***MethodsX* protocol article template Version 5 (April 2024)**

**AUTHOR INSTRUCTIONS**

**Before you complete this template**, a few important points to note:

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* Brief **instructions are in blue italics**. Additional instructions appear in comment boxes to the right of the main text.
* Please do not change any section headings (e.g., *Article information*, *Specifications table*).

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**Article information**

**Article title**

*Max. 20 words. The title should be unique.*

**Authors**

*List all authors. Please mark the corresponding author with (\*)*

**Affiliations**

*Please include the full address of each author institution*

**Corresponding author’s email address and Twitter handle**

*Institutional email address mandatory. If you have a X (formerly Twitter) handle, please add it here ‘X: @....’*

**Keywords**

*List a minimum of three keywords, separated by semi colons.**There is no maximum.*

**Related research article**

*If your protocol article supports an original research article* ***of your own****, please cite that same article here. You should only list one article.*

***For a published article:***

*J. van der Geer, J.A.J. Hanraads, R.A. Lupton, The art of writing a scientific article, J. Sci. Commun. 163 (2010) 51–59.* [*https://doi.org/10.1016/j.Sc.2010.00372*](https://doi.org/10.1016/j.Sc.2010.00372)

*If your protocol article is* ***not related to a research article****, please state “none”.*

**Abstract**

*Maximum length is 200 words.*  *Include 1-3 bullet points that outline your protocol – avoid the technical steps involved; these will be described later.*

**Graphical abstract**

*The graphical abstract should summarize the contents of your article in a concise, pictorial form. Graphical abstracts should be submitted as a separate file. Image size:****please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more****. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files.*

**Specifications table**

*This table provides general information on your protocol.*

|  |  |
| --- | --- |
| **Subject area** | *Please Select Subject Area from dropdown list*  |
| **More specific subject area** | *Describe narrower subject area* |
| **Name of your protocol** | *Please write the name of the protocol you are describing in this article* |
| **Reagents/tools** | *If applicable, include a list of reagents and equipment with manufacturers’ details* |
| **Experimental design** | *Very brief experimental description* |
| **Trial registration** | *If applicable, include clinical trial registry and number* |
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| **Value of the Protocol** | *Describe the importance of the protocol in up to 3 bullet points.* |

**Background**

*Please describe your motivation and context behind providing this protocol. This section should provide readers with context for why and how your protocol may be used. (Max. 500 words).*

**Description of protocol**

*Our goal is to publish protocols that can be replicated by other researchers. Please include a clear rationale for the study. Include a step by step description of the protocol. Describe the experimental design, reagents/tools, data measurement and analysis, study guideline such as FDA guidelines, human subject guidelines.*

* ***There is no word limit!*** *You can include figures, tables, videos – anything you feel will help others reproduce your protocol.*

**Protocol validation**

*Results and Discussion are not part of a protocol article. However, if possible please provide data that validate the protocol.*

**Limitations**

*Please describe any limitations that the protocol you describe may have. For eg., experimental conditions in which the protocol may not work.*

*If there are none, please write ‘None’ or ‘Not applicable’.*

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**References**

*If your protocol article is about a customization you made, include at least one reference to the original publication of that protocol.*

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***Thank you!***