

Supplementary Information 1. Elevated [K⁺]e limits TCR induction of transcriptional programs required for effector T cell function.

(a-e) Gene set enrichment analysis against the indicated dataset of transcriptional logarithmic ratiometric differences between primed T cells briefly activated in the presence or absence of elevated [K⁺]e (Elevated [K⁺]e stim / Ctrl stim). Kolmogorov-Smirnov statistic was used to calculate statistical significance. Additional [K⁺]e equal to 40 mM.

		TCR Stim	+	+	-	-
		↑ [K ⁺]e	-	+	-	+
Voltage-gated delayed rectified "Shaker" related	<i>Kcna1</i>	0.00	0.00	0.00	0.00	0.00
	<i>Kcna2</i>	0.29	0.32	2.04	1.86	
	<i>Kcna3</i>	183.95	133.06	46.80	48.47	
	<i>Kcna4</i>	0.00	0.01	0.02	0.01	
	<i>Kcna5</i>	0.01	0.00	0.00	0.00	
	<i>Kcna6</i>	0.00	0.00	0.00	0.00	
	<i>Kcna7</i>	0.32	0.33	0.00	0.00	
Voltage-gated "Shaw" related	<i>Kcnc1</i>	0.15	0.28	0.93	0.71	
	<i>Kcnc2</i>	0.00	0.00	0.00	0.00	
	<i>Kcnc3</i>	0.12	0.11	0.01	0.04	
	<i>Kcnc4</i>	0.00	0.00	0.00	0.00	
Intermediate / small conductance Ca ²⁺ activated	<i>Kcnn1</i>	0.00	0.02	0.00	0.02	
	<i>Kcnn2</i>	0.00	0.00	0.00	0.00	
	<i>Kcnn3</i>	0.00	0.00	0.00	0.00	
	<i>Kcnn4</i>	91.15	76.47	90.00	90.73	

		TCR Stim	+	+	-	-	
		↑ [K ⁺]e	-	+	-	+	
Two-pore domain channel	<i>Kcnk1</i>	0.01	0.00	0.01	0.00		
	<i>Kcnk2</i>	0.00	0.00	0.00	0.00		
	<i>Kcnk3</i>	0.03	0.02	0.01	0.00		
	<i>Kcnk4</i>	0.01	0.00	0.00	0.00		
	<i>Kcnk5</i>	20.78	22.21	4.46	4.58		
	<i>Kcnk6</i>	1.83	2.23	2.16	2.41		
	<i>Kcnk7</i>	0.41	0.58	1.02	0.86		
	<i>Kcnk9</i>	0.00	0.00	0.00	0.00		
	<i>Kcnk10</i>	1.12	0.44	0.09	0.10		
	<i>Kcnk12</i>	0.15	0.11	0.01	0.01		
	Inwardly-rectifying slowly activating	<i>Kcnh3</i>	0.03	0.05	0.04	0.04	
		<i>Kcnh4</i>	2.91	2.17	0.07	0.03	
<i>Kcnh8</i>		0.00	0.00	0.00	0.00		

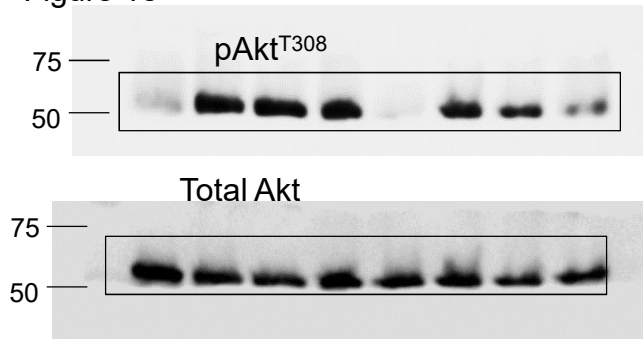
		TCR Stim	+	+	-	-
		↑ [K ⁺]e	-	+	-	+
Alpha-subunit Na ⁺ ,K ⁺ ATPase	<i>Atp1a1</i>	304.94	239.26	99.95	100.20	
	<i>Atp1a2</i>	0.00	0.00	0.00	0.00	
	<i>Atp1a3</i>	0.07	0.09	0.51	0.52	
	<i>Atp1a4</i>	0.00	0.00	0.00	0.00	
Beta-subunit Na ⁺ ,K ⁺ ATPase	<i>Atp1b1</i>	17.46	12.26	14.52	14.32	
	<i>Atp1b2</i>	0.57	0.51	0.07	0.06	
	<i>Atp1b3</i>	141.85	152.37	373.08	372.90	
	<i>Atp1b4</i>	0.00	0.00	0.00	0.00	
Fxyd domain containing ion transport regulator	<i>Fxyd1</i>	0.74	0.58	0.21	0.57	
	<i>Fxyd2</i>	0.19	0.00	0.14	0.03	
	<i>Fxyd3</i>	0.00	0.00	0.00	0.00	
	<i>Fxyd4</i>	0.21	0.08	0.14	0.23	
	<i>Fxyd5</i>	478.10	398.84	454.65	424.89	
	<i>Fxyd6</i>	0.01	0.00	0.01	0.01	
Electro-neutral K ⁺ , Cl ⁻ transporter	<i>Slc12a1</i>	0.00	0.00	0.00	0.00	
	<i>Slc12a2</i>	8.11	8.88	3.41	3.17	
	<i>Slc12a3</i>	0.01	0.01	0.01	0.02	
	<i>Slc12a4</i>	14.74	15.23	6.05	5.68	
	<i>Slc12a5</i>	0.06	0.08	0.03	0.03	
	<i>Slc12a6</i>	3.67	6.95	24.21	25.19	
	<i>Slc12a7</i>	6.92	9.61	33.83	34.88	
	<i>Slc12a8</i>	0.14	0.25	0.36	0.38	
	<i>Slc12a9</i>	1.58	2.18	4.42	4.84	

