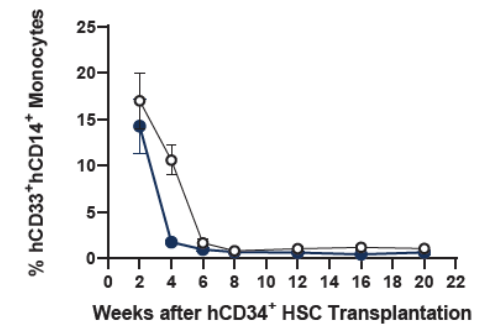
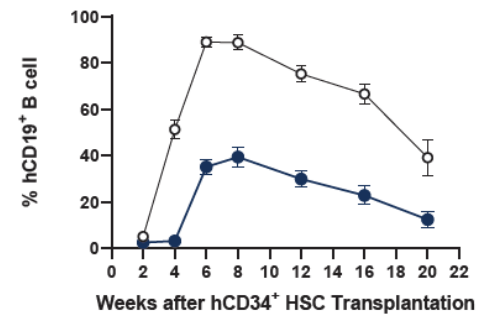
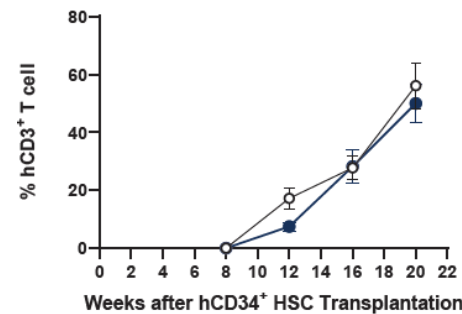
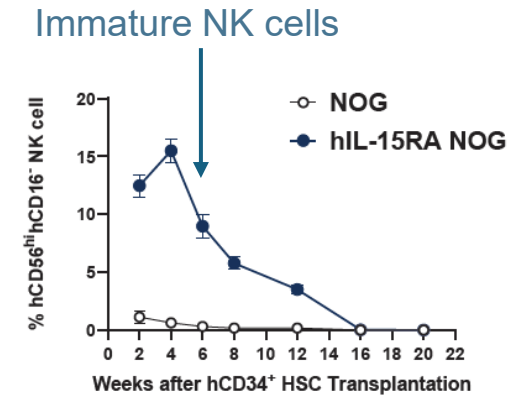
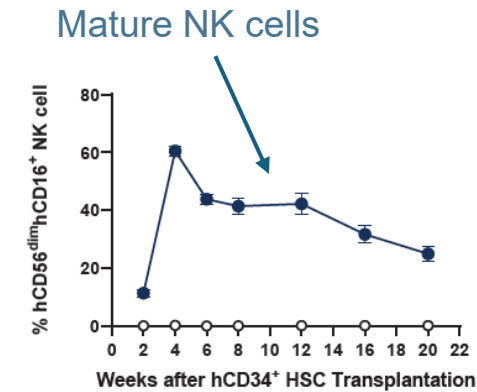
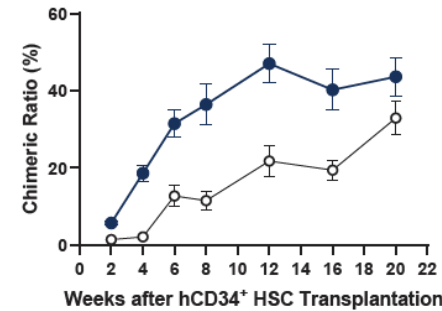
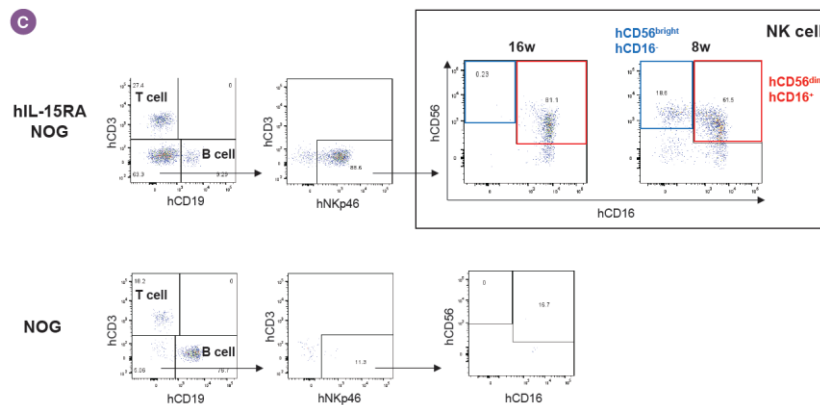
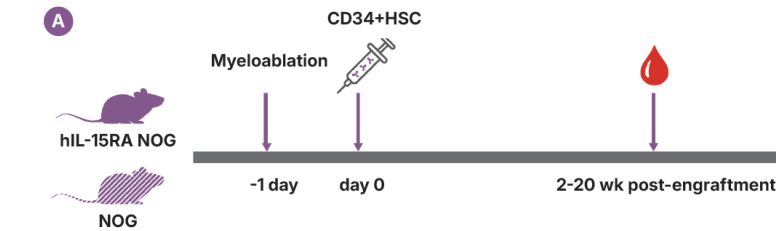


hIL-15RA NOG Coming soon

Poster Presented at AACR 2026: Wednesday, April 22 | 9am - 12pm | Poster Section: 8 | Poster Board: 6

