**Materials Design Analysis Reporting (MDAR)**

**Checklist for Authors**

**Materials:**

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| **Newly created materials** | **Indicate where provided: section/figure legend** | **N/A** |
| The manuscript includes a dedicated "materials availability statement" providing transparent disclosure about availability of newly created materials including details on how materials can be accessed and describing any restrictions on access. | The disclosure about availability of newly created materials is provided in the “Data and materials availability” section. |  |
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| **Antibodies** | **Indicate where provided: section/figure legend** | **N/A** |
| For commercial reagents, provide supplier name, catalogue number and [RRID](https://scicrunch.org/resources), if available. |  | No antibodies were used in this study |
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| **DNA and RNA sequences** | **Indicate where provided: section/figure legend** | **N/A** |
| Short novel DNA or RNA including primers, probes: Sequences should be included or deposited in a public repository. | The sequence information in provided in the “Data and materials availability” section. |  |
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| **Cell materials** | **Indicate where provided: section/figure legend** | **N/A** |
| Cell lines: Provide species information, strain. Provide accession number in repository OR supplier name, catalog number, clone number, OR RRID | The cell line information is provided in the “HEK293 cell culture and transfection” section. |  |
| Primary cultures: Provide species, strain, sex of origin, genetic modification status. |  | No primary cell cultures were used in this study. |
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| **Experimental animals** | **Indicate where provided: section/figure legend** | **N/A** |
| Laboratory animals or Model organisms: Provide species, strain, sex, age, genetic modification status. Provide accession number in repository OR supplier name, catalog number, clone number, OR RRID. | The information about laboratory animals and model organisms is provided in the “Expression and purification of ancyromonad ACRs from *Pichia pastoris*” and “Mice” sections. |  |
| Animal observed in or captured from the field: Provide species, sex, and age where possible. | No animals observed or captured in the field were used in this study. |  |
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| **Plants and microbes** | **Indicate where provided: section/figure legend** | **N/A** |
| Plants: provide species and strain, ecotype and cultivar where relevant, unique accession number if available, and source (including location for collected wild specimens). |  | No plants were used in this study. |
| Microbes: provide species and strain, unique accession number if available, and source. | The information about the microbes used is provided in the “Expression and purification of ancyromonad ACRs from *Pichia pastoris*” section. |  |
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| **Human research participants** | **Indicate where provided: section/figure legend) or state if these demographics were not collected** | **N/A** |
| If collected and within the bounds of privacy constraints report on age, sex, gender and ethnicity for all study participants. |  | There were no human participants in this study. |

**Design:**

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| **Study protocol** | **Indicate where provided: section/figure legend** | **N/A** |
| If the study protocol has been pre-registered, provide DOI. For clinical trials, provide the trial registration number OR cite DOI. |  | This study was not a clinical trial, and no pre-registered protocols were used. |
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| **Laboratory protocol** | **Indicate where provided: section/figure legend** | **N/A** |
| Provide DOI OR other citation details if detailed step-by-step protocols are available. |  | No step-by-step protocol is available. |
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| **Experimental study design (statistics details) \*** | | |
| **For in vivo studies: State whether and how the following have been done** | **Indicate where provided: section/figure legend. If it could have been done, but was not, write “not done”** | **N/A** |
| Sample size determination | As described in the “Reproducibility and statistics” section, the sample size was not pre-determined but the sample sizes were similar to those reported in the previous publications. |  |
| Randomisation | Randomisation procedures are described in the “Reproducibility and statistics” section. |  |
| Blinding | Blinding procedures are described in the “Reproducibility and statistics” section. |  |
| Inclusion/exclusion criteria | Inclusion/exclusion criteria are described in the “Reproducibility and statistics” section. |  |
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| **Sample definition and in-laboratory replication** | **Indicate where provided: section/figure legend** | **N/A** |
| State number of times the experiment was replicated in the laboratory. | The numbers of times each experiment was replicated in the laboratory are provided in the figures, figure legends or Source Data files. |  |
| Define whether data describe technical or biological replicates. | All numbers of sampled cells provided describe biological replicates. |  |
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| **Ethics** | **Indicate where provided: section/submission form** | **N/A** |
| Studies involving human participants: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval. |  | There were no human participants in this study. |
| Studies involving experimental animals: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval | As stated in the “Mice” section, all procedures to maintain and use mice were approved by the Institutional Animal Care and Use Committee at Baylor College of Medicine (protocol AN-6544). |  |
| Studies involving specimen and field samples: State if relevant permits obtained, provide details of authority approving study; if none were required, explain why. |  |  |
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| **Dual Use Research of Concern (DURC)** | **Indicate where provided: section/submission form** | **N/A** |
| If study is subject to dual use research of concern regulations, state the authority granting approval and reference number for the regulatory approval. |  | This study is not subject to dual use research of concern regulations. |

**Analysis:**

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| **Attrition** | **Indicate where provided: section/figure legend** | **N/A** |
| Describe whether exclusion criteria were pre-established. Report if sample or data points were omitted from analysis. If yes, report if this was due to attrition or intentional exclusion and provide justification. | As described in the “Reproducibility and statistics” section, exclusion criteria were pre-established. No samples or data points not satisfying these criteria were excluded from analysis. |  |
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| **Statistics** | **Indicate where provided: section/figure legend** | **N/A** |
| Describe statistical tests used and justify choice of tests. | The description and justification of the statistical tests used are provided in the figure legends. |  |
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| **Data availability** | **Indicate where provided: section/submission form** | **N/A** |
| For newly created and reused datasets, the manuscript includes a data availability statement that provides details for access (or notes restrictions on access). | The disclosure about availability of newly created data is provided in the “Data and materials availability” section. |  |
| When newly created datasets are publicly available, provide accession number in repository OR DOI and licensing details where available. | The accession numbers in repository of newly created data are provided in the “Data and materials availability” section. |  |
| If reused data is publicly available provide accession number in repository OR DOI, OR URL, OR citation. |  | No reused data was analyzed in this study. |
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| **Code availability** | **Indicate where provided: section/figure legend** | **N/A** |
| For any computer code/software/mathematical algorithms essential for replicating the main findings of the study, whether newly generated or re-used, the manuscript includes a data availability statement that provides details for access or notes restrictions. |  | Only commercial software was used in this study. |
| Where newly generated code is publicly available, provide accession number in repository, OR DOI OR URL and licensing details where available. State any restrictions on code availability or accessibility. |  | No newly generated code was used in this study. |
| If reused code is publicly available provide accession number in repository OR DOI OR URL, OR citation. |  | No newly generated code was used in this study. |

**Reporting:**

The MDAR framework recommends adoption of discipline-specific guidelines, established and endorsed through community initiatives.

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| **Adherence to community standards** | **Indicate where provided: section/figure legend** | **N/A** |
| State if relevant guidelines (e.g., ICMJE, MIBBI, ARRIVE, STRANGE) have been followed, and whether a checklist (e.g., CONSORT, PRISMA, ARRIVE) is provided with the manuscript. |  | This study did not require following specific guidelines. |