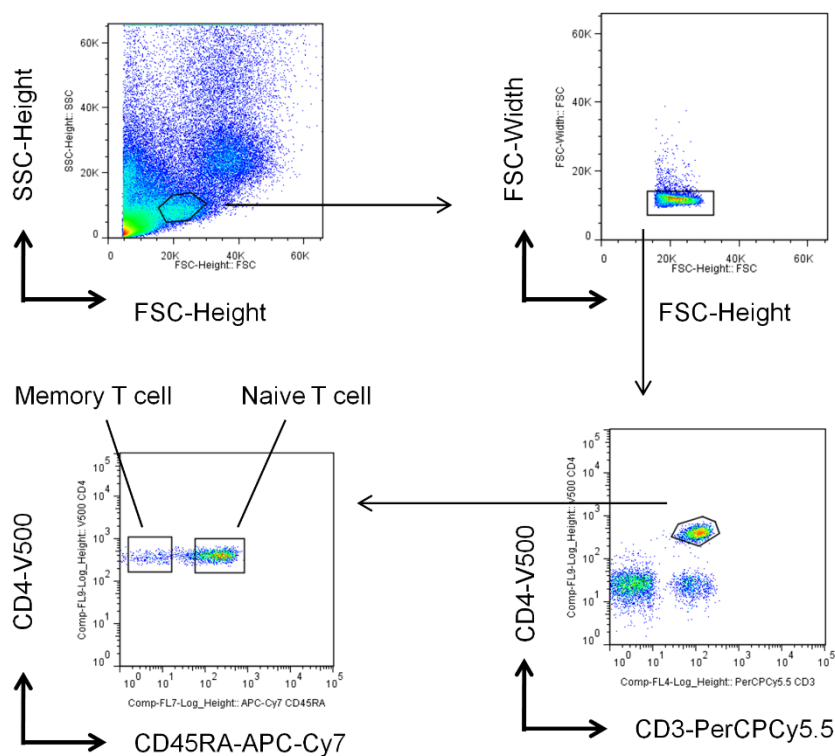


ONLINE SUPPLEMENTARY DATA

Supplementary Figure 1. Cell sorting strategy of peripheral T cell samples. Naive (CD45RA⁺) and memory (CD45RA⁻) CD4⁺ T cells were sorted by FACS (Moflo XDP), and their purities were more than 99.5%. The sorted cell number was 50,000 each.