Enhanced NK cell engraftment in HSC-engrafted hIL-15RA NOG

hIL-15RA NOG Coming soon

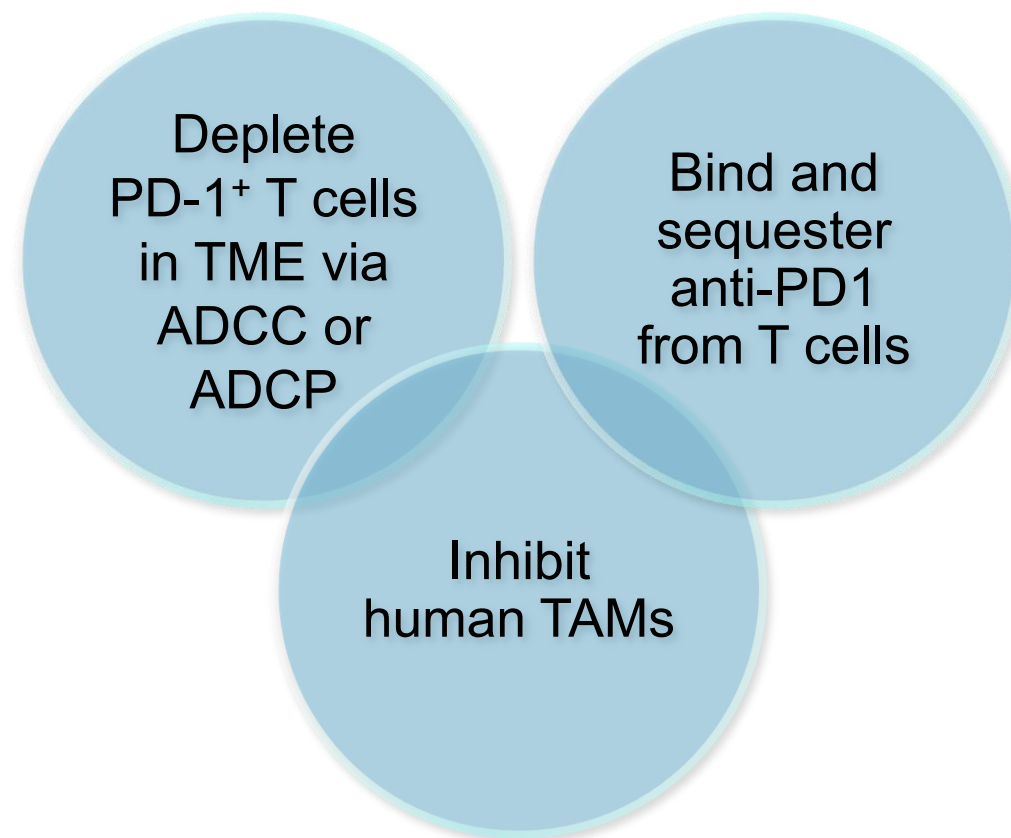
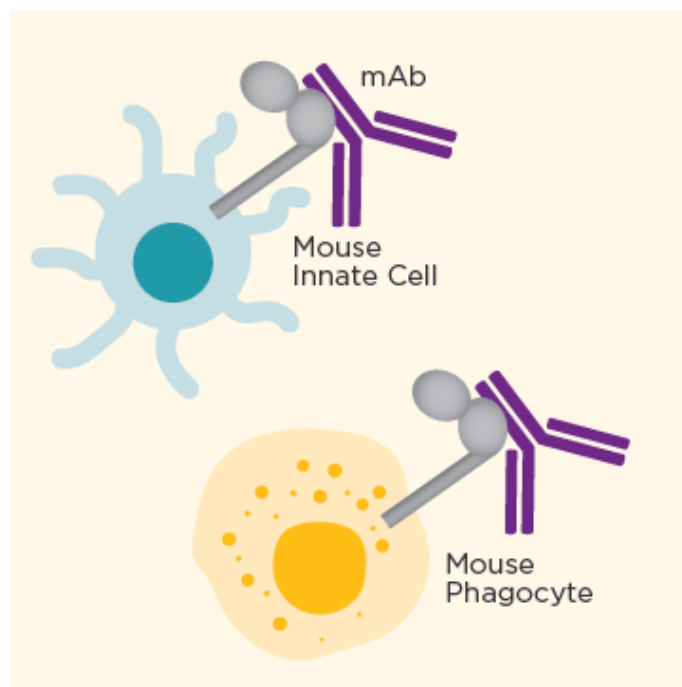


Poster Presented at AACR 2026: Wednesday, April 22 | 9am - 12pm | Poster Section: 8 | Poster Board: 6

FcResolv™ Portfolio

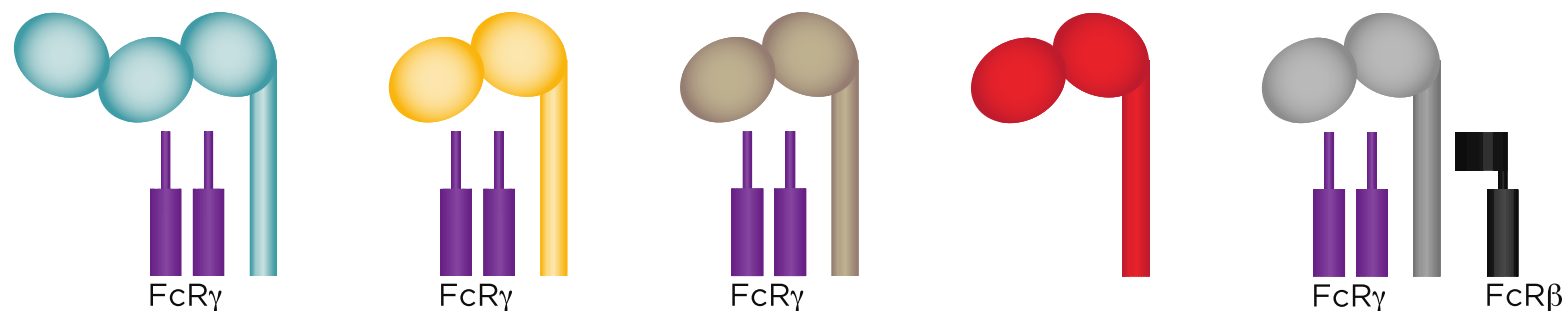
Residual Murine Immune Cells Functionally Interact with human Biologics

- All super-immunodeficient mice have residual murine immune cells
- Human mAbs (e.g. anti-PD-1) can cross-react with murine FcγRs to confound results in preclinical models





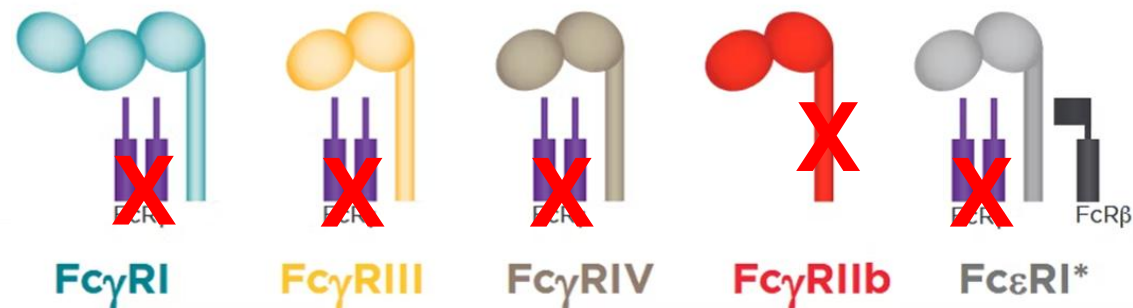
Human IgGs differentially activate Murine FcγRs



