Supplementary Table 1. CDR3 sequences used to produce α chain retrogenic NOD mice (Sequences derived from NOD CD4 T cell clones)

	Vα (TRAV)	N	Jα (TRAJ)	Original Epitope	*Insulin Autoantibodies
12-4.4	5D-4*04		53	B:9-23	100% (8/8)
	AAS	A	SGGSNYKLTF		
12-4.1	5D-4*04		53	B:9-23	83% (5/6)
	AAS	GAN	SGGSNYKLTF		
8-1.1	5D-4*04		56	B:9-23	100% (5/5)
	AAS	K	TGGNNKLTF		
BDC-6.9	5D-4*01		9	Unknown (Islets)	50% (2/4)
	AAS	AV	GYKLTF		
NY4.1	5D-4*04		40	Unknown (Islets)	55% (5/9)
	AAS	VR	NYKYVF		
14H4	5D-4*04		58	HEL:11-25	40% (2/5)
	AAS	E	QGTGSKLSF		
5F2	5D-4*04		57	HEL:11-25	0% (0/5)
	AAS	I	QGGSAKLIF		
2H6	21		53	B:9-23	0% (0/7)
	ILRV	D	SGGSNYKLTF		
12-2.35	7-4		23	B:9-23	0% (0/7)
	AA	IQ	NYNQGKLIF		
12-1.19	13-1		11	B:9-23	50% (4/8)
	AME	RS	SGYNKLTF		
BDC-10.1	17		32	Chromogranin	0% (0/7)
	ALE	GH	YGGSGNKLIF		
BDC-2.5	7D-6		22	Chromogranin	0% (0/7)
	AAS	LA	GSWQLIF		
6C5	9D-4		23	Unknown (Islets)	0% (0/4)
	ALS	G	NYNQGKLIF		

*The frequency of mice that developed insulin autoantibodies.

Supplementary Table 2. TCR β chains infiltrating pancreatic islets of TRAV5D-4 α chain retrogenic mice.

	12-4.1	**8-1.1**	**Total**
Number of mice tested	4	5	9
Number of sequences examined	64	82	146
Number of unique sequences	44	47	90*
TRBV usage of unique sequences			
TRBV1	2 (5%)	0 (0)	2 (2%)
TRBV2	0 (0)	1 (2%)	1 (1%)
TRBV3	1 (2%)	9 (19%)	10 (11%)
TRBV5	3 (7%)	9 (19%)	12 (13%)
TRBV12-1	0 (0)	1 (2%)	1 (1%)
TRBV12-2	3 (7%)	1 (2%)	4 (4%)
TRBV13-1	2 (5%)	2 (4%)	4 (4%)
TRBV13-2	6 (14%)	8 (17%)	14 (16%)
TRBV13-3	2 (5%)	3 (6%)	5 (6%)
TRBV14	0 (0%)	1 (2%)	1 (1%)
TRBV15	10 (23%)	4 (9%)	14 (16%)
TRBV16	5 (11%)	3 (6%)	8 (9%)
TRBV17	1 (2%)	0 (0)	1 (1%)
TRBV20	2 (5%)	0 (0)	2 (2%)
TRBV23	2 (5%)	0 (0)	2 (2%)
TRBV26	3 (7%)	1 (2%)	4 (4%)
TRBV29	0 (0)	1 (2%)	1 (1%)
TRBV30	1 (2%)	0 (0)	1 (1%)
TRBV31	1 (2%)	3 (6%)	4 (4%)
TRBJ usage of unique sequences			
TRBJ1-1	6 (14%)	5 (11%)	11 (12%)
TRBJ1-2	1 (2%)	3 (6%)	4 (4%)
TRBJ1-3	1 (2%)	3 (6%)	4 (4%)
TRBJ1-4	7 (16%)	5 (11%)	12 (13%)
TRBJ1-5	2 (5%)	0	2 (2%)
TRBJ1-6	3 (7%)	3 (6%)	6 (7%)
TRBJ2-1	5 (11%)	5 (11%)	10 (11%)
TRBJ2-2	2 (5%)	1 (2%)	3 (3%)
TRBJ2-3	2 (5%)	3 (6%)	5 (6%)
TRBJ2-4	3 (7%)	4 (9%)	7 (8%)
TRBJ2-5	7 (16%)	5 (11%)	12 (13%)
TRBJ2-7	5 (11%)	10 (21%)	15 (17%)

* One unique sequence is detected in both 12-4.1 and 8-1.1 α chain retrogenic mice.