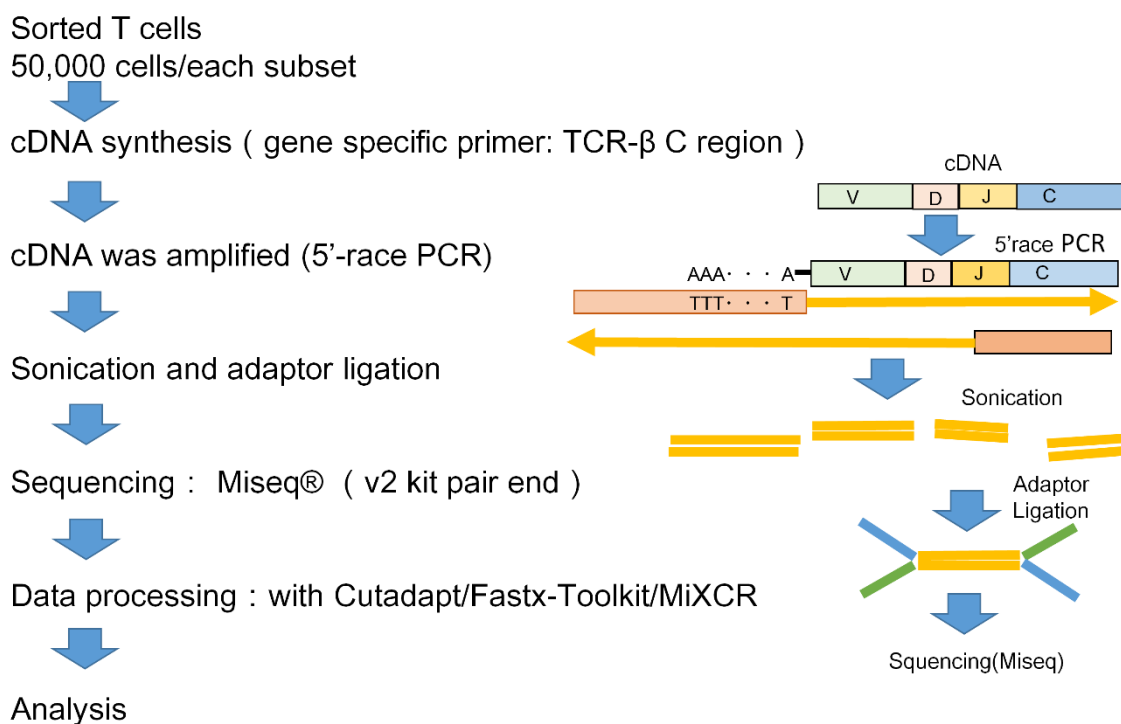
Supplementary Table 1

List of PCR primers. Sequences were conformed to IUPAC ambiguity codes. A: Adenine, T: Thymine, G: Guanine, C: Cytosine, V: A or C or G, R: A or G, N: G or A or T or C

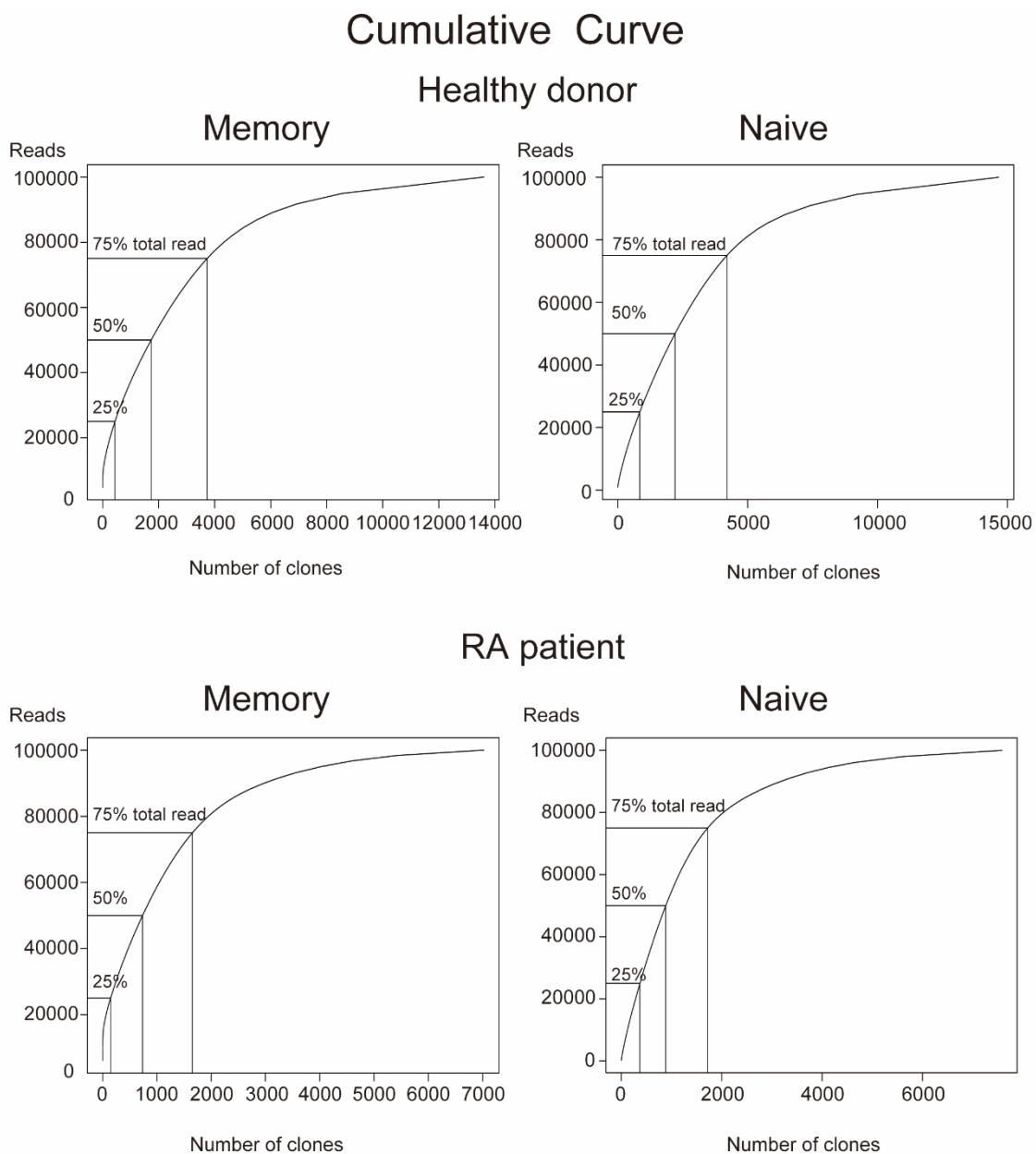
Primer name	Sequence
hTCR-CB-R3.2	CCATGACGGGTTAGAAGCTCCTAACTCC
hTCR-CB2-R3	CTGGGATGGTTTTGGAGCTA
Oligo-dT-N0-Adaptor	ACAGCAGGTCAGTCAAGCAGTAGCAGCAGTTCGATAACATTTTTTTTTTTTTT TTTTTTTTTTTTTVN
hTCR-CB-R9	VVGRAATCCTTTCTCTTGACCATGGCCATCA
AP2	AGCAGTAGCAGCAGTTCGATAA
TRBC-HTS	CGACCTCGGGTGGGAACA

