This template contains the formatting and instructions for a submission to *JoVE*. Write directly in this document. The submitted manuscript should include original text, not previously published online or in print, including journals, websites or blogs.

**TITLE:** ([Instructions](#gjdgxs))

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**AUTHORS AND AFFILIATIONS:** ([Instructions](#30j0zll))

Enter text here.

**SUMMARY:** ([Instructions](#lnxbz9))

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**ABSTRACT:** ([Instructions](#3znysh7))

Enter text here.

**INTRODUCTION:** ([Instructions](#2et92p0))

Enter text here.

**PROTOCOL:** ([Instructions](#tyjcwt))

Enter text here (10-page maximum, highlight 3 pages of protocol for filming).

**REPRESENTATIVE RESULTS:** ([Instructions](#3dy6vkm))

Enter text here.

**FIGURE AND TABLE LEGENDS:** ([Instructions](#1t3h5sf))

Enter text here.

**DISCUSSION:** ([Instructions](#4d34og8))

Enter text here.

**ACKNOWLEDGMENTS:** ([Instructions](#2s8eyo1))

Enter text here.

**DISCLOSURES:** ([Instructions](#17dp8vu))

Enter text here.

**REFERENCES:** ([Instructions](#3rdcrjn))

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**INSTRUCTIONS**

**General formatting**

* The manuscript must be submitted as an editable .doc or .docx file.
* Define acronyms/abbreviations upon first use in the main text.
* Use SI units as much as possible and abbreviate all units: L, mL, µL, cm, kg, h, min, s, etc*.*
* Include a space between all numbers and the corresponding unit: 50 mg, 100 mL, 37 °C,etc*.*
* Abbreviate species names after first use: *Caenorhabditis elegans* should be *C. elegans.*
* Remove the header, the footer, links, and any gray text and links prior to submission.
* Include line numbers in a continuous manner. Open the Word document, go to 'Layout' tab, click 'Page Setup,' select the 'Layout' tab, choose 'Continuous' under 'Line numbers,' and click 'OK'."

**TITLE:** (150-character maximum)

The title should include the model system used or the type of study design. Avoid the use of abbreviations.

**AUTHORS AND AFFILIATIONS:**

* Provide full unabbreviated affiliations and institutional email addresses for all authors. Affiliations should reflect where the work was performed.
* Please see our editorial policies: ([www.jove.com/author/editorial-policies](http://www.jove.com/author/editorial-policies)) for more details regarding authorship. Indicate equal contributions or other footnotes with asterisks (\*).
* The corresponding author in the published article may differ from the one used for correspondence with the editorial office during the submission and publication process.

**SUMMARY:** (10-word minimum, 50-word maximum)

**ABSTRACT:** (150-word minimum, 300-word maximum)

**INTRODUCTION:** (150-word minimum, 1,500-word maximum, 2-paragraph minimum)

**PROTOCOL:** (1-page minimum, 10-page maximum)

The protocol text should provide a detailed description to enable the accurate replication of the presented methods by both experts and researchers new to the field. The protocol should be broken up into multiple clearly distinct sections.

In the text manuscript, the commercial names of research tools and names of their producers should be placed in the Table of Materials. The text manuscripts should avoid any descriptions that would amount to promotion or advertisement of companies or their products. For example, repeated statements of commercial instrument names should be avoided. If necessary, the commercial name of a research tool can be mentioned once, and a generic commonly acceptable name of this research tool should be used throughout the text.

Providing a figure with a diagram/schematic of the method is recommended.

When appropriate, include an ethics statement before the numbered protocol steps, indicating that the protocol follows the guidelines of your institution’s human research ethics committee or animal care and use committee. If live animals are used in the protocol, ensure that the protocol adheres to [JoVE’s animal use guidelines](https://www.jove.com/files/editorial_resources/Animal_Use_Guidelines.pdf).

**A) Format**

* Break up the protocol into distinct sections: Method 1, Method 2, etc.
* Each distinct protocol section should have numbered steps: 1.1, 1.2, etc. Each step should include 1−2 actions and contain 2−3 sentences. Use subheadings and substeps for clarity.
* Include a space between each numbered step or note in the protocol.
* Short notes (“NOTE:”) can be used sparingly to describe non-actionable items. Discussion of the method can be included in the Representative Results or Discussion section.
* Indicate any points at which the experiment can be paused and then restarted later. For these situations, indicate the choices at that point in the protocol.
* Indicate any toxic or harmful chemicals with the word “CAUTION” when they are first used. Describe the hazard and the appropriate handling guidelines.
* All methods that involve the use of human or vertebrate subjects and/or tissue sampling must include a statement that the research was performed in compliance with institutional guidelines at the beginning of the protocol section.
* For actions involving software usage, provide all specific details (e.g., button clicks, software commands, any user inputs, etc.) needed to execute the actions.