Mouse FcR	FcγRI	FcγRIII	FcγRIV	FcγRIIb	FcεRI*
Expression Pattern	Dendritic Cells, Monocytes/ Macrophages (±)	Dendritic Cells, Natural Killer Cells, Monocytes/ Macrophages, Neutrophils	Monocytes/ Macrophages, Neutrophils	Dendritic Cells, Monocytes/ Macrophages, Neutrophils	Mast Cells, Basophils
Human Ig Relative Binding Affinity to Mouse FcR	hIgG1: ↑↑↑↑ hIgG2: - hIgG3: ↑↑↑↑ hIgG4: ↑↑↑	hIgG1: ↑ hIgG2: ↑ hIgG3: ↑↑ hIgG4: ↑	hIgG1: ↑↑↑ hIgG2: - hIgG3: ↑↑↑ hIgG4: ↑	hIgG1: ↑↑ hIgG2: ↑ hIgG3: ↑↑ hIgG4: ↑	hIgE: -
Human FcR Ortholog	hFcγRI	hFcγRIIa	hFcγRIIIa	hFcγRIIb	

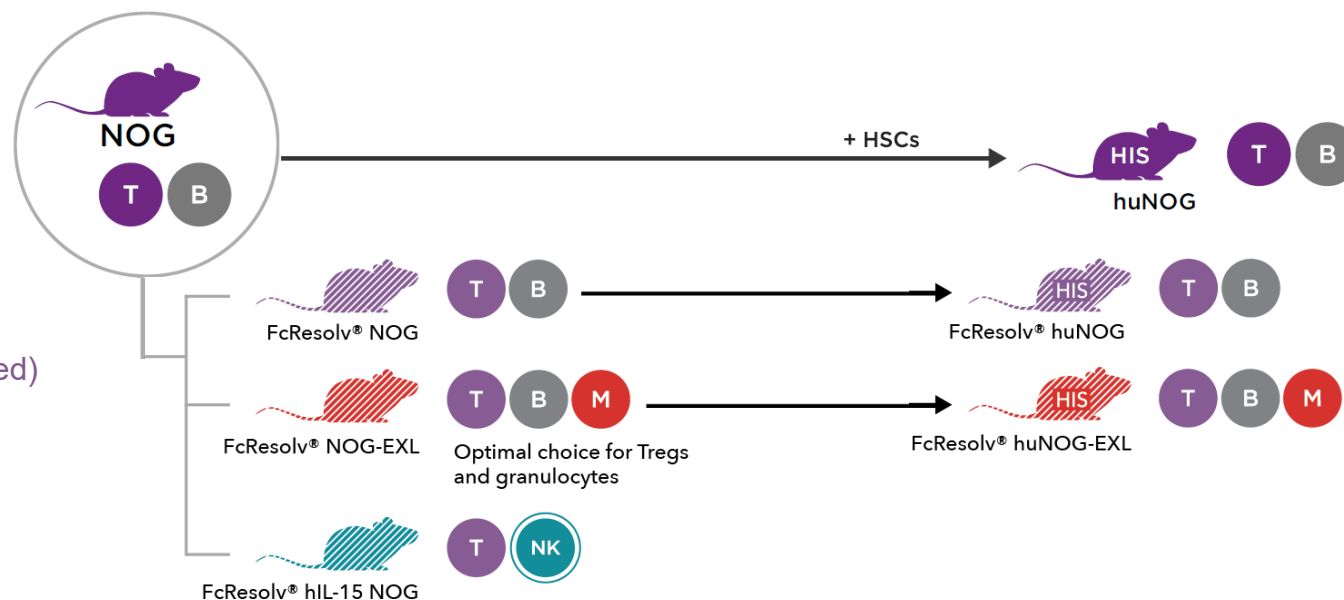
Solution: FcResolv[®] NOG

- Severely immunodeficient NOG mouse
- KO of common FcRγ subunit and FcγRIIb to prevent all Fc-mediated effector functions
- Can be used in a similar fashion to the NOG mouse, including for xenograft and immune system humanization experiments.
- Removes confounding effects to improve accuracy



Learn more about FcResolv options including:

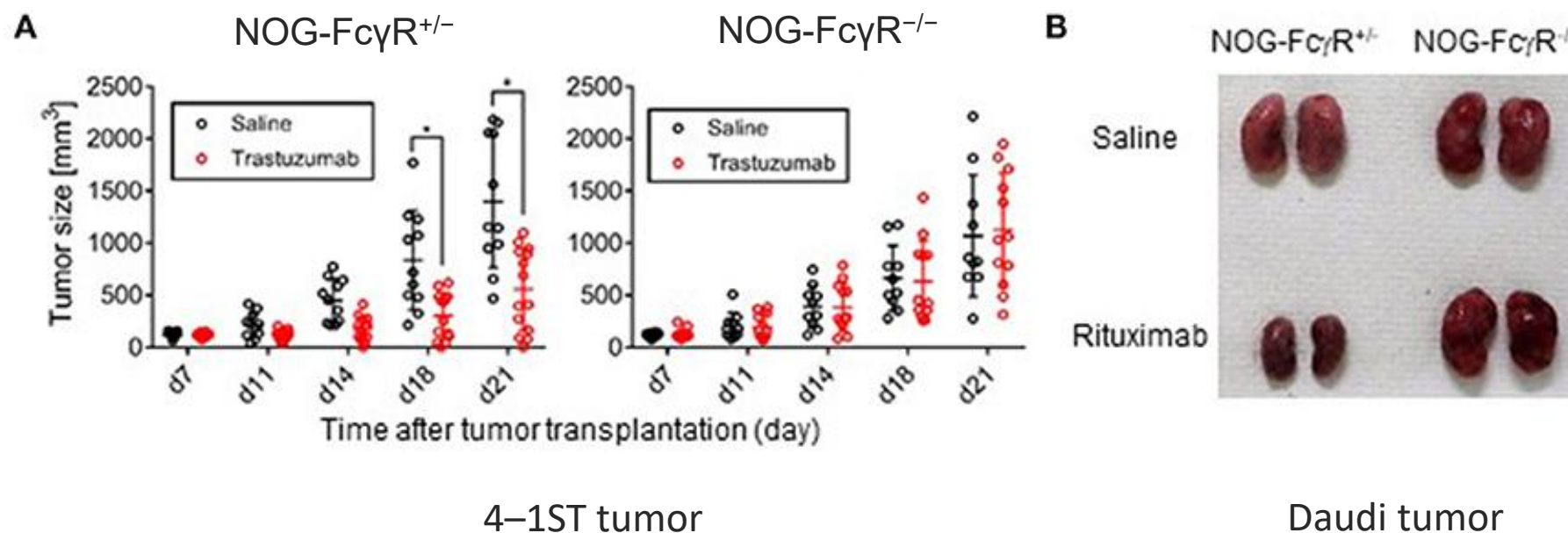
- FcResolv NOG (humanized and non-humanized)
- FcResolv NOG-EXL (humanized and non-humanized)
- FcResolv hIL-15 NOG