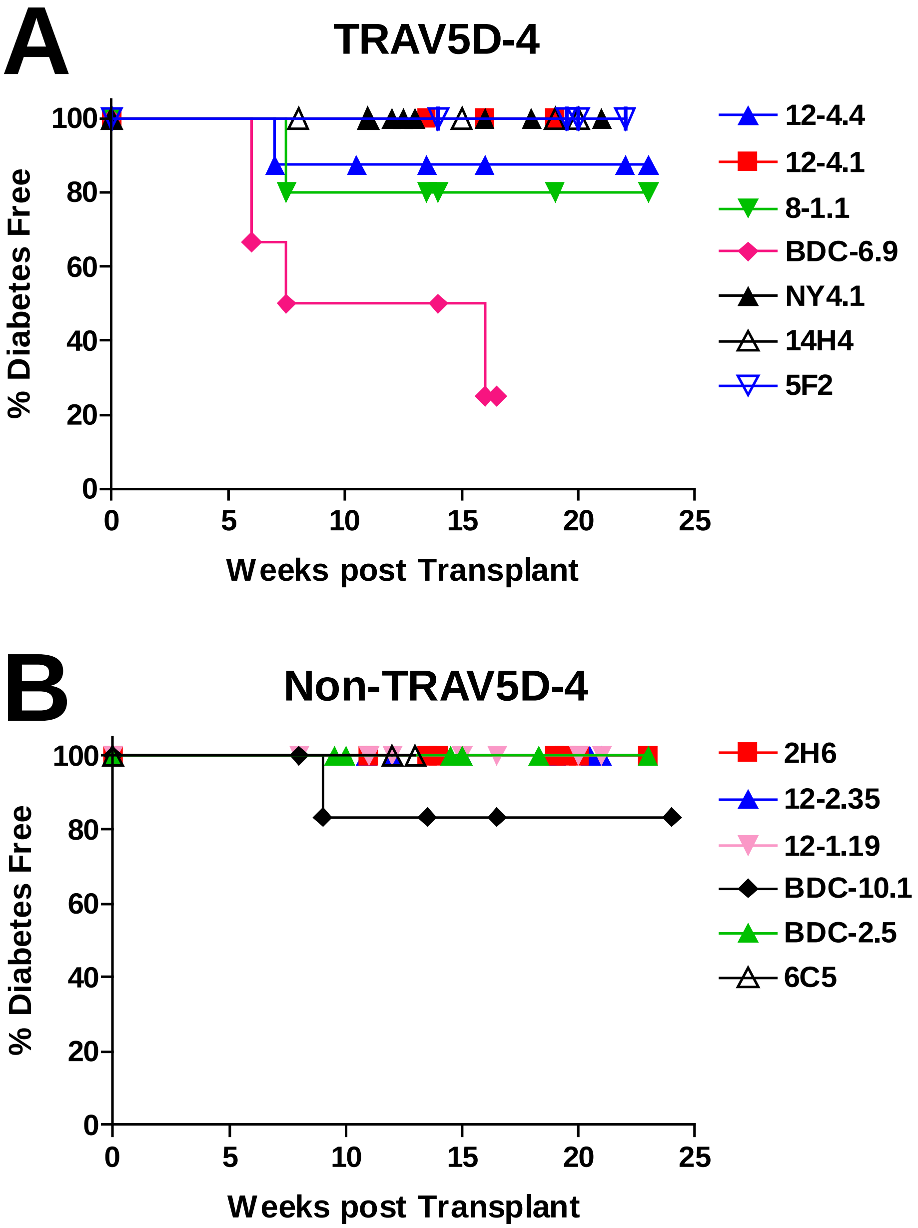
Supplementary Table 3. CDR3 sequences used to produce α chain retrogenic NOD mice (Sequences detected in NOD islets by 454 sequencing).

		Vα (TRAV)	N	Jα (TRAJ)	*Insulin Autoantibodies
TRAV 5D-4	Frequent 1	5D-4*04		56	100% (6/6)
		AAS	T	TGGNNKLTF	
	Frequent 2	5D-4*04		40	60% (3/5)
		AAS	GTG	NYKYVF	
	Singleton 1	5D-4*04		53	50% (2/4)
		AA	V	SGGSNYKLTF	
	Singleton 2	5D-4*04		56	20% (1/5)
		AAS	QA	TGGNNKLTF	
	Singleton 3	5D-4*04		56	0% (0/3)
		AA	N	GGNNKLTF	
TRAV 6	Frequent 1	6D-4		38	0% (0/4)
		ALV	P	NVGDNSKLIW	
	Frequent 2	6-1		22	0% (0/5)
		VL	GDRP	SGSWQLIF	
	Frequent 3	6-5		49	0% (0/3)
		AL	HTG	TGYQNFYF	
TRAV 13-1	Frequent 1	13-1		44	0% (0/3)
		AME	RG	TGSGGKLTL	
	Frequent 2	13-1		18	0% (0/3)
		A	-	RGSALGRLHF	
	Frequent 3	13-1		17	0% (0/3)
		AM	K	SAGNKLTF	

