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Life Sciences Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form is intended for publication with all accepted life science papers and provides structure for consistency and transparency in reporting. Every life science submission will use this form; some list items might not apply to an individual manuscript, but all fields must be completed for clarity.

For further information on the points included in this form, see Reporting Life Sciences Research. For further information on Nature Research policies, including our data availability policy, see Authors & Referees and the Editorial Policy Checklist.

Please do not complete any field with "not applicable" or n/a. Refer to the help text for what text to use if an item is not relevant to your study.
For final submission: please carefully check your responses for accuracy; you will not be able to make changes later.

Experimental design

1. Sample size

Describe how sample size was determined.

iMab foci of 300 - 400 nuclei were counted per condition for each biological replicate. Means shown for clarity purposes.

2. Data exclusions

Describe any data exclusions.

No data were excluded from the analyses.

3. Replication

Describe the measures taken to verify the reproducibility of the experimental findings.

For each experiment and condition, at least three independent technical replicates were performed for each of the two biological replicates. All observations reported in the manuscript were reproducible.

4. Randomization

Describe how samples/organisms/participants were allocated into experimental groups.

N/A

5. Blinding

Describe whether the investigators were blinded to group allocation during data collection and/or analysis.

N/A

Note: all in vivo studies must report how sample size was determined and whether blinding and randomization were used.

6. Statistical parameters

For all figures and tables that use statistical methods, confirm that the following items are present in relevant figure legends (or in the Methods section if additional space is needed).

n/a	Confirmed
☐	☒ The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement (animals, litters, cultures, etc.)
☐	☒ A description of how samples were collected, noting whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒ A statement indicating how many times each experiment was replicated
☐	☒ The statistical test(s) used and whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☐	☒ A description of any assumptions or corrections, such as an adjustment for multiple comparisons
☐	☒ Test values indicating whether an effect is present *Provide confidence intervals or give results of significance tests (e.g. P values) as exact values whenever appropriate and with effect sizes noted.*
☐	☒ A clear description of statistics including central tendency (e.g. median, mean) and variation (e.g. standard deviation, interquartile range)
☐	☒ Clearly defined error bars in all relevant figure captions (with explicit mention of central tendency and variation)

See the web collection on statistics for biologists for further resources and guidance.

Software

Policy information about availability of computer code

7. Software

Describe the software used to analyze the data in this study.	1) Number of foci were counted using FIJI as described in the supplementary information. 2) Imaris version 8 was used to analyze the colocalization assay. 3) Statistical analyses was performed using GraphPad Prism version 7. 4) Global fitting curves in the BLI experiment were analyzed using BLItz Pro version 1.2.

For manuscripts utilizing custom algorithms or software that are central to the paper but not yet described in the published literature, software must be made available to editors and reviewers upon request. We strongly encourage code deposition in a community repository (e.g. GitHub). *Nature Methods* guidance for providing algorithms and software for publication provides further information on this topic.

Materials and reagents

Policy information about availability of materials

8. Materials availability

Indicate whether there are restrictions on availability of unique materials or if these materials are only available for distribution by a third party.	iMab antibody fragment generated at the Garvan Institute would be available upon request for research applications.

9. Antibodies

Describe the antibodies used and how they were validated for use in the system under study (i.e. assay and species).	1) Anti-myc horseradish peroxidase (HRP) antibody (CMYC-45P, ICL) 2) Anti-FLAG antibody (14793S, Cell Signaling Technology) 3) Anti-rabbit Alexa 488-cojugated antibody (711-546-152, Jackson ImmunoResearch) 4) Anti-TRF2 antibody (ab13579, Abcam) 5) Anti-mouse Alexa 488-cojugated antibody (715-545-150, Jackson ImmunoResearch) 6) Anti-rabbit Alexa 594-cojugated antibody (A-11037, ThermoFisher) 7) BG4 antibody (Ab00174-1.1, Absolute Antibody) 8) Anti-E12/E47 antibody (sc-133075, Santa Cruz Biotechnology) 9) Anti-mouse Alexa 594-conjugated antibody (A11005, ThermoFisher)

10. Eukaryotic cell lines

a. State the source of each eukaryotic cell line used.	MCF7: Michigan Cancer Foundation HeLa: Garvan Institute of Medical Research HEK 293T: Garvan Institute of Medical Research U2OS: Garvan Institute of Medical Research
b. Describe the method of cell line authentication used.	MCF7: validated by Cellbank Australia using short tandem repeat (STR) profiling HeLa: not done HEK 293T: validated by Cellbank Australia using STR profiling U2OS: not done
c. Report whether the cell lines were tested for mycoplasma contamination.	All cell lines were tested and are negative for mycoplasma
d. If any of the cell lines used are listed in the database of commonly misidentified cell lines maintained by ICLAC, provide a scientific rationale for their use.	Cell lines used in this study were chosen as models and results did not show any cell line dependency.

Animals and human research participants

Policy information about studies involving animals; when reporting animal research, follow the ARRIVE guidelines

11. Description of research animals

Provide all relevant details on animals and/or animal-derived materials used in the study.	N/A

Policy information about studies involving human research participants

12. Description of human research participants

Describe the covariate-relevant population characteristics of the human research participants.	N/A