FcγR knockout resolves false positives

Abrogation of mouse innate cell mediated antibody dependent cytotoxicity in NOG-FcγR^{-/-} mice



Katano I, Ito R, Kawai K and Takahashi T (2020) Improved Detection of *in vivo* Human NK Cell-Mediated Antibody-Dependent Cellular Cytotoxicity Using a Novel NOG-FcγR-Deficient Human IL-15 Transgenic Mouse. [Front. Immunol. 11:532684](https://doi.org/10.3389/fimmu.2020.532684). doi: 10.3389/fimmu.2020.532684. Licensed under CC BY 4.0



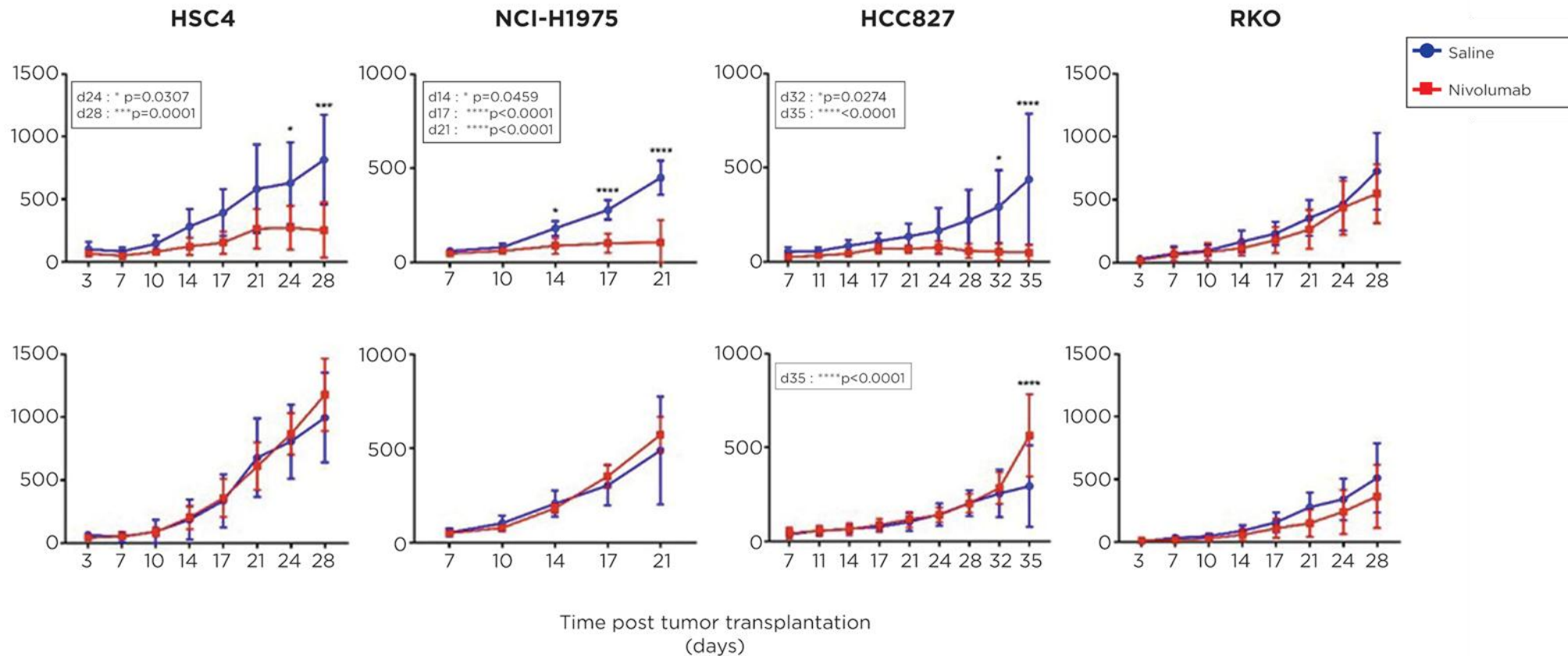
View paper



FcγR knockout resolves false negatives

HSC-engrafted
FcResolv[®] NOG

HSC-engrafted
NOG



Katano et al. Development of a novel humanized mouse model for improved evaluation of in vivo anti-cancer effects of anti-PD-1 antibody [Scientific Reports. 2021.](https://doi.org/10.1038/s41598-021-00641-8)
doi: [10.1038/s41598-021-00641-8](https://doi.org/10.1038/s41598-021-00641-8). Licensed under CC BY 4.0 (www.creativecommons.org/licenses/by/4.0)