		TCR Stim	+	+	-	-
		↑ [K ⁺]e	-	+	-	+
Voltage-gated beta subunit	<i>Kcnab1</i>	0.03	0.04	0.04	0.01	
	<i>Kcnab2</i>	23.08	26.03	63.83	63.81	
	<i>Kcnab3</i>	0.05	0.11	0.22	0.15	
K _v channel interacting protein	<i>Kcnip1</i>	2.27	2.45	0.80	0.00	
	<i>Kcnip2</i>	0.80	1.78	6.54	8.50	
	<i>Kcnip3</i>	0.03	0.08	0.05	0.10	
	<i>Kcnip4</i>	0.45	0.46	0.62	0.68	

Supplementary Information 2. TCR dependent dynamic expression of potassium channels and pumps.

Averaged RPKM (Reads per kilobase per megabase) normalized values from three biological replicates of selected transcripts from FACS purified mouse CD8⁺ T cells in the indicated condition with or without 2 hour TCR stimulation via anti-CD3/28, additional [K⁺]e equal to 40mM and being isotonic to RPMI 1640.

Figure 1e



Extended Data 3c

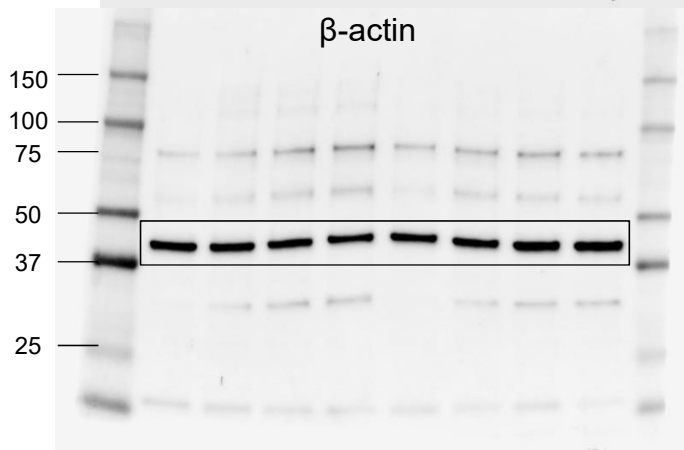
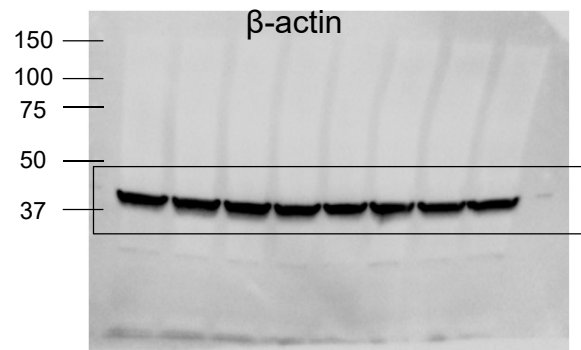
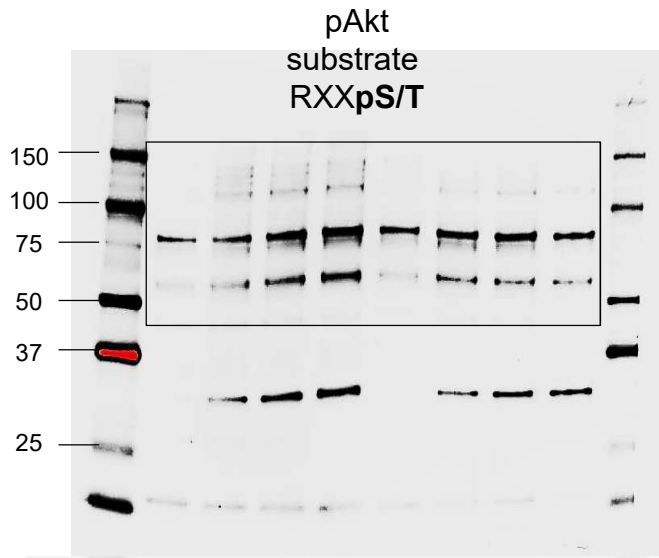
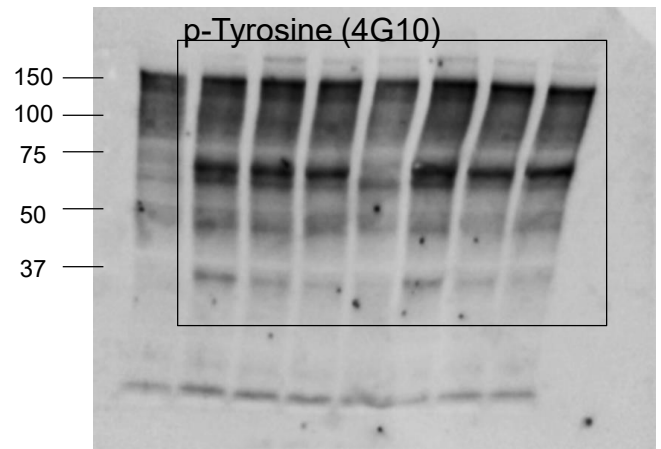


Figure 4b