**B) Grammar**

* Avoid the use of commercial language, including ™/®/© symbols or company brand names before/after an instrument or reagent. Cite these in the **Table of Materials** instead.
* List all centrifugation speeds in terms of centrifugal g-force instead of rpm: 100 x *g*

**C) Protocol length and highlighting**

* The protocol length is 10-page maximum (with proper formatting). For a protocol section that exceeds 3 pages, highlight in yellow up to 3 pages to be featured in the video.

**D) Equations** (example: [www.jove.com/video/60874](http://www.jove.com/video/60874))

**REPRESENTATIVE RESULTS:** (example: [www.jove.com/video/60692](http://www.jove.com/video/60692))

Provide a concisely written description of representative outcomes following the use of this method, so that a viewer will have a sense of a “positive” and/or “negative” result. Describe how the results confirm the success of the protocol and how to interpret the data. Include data from successful experiments and data from suboptimal experiments to demonstrate the range of outcomes possible. All claims of the effectiveness of a method must be supported with data.

**FIGURES AND TABLES:**

* Provide a separate file for each figure and table; do NOT embed figures or tables within the manuscript document. The default placement for all figures and tables in the final publication is below the Representative Results’ text. Indicate via brackets if figure/table placement at another location in the text is preferred [Place **Figure 1** here].
* If a figure is adapted or republished from a previous publication, cite the original article in the figure legend. Reprint permission for the previously published/adapted figure is required.
* Ensure that all details are visible and that formatting is consistent throughout. All figures should be provided as individual files. Multipanel figures (A, B, C, etc.) should be submitted as a single image file that contains the entire figure.
* All microscopic images must include scale bars, ideally at the lower right corner.
* All data figures must include measurement definitions and error bars (if applicable). Define all error bars (SEM, SD, range, etc.).
	+ Preferred figure file types: .ai, .eps, .psd, .svg, .pdf
	+ .tiff and .jpg (not preferred) files must be at least 1,440 pixels x 480 pixels, or 300 dpi.
	+ All tables should be provided as individual .xls or .xlsx files and submitted as tables. Avoid any coloring or formatting in the tables.

**FIGURE AND TABLE LEGENDS:**

Each figure or table, including supplemental figures/tables, must have an accompanying legend consisting of a short title and a short description of each panel or a general description. Legends should be included as part of the manuscript and not be included in the figure file.

**TABLE OF MATERIALS:**

A Table of Materials is required for all articles. A template is provided [here](http://www.jove.com/files/templates/JoVE_Materials.xls). Sort the materials alphabetically by material name. Do not number the Table of Materials in the article.

**SUPPLEMENTARY FILES:**

Supplementary figure files must be referenced in the text. Production files, such as screenshots and permissions, can be uploaded as numbered “supplemental files”.

* Upload all scripts and coding files as “Supplemental Files”.

**DISCUSSION:** (3–6 paragraphs)

JoVE is a methods journal. Thus, the Discussion section of the article should be focused on the Protocol. Discuss the following with citations:

* Critical steps in the protocol
* Modifications and troubleshooting of the method
* Limitations of the method
* The significance of the method with respect to existing/alternative methods
* Importance and potential applications of the method in specific research areas

**ACKNOWLEDGMENTS:**

List acknowledgments and all funding sources for the work here.

**DISCLOSURES:**

Ensure that all authors have disclosed any and all conflicts of interest.

**REFERENCES:** (10 minimum; if using EndNote, use the [JoVE EndNote style file](http://www.jove.com/files/JoVE.ens))

**Citation formatting:** Last name, first and middle initials (if available). List **ALL** authors. If there are six or more authors, list the first author and then “et al.”. “Accepted” or “In Press” can be listed after the title or journal name and before the year.

**Examples:**

Baker, A. R., Slack, F. J. ADAR1 and its implications in cancer development and treatment. *Trends Genet.* **38** (8), 821-830 (2022).

Vue, Z. et al. Stories from Hmong in STEMM. *Trends Genet.* **39** (8), 587-592. 2023.