NeoThy™ Human Immune Engraftment Platform

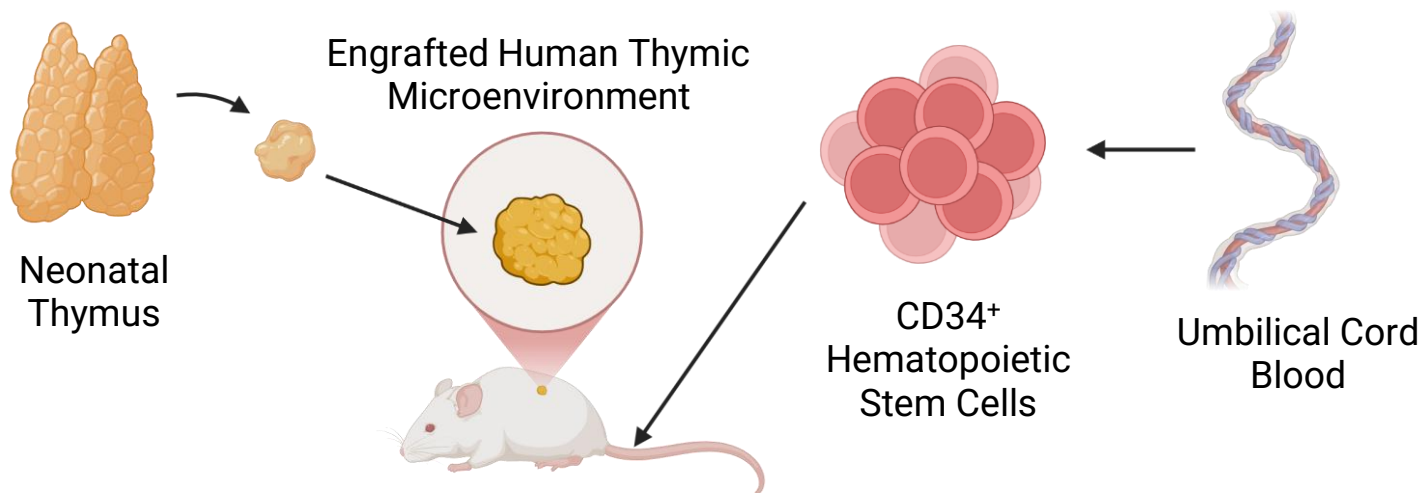


Learn more
about the
NeoThy™
Platform

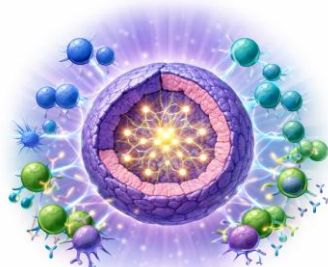


NeoThy™ Human Immune Engraftment Platform

Human adaptive immunity in a controlled in vivo system



Human thymic microenvironment-mediated HLA education enables functional adaptive (human) immunity



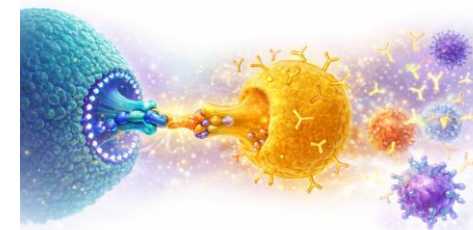
Human Thymus-Mediated T Cell Education

Human thymic fragments support
HLA-restricted CD4⁺ and CD8⁺ T cell development.



HLA Class II-Restricted CD4⁺ T Cell Activation

More robust helper T cell antigen specificity and
activation.



T Cell-Dependent Humoral Immune Function

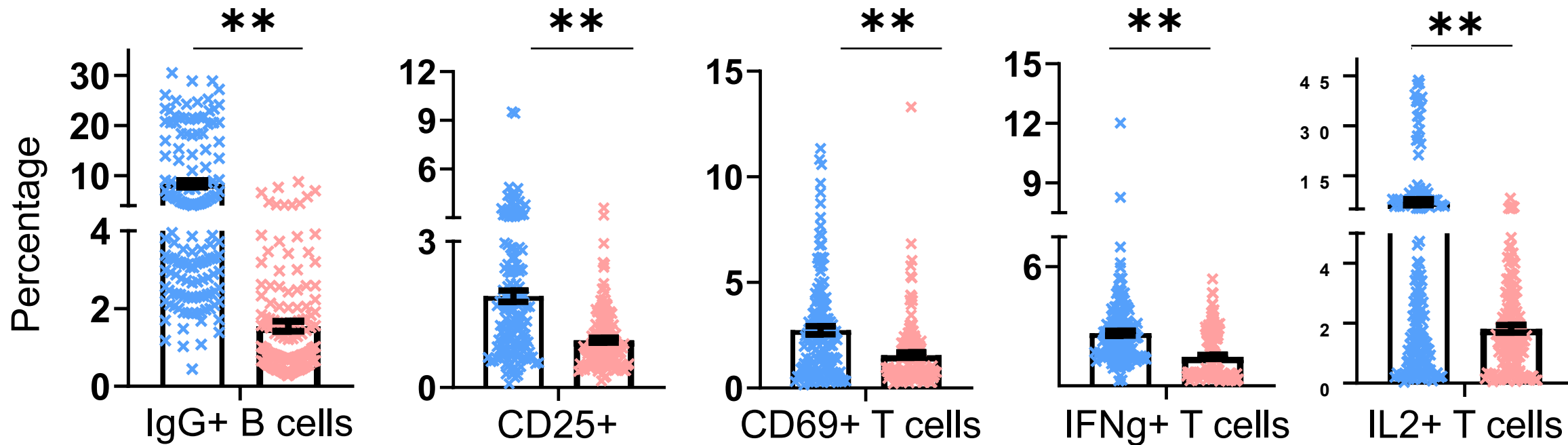
CD4⁺ T cell help enables B cell activation, plasma cell differentiation,
and antigen-specific antibody production.



