

Fig. S1. Diversity measures and CDR3 length distribution.

(A, B) The number of unique sequences and their copies for the 5 different group (Control-young, control-old, no-cancer, pre-cancer and cancer) in alpha (a) and beta (b) chains. (C, D) Shannon entropy and ecological diversity measures of the different groups. (E, F) CDR3 length distribution of the different groups in alpha and beta chains.

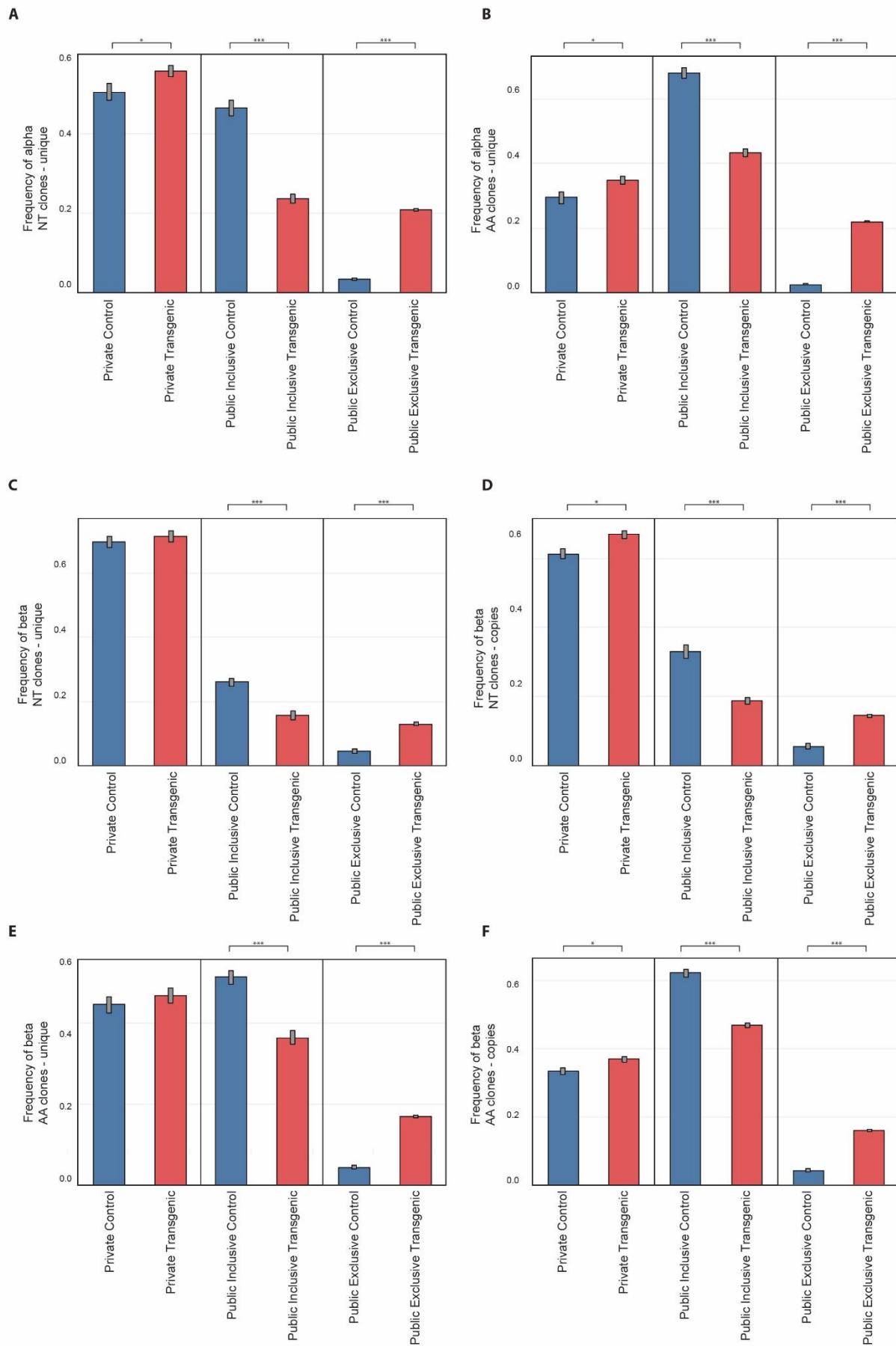


Fig. S2. Public repertoires. (A-F) The ratios of private, inclusive-public and exclusive-public repertoires in alpha unique NT clones (A) and AA clones (B), beta unique NT clones (C) and copies (D) and beta unique AA clones (E) and copies (F).

