

# Review of: "Enhanced cultured diversity of the mouse gut microbiota enables custom-made synthetic communities"

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**Potential competing interests:** The author(s) declared that no potential competing interests exist.

The study by Afrizal, Jennings and Hannings *et al.* describes the (welcome) expansion of the mouse intestinal bacterial collection (miBC), which is crucial for studying host-microbe interactions in both fundamental and clinical research. The manuscript is well written and combines a comprehensive taxonomical description of a novel family, novel genera and species with impressive functional validation in mouse models. Moreover, it proposed an expanded and adapted Oligo-Mouse Microbiota of 19 species, to close the gap with SPF mice in terms of host parameters. Although the followed approach is well described, it could be improved to make it easier to follow for the (new) reader.

## Suggestions

- Figure 1: The figure is clear, but it would be more informative to include a legend explaining the colours and symbols, which are now only described in the caption. The same goes for Figure 2C-F: The figures could benefit from a legend explaining the dots.
- Figure 2G: To me, it was not immediately clear what the grey part of the bar was referring to. For clarity, perhaps the grey area could be left white or a legend should be included with "Grey area" = uncovered, or something.
- Line 126: "catalogue of the mouse gut" - To clarify, I think "catalogue of the mouse gut **microbiota**" would be a better term to use.
- Line 206: Please introduce the meaning of R-syn and S-syn earlier in this paragraph (mainly for new readers, who are not familiar with the previous work).
- Line 212: Write SCFA in full, since the term is only used once.
- Line 214: "...multiple pathways..." - The connection with the previous sentence is not obvious. Perhaps this can be replaced with: "multiple pathways **related to short-chain fatty acid production**".
- Line 229-230: Please describe briefly why and how the additional species were selected, including the replacement of two original OMM12 strains and addition of 9 new species (now only (but clearly) described in the caption of Figure S3).
- Line 240: Since *F. butyricus* failed to colonize the mice, include a brief statement on the inclusion of this species in future studies - or suggestions on how to improve its colonization.
- Line 377 and on (Methods): Since sex has been shown to influence some host parameters and microbial colonization patterns, please specify for each mouse experiment, which sex was used to ensure reproducibility (as much as possible) for future experiments.

- Line 523: Please specify feed in more detail (similar to the section for Facility A) to ensure reproducibility (as much as possible) for future experiments in this or another facility.