View data
and more



NeoThy Increases Lymph Node B and T cell Activation



*p<0.05

**p<0.01

× = NeoThy
× = CD34+

Data presented at SOT 2024

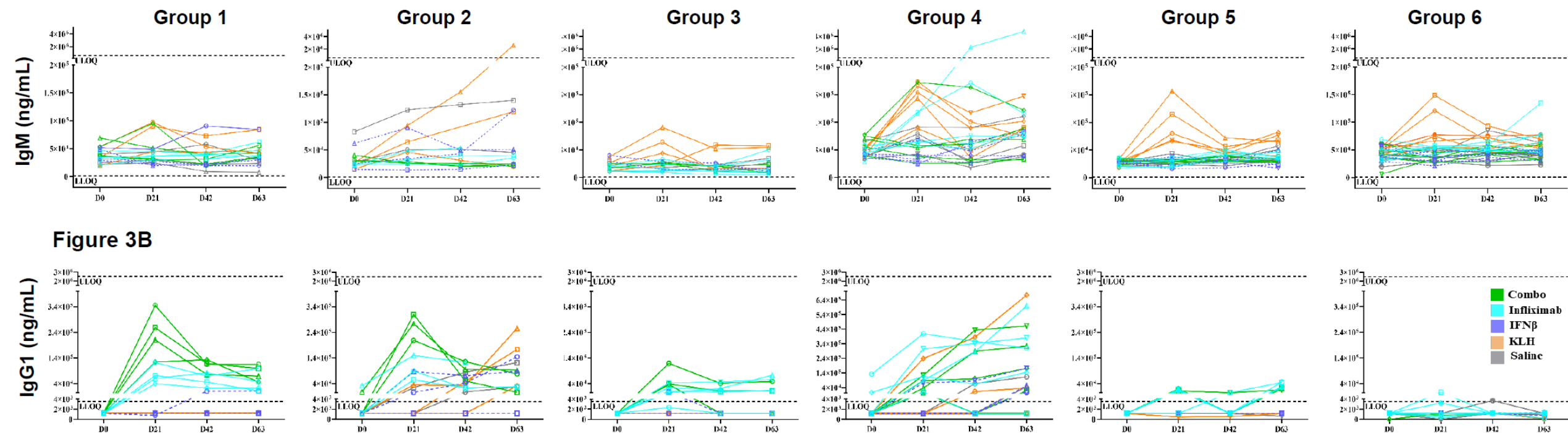
Mice: Taconic
Data: FDA CBER



View data
and more



Immunoglobulin Class Switching in NeoThy Humanized Mice



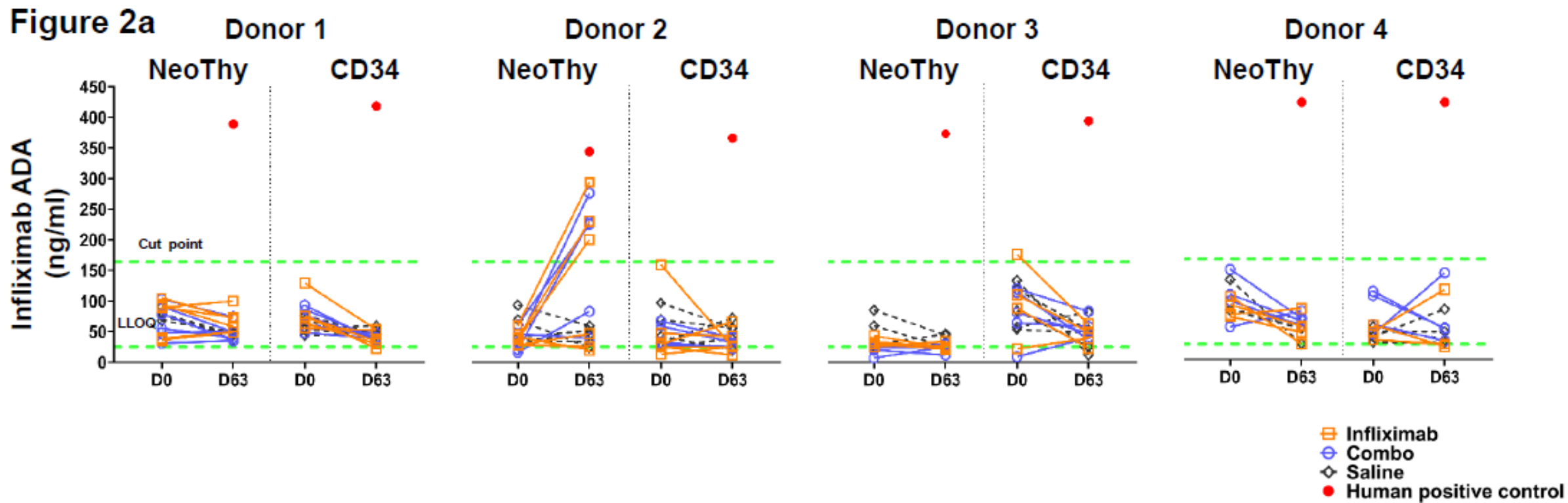
Data presented at SOT 2026



View data
and more



Anti-Drug Antibodies in NeoThy Humanized Mice



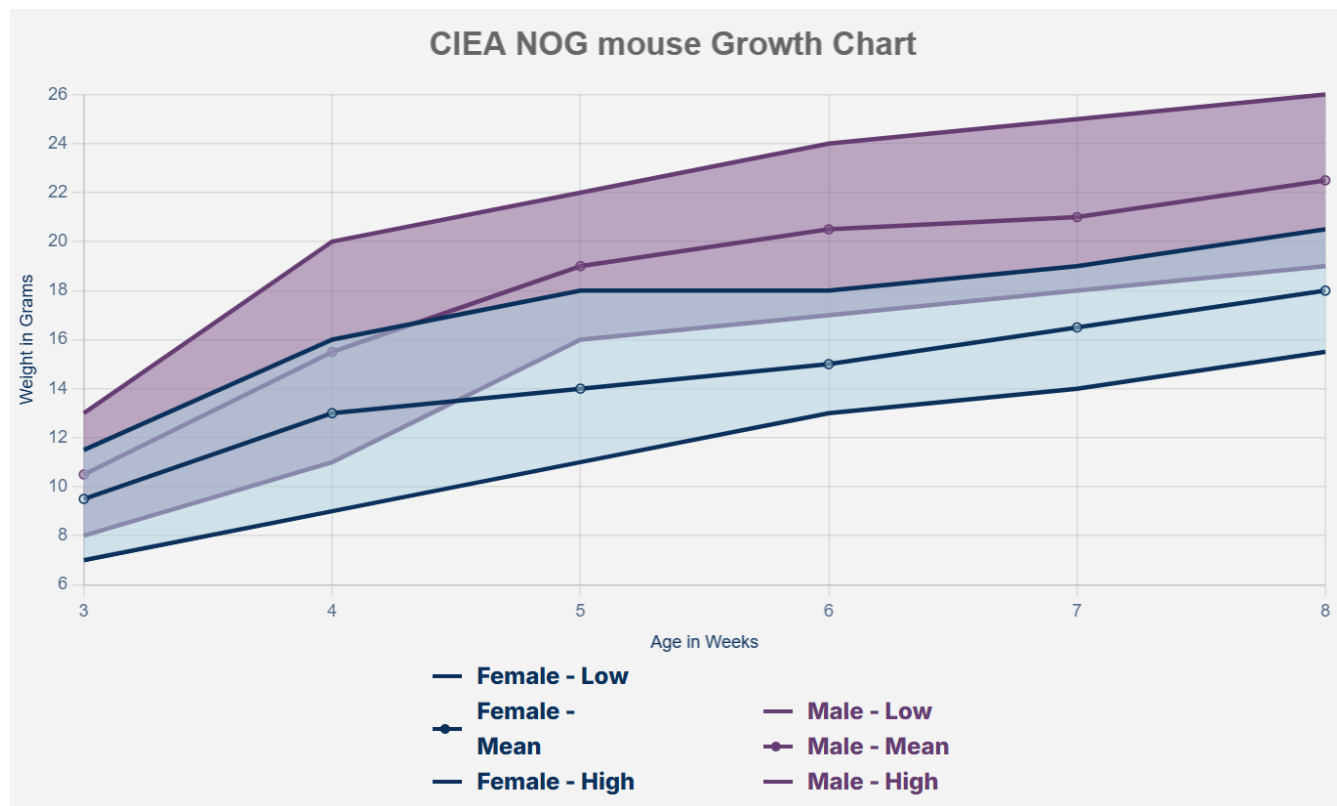
Data presented at SOT 2026

Appendix

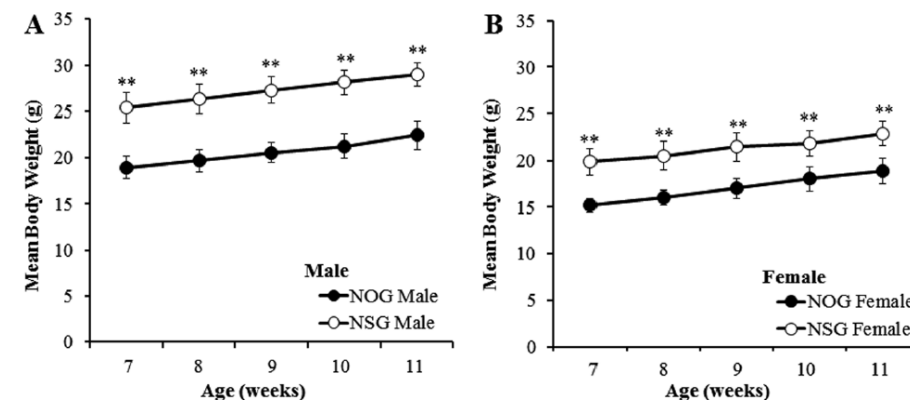


View NOG
model webpage

Basic NOG Characteristics



NOG vs. NSG Body Weight



Mean body weights in males (A) and females (B) of NOG and NSG mice.
**: Significantly different from NOG mice at $P < 0.01$ by Student's t-test.

From: Nagatani et al. (2019). Exp Anim, 68(4), 471–482.
<https://doi.org/10.1538/expanim.19-0024>. Licensed under CC BY-NC-ND