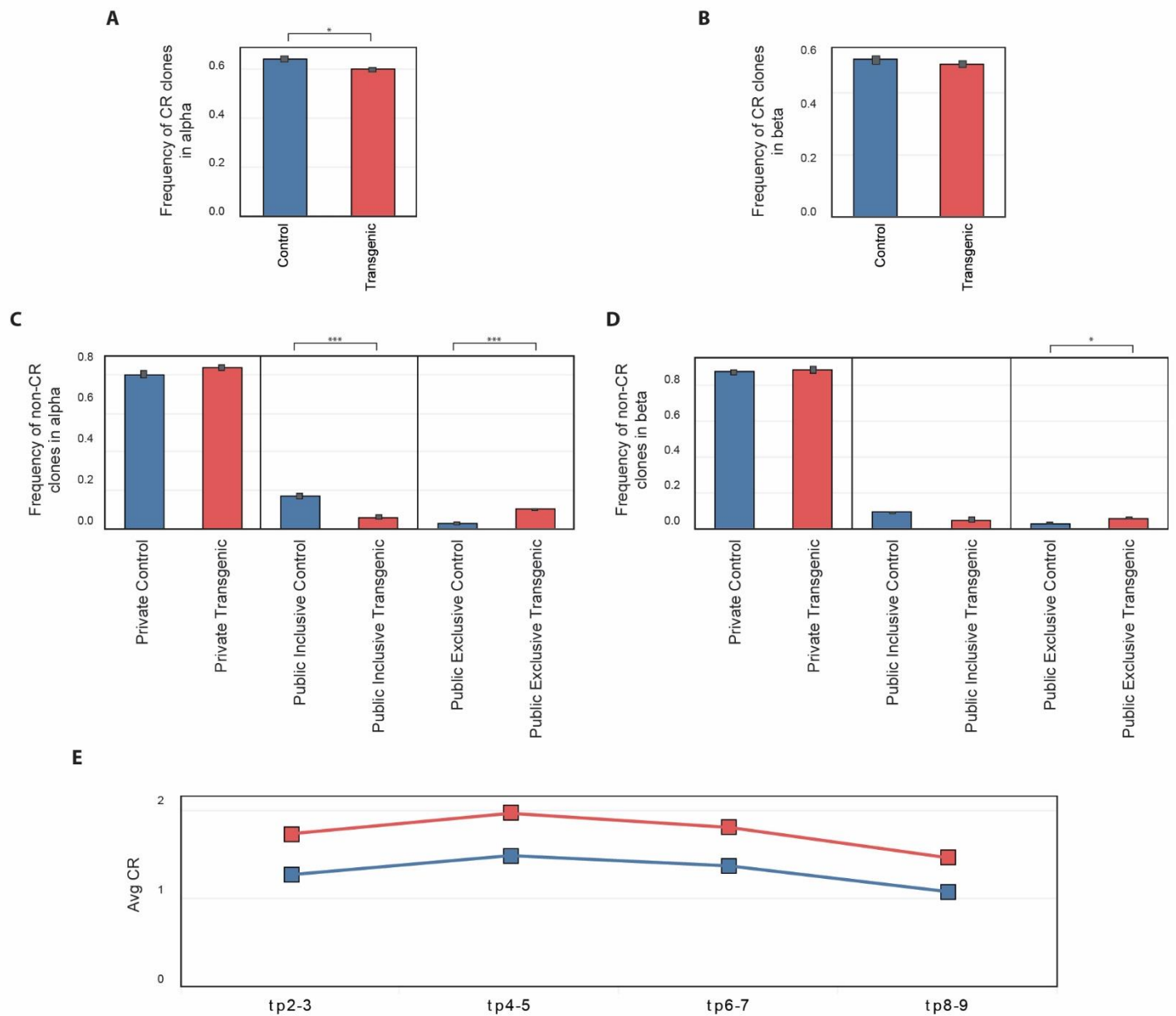


Fig. S3. Convergent recombination. (A-D) Frequency of convergent recombined clones in alpha (A) and beta (B) and non-convergent recombined clones in alpha (C) and beta (D). (E) The average CR level in the Control group (blue line) and the Tg group (red line) over time.

