

The study by Rådecker and Meibom aims at understanding nutrient cycling in food deprived Cnidarian-Symbiodinium holobionts using the Aiptasia model. It combines stable isotope probing and NanoSIMS to provide direct evidence of enhanced C assimilation and similar N assimilation in symbionts between 1 year fed and unfed Aiptasia. Indirect evidences suggest more efficient C translocation from symbionts in artemia deprived holobionts.

The paper is clear and easy to read.

Title: The title reflects the content of the article.

Introduction: The introduction provides a good background on the importance of trophic plasticity in corals with appropriate references. The objectives and general findings are clearly stated.

Materials and methods: The method used seems appropriate for the study however I do not have sufficient expertise in statistics to evaluate the *Statistical analyses* paragraph (lines 155 to 161). The Materials and methods section provides sufficient details for replication by others.

1. *Animal husbandry & experimental design (line 84 to 98)* How many animals were kept in each batch and how many survived the one-year starvation?
2. Line 106; It mentioned that the centrifugation parameters are the same for both treatments. Is there a possibility that symbionts from unfed Aiptasia have different densities compare to symbionts from fed Aiptasia? If so, using the same centrifugation parameters in both treatments might not allow the author to capture all the symbiont fraction. Did the author check the host fraction to make sure it doesn't content symbionts?
3. Please clarify which controls were used for Stable Isotope probing and NanoSIMS.
4. Please describe the number of ROI as well as ROI selection process for C data as it done in the following reference: Rådecker N, Raina J-B, Pernice M, Perna G, Guagliardo P, Kilburn MR, Aranda M, Voolstra CR (2018) Using Aiptasia as a model to study 345 metabolic interactions in cnidarian-Symbiodinium symbioses. *Front Physiol* 9:214

Results: The results are well-explained and are presented in appropriate format.

1. Please include data from the unlabeled controls in the raw data.
2. Line 186-187: The authors claimed that ¹³C assimilation within the host was primarily observed in lipid bodies however as there is no TEM correlation in this study, there is no evidence that structures labeled as lipid bodies on fig 2 A and B are lipid bodies. It would be useful if the author could provide the TEM correlated image or explain how they came to this labeling. In fact, those structures could just be symbionts appearing smaller because of the sectioning plane.

Tables and figures

3. Fig. 2 A and B: The scales are different (0.0105 to 0.0400 vs 0.105 to 0.400). I assume it is a mistake and it should read 0.0105 to 0.0400 on both scales. Please correct or explain otherwise.

4. Fig 2 B, C and D: Please include number of replicates and ROI in the legend

Discussion:

1. Line 221-222: The author stated “translocation of photosynthates by algal symbionts remained sufficient to maintain the basal metabolic requirement of the host.” Could the author specify number of Aitpasia in each batch at the end of the experiment? Knowing how many individuals survived the experiment would help support their claim. Also, in view basal metabolic requirement implies cell growth. Do the authors have any evidence of cell growth in the system that would support their claim?

References

1. Line 341-342: reference is incomplete :...118 **(5)**