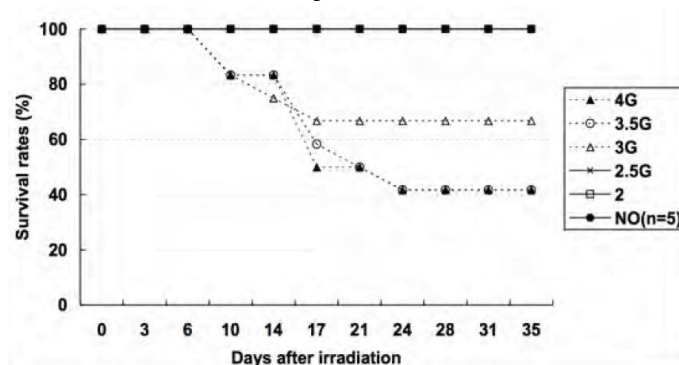
n= 100 animal per sex Restricted Flora health standards from US colonies. Data collected 2012-2013.
High and Low represent mean +/- standard deviations.
The sample size above is not large enough to necessarily represent a normal population.
All growth curves represent animals housed in our barriers, at our standard density and fed NIH31-M diet.
Variations at customer facilities will alter expected growth curves.
Growth charts are provided only as a guide, if a specific weight criteria is needed please order animals by weight.



View detailed
guide

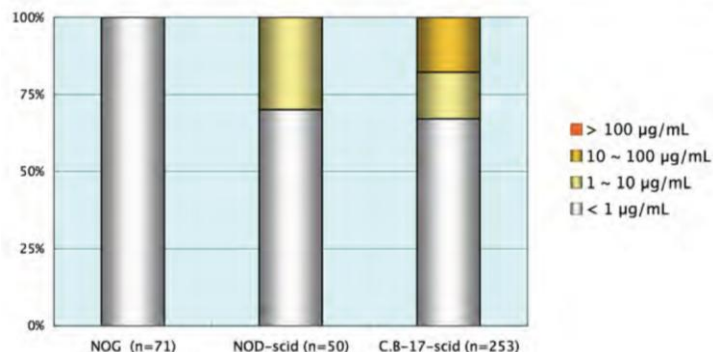
Basic NOG Characteristics

Irradiation sensitivity

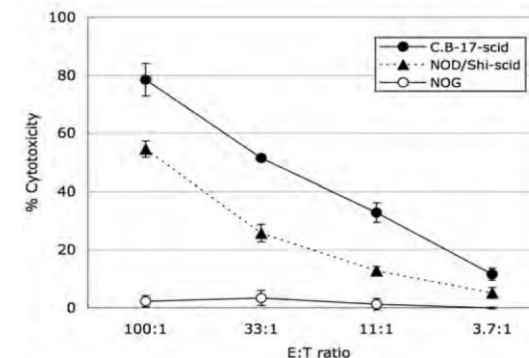


Five mice in each group were irradiated with 2 to 4 Gy with using an X-ray device (MBR-1505R, Hitachi Medical Co., Tokyo) at age of 8 weeks.

