***eLife’s* transparent reporting form**

We encourage authors to provide detailed information *within their submission* to facilitate the interpretation and replication of experiments. Authors can upload supporting documentation to indicate the use of appropriate reporting guidelines for health-related research (see [EQUATOR Network](http://www.equator-network.org/%20)), life science research (see the [BioSharing Information Resource](https://biosharing.org/%22%20%5Ct%20%22_blank)), or the [ARRIVE guidelines](http://www.plosbiology.org/article/info%3Adoi/10.1371/journal.pbio.1000412) for reporting work involving animal research. Where applicable, authors should refer to any relevant reporting standards documents in this form.

If you have any questions, please consult our Journal Policies and/or contact us: editorial@elifesciences.org.

**Sample-size estimation**

* You should state whether an appropriate sample size was computed when the study was being designed
* You should state the statistical method of sample size computation and any required assumptions
* If no explicit power analysis was used, you should describe how you decided what sample (replicate) size (number) to use

N/A. See information on replicates below.

Please outline where this information can be found within the submission (e.g., sections or figure legends), or explain why this information doesn’t apply to your submission:

**Replicates**

* You should report how often each experiment was performed
* You should include a definition of biological versus technical replication
* The data obtained should be provided and sufficient information should be provided to indicate the number of independent biological and/or technical replicates
* If you encountered any outliers, you should describe how these were handled
* Criteria for exclusion/inclusion of data should be clearly stated
* High-throughput sequence data should be uploaded before submission, with a private link for reviewers provided (these are available from both GEO and ArrayExpress)

Please outline where this information can be found within the submission (e.g., sections or figure legends), or explain why this information doesn’t apply to your submission:

1. PAR-CLIP experiments in Figure 1 and Figure 1–figure supplement 1 were carried out in biological duplicate (see Methods).

2. Confocal imaging in Figure 1 and Figure 1–figure supplement 2 was analyzed using 5 cells for each condition, and analyzed as indicated in the figure legends and Methods.

3. The polysome fractionation experiments in Figure 2 and Figure 2–figure supplement 1 were carried out in biological duplicate, with a technical triplicate from one experiment shown, as described in the figure legend.

4. All the nanoluciferase reporter experiments in Figures 3 and 4 were carried out from two donors, with triplicate measurements from each donor. Representative results from one donor are shown in Figures 3 and 4, as noted in the figure legend.

5. The westerns in Figure 4 and Figure 4–figure supplement 1 are from two donors.

6. All experiments in Figure 5 and Figure 5–figure supplements 1-4 are from two donors. Representative results from one donor are shown in Figure 5 panels D-G as described in the figure legend. Representative results from one donor are also shown in Figure 5–figure supplement 1D-1E, and in Figure 5-figure supplements 2-4, as described in the figure legends.

7. Experiments in Figure 5–figure supplement 5 are from two biological replicates. Representative results are shown as indicated in the figure legend.

8. The nanoluciferase reporter experiments in Figure 6A were carried out from two donors, with triplicate measurements from each donor. One for each is shown in Figures 3 and 4, as noted in the figure legend.

9. The westerns in Figure 6D are from two donors, as indicated in the figure legend.

10. The cytotoxicity assays in Figure 6 and Figure 6-figure supplements 1-6 were carried out using CAR T cells from six donors. All experiments were carried out in triplicate, as indicated in the figure legends.

**Statistical reporting**

* Statistical analysis methods should be described and justified
* Raw data should be presented in figures whenever informative to do so (typically when N per group is less than 10)
* For each experiment, you should identify the statistical tests used, exact values of N, definitions of center, methods of multiple test correction, and dispersion and precision measures (e.g., mean, median, SD, SEM, confidence intervals; and, for the major substantive results, a measure of effect size (e.g., Pearson's r, Cohen's d)
* Report exact p-values wherever possible alongside the summary statistics and 95% confidence intervals. These should be reported for all key questions and not only when the p-value is less than 0.05.

Please outline where this information can be found within the submission (e.g., sections or figure legends), or explain why this information doesn’t apply to your submission:

Confocal imaging in Figure 1 and Figure 1–figure supplement 2 was analyzed using 5 cells for each condition and analyzed using Pearson’s correlation coefficients as indicated in the figure legends and Methods.

(For large datasets, or papers with a very large number of statistical tests, you may upload a single table file with tests, Ns, etc., with reference to sections in the manuscript.)

**Group allocation**

* Indicate how samples were allocated into experimental groups (in the case of clinical studies, please specify allocation to treatment method); if randomization was used, please also state if restricted randomization was applied
* Indicate if masking was used during group allocation, data collection and/or data analysis

Please outline where this information can be found within the submission (e.g., sections or figure legends), or explain why this information doesn’t apply to your submission:

N/A

**Additional data files (“source data”)**

* We encourage you to upload relevant additional data files, such as numerical data that are represented as a graph in a figure, or as a summary table
* Where provided, these should be in the most useful format, and they can be uploaded as “Source data” files linked to a main figure or table
* Include model definition files including the full list of parameters used
* Include code used for data analysis (e.g., R, MatLab)
* Avoid stating that data files are “available upon request”

Please indicate the figures or tables for which source data files have been provided:

1. Source data has been deposited in the Gene Expression Omnibus with accession GSE191306.

2. Computer code for colocalization analysis is available at: <https://github.com/Llamero/TCR_colocalization_analysis-macro>.