**Academic Review For ISF Proposal – Project 12533**

In this proposal, the authors present a well-crafted but incomplete project outline that seeks to clarify the roles that different mechanoreceptors play in the processing of tactile information. Overall, the authors demonstrate a strong grasp of the core concepts and experimental approaches needed to complete their study, and Specific Aim 1 is particularly strong and well written. While the majority of my concerns and comments regarding the completed sections of this manuscript are relatively minor, I have provided commentary for each section below, along with comments corresponding to specific issues or questions in the edited text. However, the incomplete nature of the proposal, particularly for Aims 2/3, does make fully appreciating its overall strength difficult. Even so, I anticipate that when the authors address the below suggestions as appropriate and complete Aims 2/3 to a similar level of detail as exhibited for Aim 1, their proposal will have a high chance of being funded.

Abstract

* Make sure to add in your Hypothesis. You can use the same version you include in the final full grant proposal.
* Consider reorganizing this section to discuss more background and all of your preliminary data first, before stating your specific Aims, closing with a sentence emphasizing the significance of this project.

Introduction/Background

* This section provides a concise but effective background on relevant whisker-related mechanosensing pathways. The main issue with this section may simply be that the authors don’t do enough work to emphasize the unknowns that form the foundation of their proposed study. A bit more explicit mention of gaps in current knowledge before the final two paragraphs of this section would help smooth the transition into the project goals.
* Given your focus in your aims on different classes of RA/SA mechanoreceptors, I would suggest spending more time delineating the overlapping/non-overlapping characteristics and functions of these mechanoreceptor classes of interest in your Introduction section.
* As noted in the text, the frequent use of italicization is potentially distracting. Consider minimizing this and simply bolding your key hypothesis/aims statements.

Aims and Experimental Approach

* In general, I find the organization of this section (where complete) somewhat confusing. In my experience grants are generally clearer if they list the preliminary results first and then detail the future experimental plans. While it is possible that the placement of the preliminary results at the end of each experimental section is simply standard ISF grant formatting, if that is not the case I would suggest reorganizing the individual sections to place the preliminary data first. This will help make the current status of your work and goals for each section clearer.
* The term “experiment set” is somewhat clunky. I have rephrased these as Sub-Aims, although you can revert the terminology or use another term such as “task” as you see fit.
* For Specific Aim 1, please check that I have understood your mouse model system correctly as it was not explained with sufficient clarity.
* Your Aim 1 “Possible Outcomes” section doesn’t really provide specific expected experimental outcomes, just general results. Give a more detailed description of what exactly you expect to find through these experiments.
* Relative to Aim 1, the other Aims seem less developed (in addition to incomplete). Ideally, at least some discussion of your expected findings/potential pitfalls would be of value for each of your Sub-Aims (or a discussion for all of the Sub-Aims at the end of the corresponding Specific Aim section).
* For Aim 3, is a 75% correct response rate for your operantly conditioned mice really high enough to permit robust analyses of the relationship between mechanosensing and decision-making?
* Aim 3 is particularly under-developed. In particular, more background is needed, as a bit clearer explanation for your intended illusory surface experiments and their goals.
* When you discuss potential pitfalls, your study will be strengthened significantly by also discussing some alternative approaches that may have the opportunity to overcome these pitfalls. I would consider adding these in wherever possible.

General Experimental Methods

* There are some methods for which no details are provided at present, and one instance in which rats are mentioned in place of mice.
* Discussion of the ethical oversight of your animal studies is important to ensure that all of these protocols are consistent with established university/national guidelines.
* Several comments in this section on specific points/uncertainty should be addressed.
* Your operant conditioning experimental description seems to largely copy text from earlier in the proposal – this is likely unnecessary duplication such that you can shorten the text in one of these two sections.

Other Comments

* In general, I think your proposal will benefit from a detailed description of your statistical analytical plan crafted by a collaborating statistician (or by any member of the current research team with strong statistics experience).