No B cell leakiness

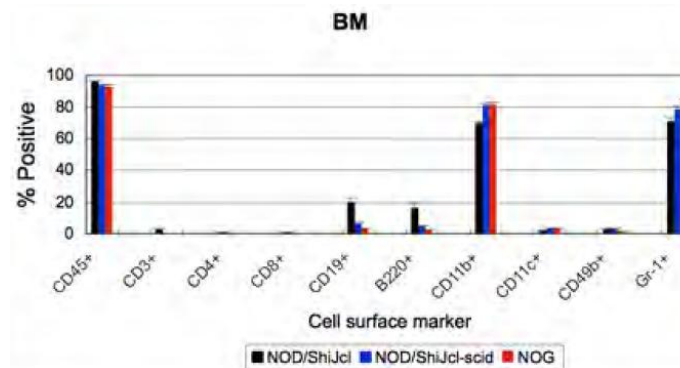
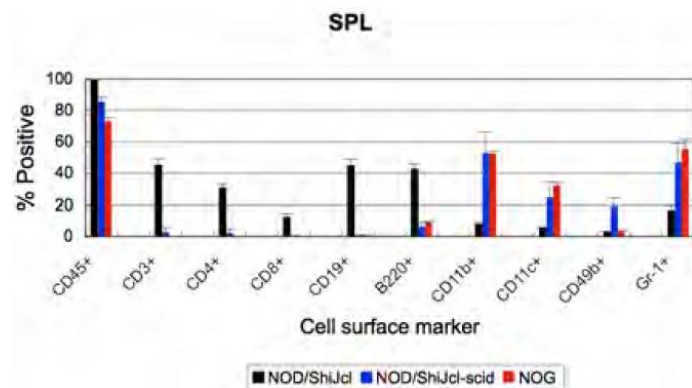


Defective NK cell activity



The NK cell activity was determined by a cytotoxicity test using NK sensitive YAC-1 cells as a target cell. Mice were intraperitoneally inoculated with 100 mg of polyinosinic-polycytidylic acid (poly I:C, SIGMA Chemical Co., St. Louis, MO) to stimulate NK cell activity for 48 hrs before assay. Spleen cells were separated from 4 mice of each strain of mice, pooled and co-cultured with 51Cr-labeled YAC-1 cells as target cells for 4 hrs at 37C in 5% CO₂. The supernatants harvested were assayed on a gamma counter. The present specific 51Cr release was calculated using the following formula, where X is the mean experimental release from triplicate wells. Total release (T) was determined from wells with 51Cr labeled YAC-1 cells and 1H HCl, and spontaneous release (S) was determined from wells with 51Cr -labeled YAC-1 cells and medium: % specific release = [(X-S)/(T-S)] x 100.

Mouse hematopoietic cells in spleen and bone marrow



Bone marrow (BM) and spleen (SPL) were removed from 12-week-old NOG mice. Single cell suspensions prepared in the usual manner were stained with FITC or PE-labeled anti-mouse CD45+, CD3+, CD4+, CD8+, CD19+, B220+, CD11b+, CD11c+, Gr-1+ and analyzed with FACSCanto (BD Sciences, CA)

Data courtesy of the [Central Institute for Experimental Medicine and Life Science](#)

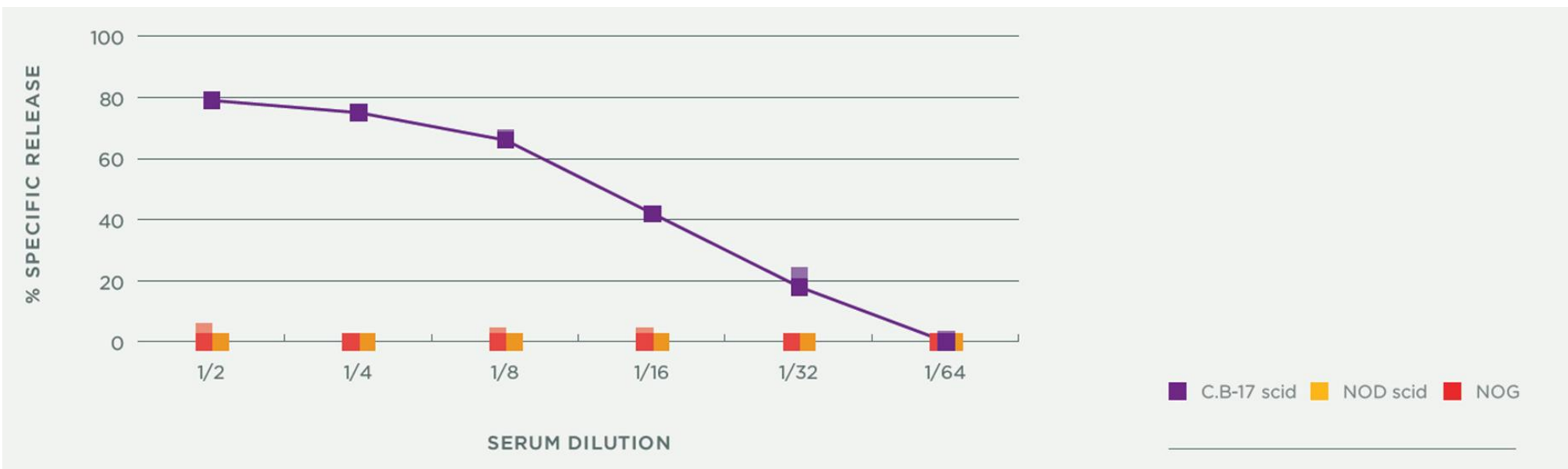


View detailed
guide



Basic NOG Characteristics

Defect of hemolytic complement activity in serum



Complement-dependent hemolytic activity in sera was determined by measurement of ^{51}Cr released in the supernatants after 30 min incubation of mouse sera and ^{51}Cr labeled SRBC/anti SRBC antibody conjugates. Spontaneous release (S) was determined from wells with ^{51}Cr SRBC-Ab conjugate in media. Total release (T) was determined from wells with ^{51}Cr SRBC-Ab conjugates and 100 μl 2% SDS. Percent specific release = $[(X-S)/(T-S)] \times 100$.

Data courtesy of the [Central Institute for Experimental Medicine and Life Science](#)