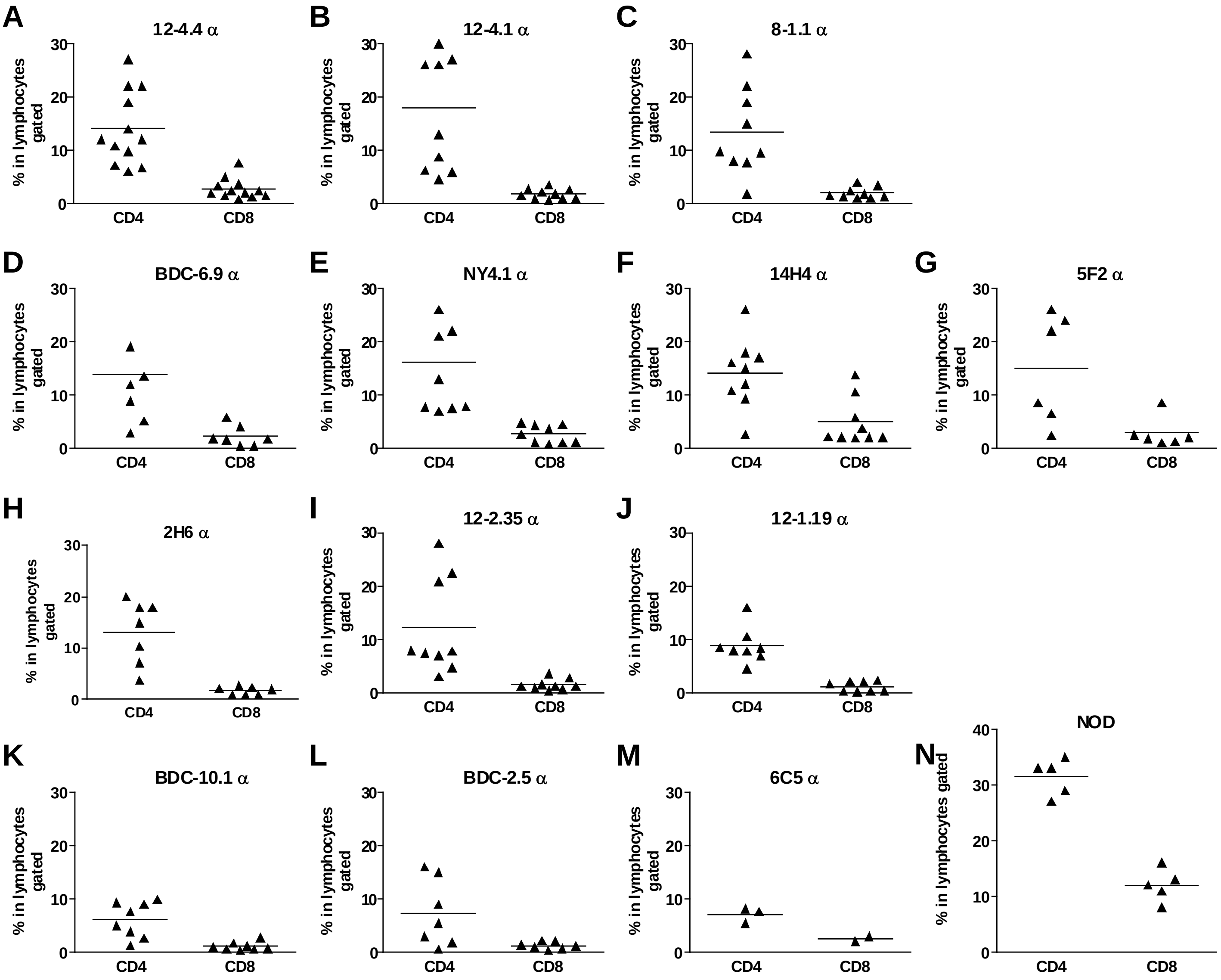
*The frequency of mice that developed insulin autoantibodies.

SUPPLEMENTARY DATA

Supplementary Figure 1. Development of diabetes in α chain retrogenic NOD mice. NOD mice retrogenic for α chains with TRAV5D-4 (panel A: 12-4.4 (n=8), 12-4.1 (n=6), 8-1.1 (n=5), BDC-6.9 (n=6), NY4.1 (n=9), 14H4 (n=5), 5F2 (n=5)) and with non-TRAV5D-4 (panel B: 2H6 (n=7), 12-2.35 (n=7), 12-1.19 (n=8), BDC-10.1 (n=7), BDC-2.5 (n=7), 6C5 (n=4)) were tested for blood glucose levels weekly.



Supplementary Figure 2. CD4 and CD8 T cells in the peripheral blood in α chain retrogenic NOD mice.



Supplementary Figure 3. Comparison of Vα amino acid sequences of mouse TRAV5D-4 and human TRAV13-1.

Amino acid sequences of orthologous Vα genes (mouse TRAV5D-4 and human TRAV13-1) are aligned. The CDR regions are designated by blue, and differences are highlighted by red.

CDR1

MOUSE 5D-4 GEQVEQLPSILRVQEGSSASINCSYE DSAS**N**Y

HUMAN 13-1 GENVEQHPSTLSVQEGDSAVIKCTYS DSAS**N**Y

CDR2

MOUSE 5D-4 FPWYKQEPGENPKLIID I**R**SNME

HUMAN 13-1 FPWYKQELGKGPQLIID I**R**SNVG

CDR3

MOUSE 5D-4 RKQTQGLIVLLDKKAKRFSLHITDTQPGDSAMYFC AAS

HUMAN 13-1 EKKDQRIAVTLNKTAKHFSLHITETQPEDSAVYFC AAS