Supplementary Figure 2. Summary of PCR and sequencing methods. RNA was extracted from the total sorted cells (50,000 cells/each), and TCR beta chain sequence was amplified by 5'-rapid amplification cDNA end (RACE) PCR strategy. Amplified cDNA was fragmented by Covaris S2, and sequenced by Miseq system after adaptor ligation. Data processing was performed by Cutadapt/Fastx-Toolkit/MiXCR.

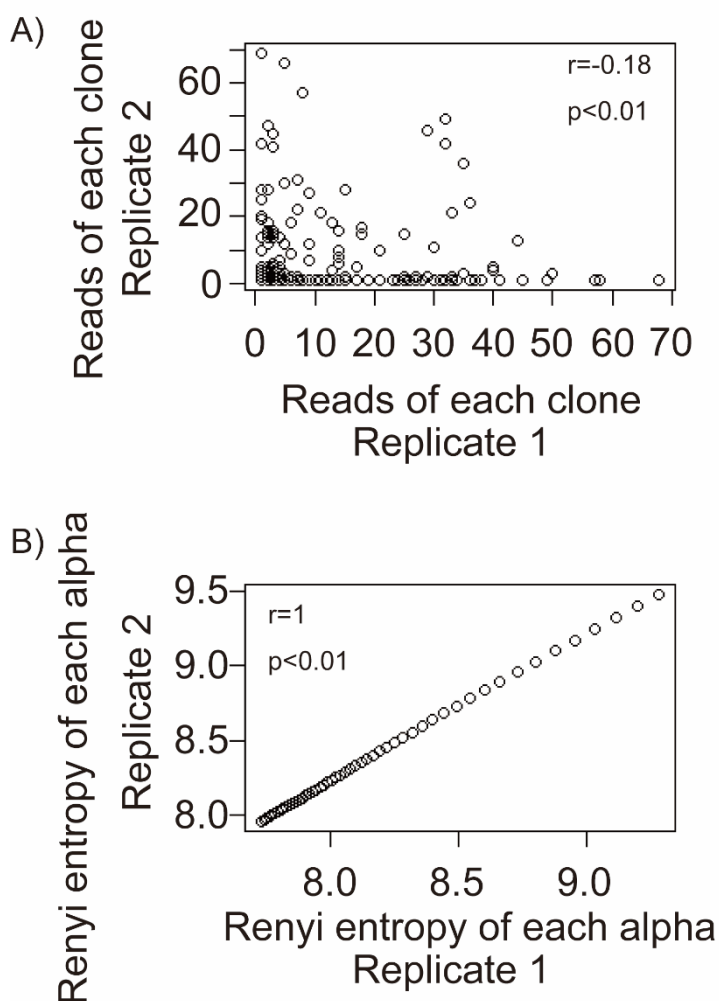
Method (at a glance)



Supplementary Figure 3. The representative cumulative plots of clone distribution were indicated. Cumulative reads were calculated from the most expanded clone to less expanded clone and plotted in this order. The points where the cumulative reads achieved 25%, 50%, and 75% of total reads (100,000 reads) were particularly indicated.



Supplementary Figure 4. Comparisons of the clone frequencies and the Renyi index between the biological replicates. Two samples of memory CD4⁺ T cells were sorted from the same donor at the same occasion. The following experiments were performed independently. A) The read counts of the same clones detected in replicated samples were plotted. B) The Renyi indexes (alpha from 0.1 to 5 in steps of 0.1) calculated in the replicated samples were plotted. Spearman's correlation analysis was indicated.



Supplementary Figure 5. The TCR repertoire diversity of anti-CCP antibody positive (>5U/ml) (n=18) and negative RA patients (n=4). (A, B) The TCR repertoire diversity of memory and naive CD4⁺ T cells were evaluated by the Renyi entropy. Statistical analyses were performed using the Mann-Whitney's U-test. * P < 0.05.