Sample_id	# cells	Raw reads	Alpha			Beta			group
			Copies	Unique NT sequences	Unique AA sequences	Copies	Unique NT sequences	Unique AA sequences	
A_2	32064	723712	85327	1263	1219	232198	3003	2938	control_young
A_4	27964	535959	106943	3464	3168	185003	5476	5230	control_young
A_7	106503	730212	99261	8816	7622	227057	19443	17787	control_old
A_9	29695	637360	104969	678	671	240207	1366	1346	control_old
B_3	126011	647621	-	-	-	243750	27155	24013	control_young
B_4	126711	581011	-	-	-	226716	35432	30938	control_young
B_6	26085	568208	86848	1246	1215	172698	2339	2304	control_old
B_8	59652	576945	80271	2384	2246	200162	5186	5009	control_old
C_2	123170	651732	66430	753	736	212338	2083	2059	control_young
C_4	86484	746969	-	-	-	271564	27814	24538	control_young
C_5	103905	923329	385040	11272	10516	385040	11272	10516	control_young
C_6	22735	802049	116365	989	972	230074	1841	1814	control_old
C_7	83428	346810	46161	2534	2369	116751	6213	5907	control_old
C_8	15584	1017191	85478	284	282	275614	641	637	control_old
C_9	15584	523715	89757	658	650	171295	1144	1136	control_old
D_2	128461	421400	-	-	-	149785	2376	2338	control_young
D_4	79088	543240	95016	2346	2187	218530	4631	4481	control_young
D_5	10182	600106	68041	201	200	174093	528	525	control_young
D_6	43027	830358	130438	1975	1887	272778	4015	3895	control_old
D_7	96447	1083692	171337	10396	8842	340475	19975	18157	control_old
D_8	11906	581158	90907	768	755	189112	1462	1446	control_old
E_4	39288	507655	90476	2321	2162	189405	4270	4118	control_young
E_6	36585	1073086	154155	2080	1998	379892	4435	4333	control_old
E_8	13602	543944	87329	1251	1215	201248	2532	2491	control_old
E_9	116084	583740	67526	1043	1011	206646	2960	2908	control_old
F_2	46966	475816	59923	2903	2668	169413	7058	6683	no_cancer
F_3	46966	2312834	231515	879	865	756883	2683	2643	no_cancer
F_4	131442	528731	40967	5596	4986	208806	18533	16913	no_cancer
F_5	129099	692292	120926	7963	6973	225972	14483	13458	pre_cancer
F_7	216697	739307	120341	9164	7901	273558	19190	17526	cancer
G_2	17043	484586	64057	938	910	139881	2002	1964	no_cancer
G_3	83739	490738	-	-	-	173201	12197	11246	no_cancer
G_5	144398	595335	-	-	-	169581	9030	8540	pre_cancer
G_6	69022	799409	80974	932	918	183392	2090	2065	cancer
G_7	79109	816287	104596	17011	13780	249379	39320	34222	cancer
H_2	38453	567175	79845	4369	3935	195858	8722	8192	no_cancer
H_3	50269	524514	99457	4787	4254	198872	8423	7903	no_cancer
H_4	124606	447490	83153	5941	5237	168351	10852	10048	no_cancer
H_6	7034	949643	134941	355	354	234373	653	649	pre_cancer
H_7	10176	495208	76313	317	316	154007	626	623	cancer
H_8	152151	544731	75481	6329	5622	184779	14986	13808	cancer
I_4	193660	300981	49950	11832	9995	124731	28330	25162	no_cancer
I_5	96363	781927	134555	6712	5945	272228	12963	12066	no_cancer
I_6	28989	636704	95469	1581	1514	214157	3341	3256	pre_cancer
J_2	144614	572782	49086	1825	1710	145251	4731	4520	no_cancer
J_3	26329	1015608	148475	758	746	375973	1819	1802	no_cancer
J_4	91338	529691	90156	5491	4866	191619	10561	9851	no_cancer
J_5	77937	745616	140542	3931	3617	213861	6004	5777	no_cancer
J_6	45291	542297	74374	1912	1806	169588	4272	4147	no_cancer
J_7	34020	661602	109047	2187	2092	226989	4336	4206	pre_cancer
J_8	36790	1708688	212218	1186	1154	463049	2490	2457	cancer
J_9	34984	400204	64135	710	698	127169	1257	1242	cancer
K_2	190167	1437881	74511	440	438	148237	771	769	no_cancer
K_4	57570	434631	71424	1435	1358	164672	2998	2928	no_cancer
K_5	107631	416509	63021	2264	2157	128584	4494	4327	no_cancer
K_6	17492	492313	76982	1212	1191	175489	2954	2906	cancer
K_7	131795	432717	49687	1141	1104	106906	2403	2358	cancer
L_2	23572	596425	74605	9486	8067	228171	24582	21884	no_cancer
L_5	102133	696688	107780	4394	4022	231699	9063	8584	no_cancer
L_6	12365	588921	104142	1003	982	187046	1731	1717	pre_cancer
M_2	42588	573640	-	-	-	219794	16317	14823	no_cancer
M_4	133728	461569	80092	11267	9482	181396	24049	21542	no_cancer
M_6	16257	687307	102585	1257	1229	236790	2843	2803	pre_cancer
M_7	112515	778042	-	-	-	255111	13674	12777	cancer
N_2	74616	720944	74694	2096	1968	209818	4890	4717	no_cancer
N_3	84879	653289	98991	3821	3515	211537	7791	7419	no_cancer
N_5	44765	556754	102816	1823	1746	177587	3048	2987	no_cancer
N_7	92808	677063	110246	8058	7132	246097	16984	15645	cancer
O_2	77757	610413	-	-	-	205298	21875	19585	no_cancer
O_4	126723	558054	91567	9278	7878	220692	20251	18332	no_cancer
O_5	92134	738591	121411	5171	4683	232310	9479	8960	no_cancer
O_6	37852	735687	109656	3015	2817	228839	5863	5653	no_cancer
O_7	124562	705997	-	-	-	242723	19064	17431	pre_cancer
O_8	195153	527388	74832	15493	12691	196024	37787	32846	cancer

Table S1. The final count of productive libraries and their count of TCR α and β sequences.