

## Reviewer Report

**Title: The genomic basis for colonizing the freezing Southern Ocean revealed by Antarctic toothfish and Patagonia robalo genomes**

**Version: Original Submission**    **Date: 10/2/2018**

**Reviewer name: Nicholas Jeffery**

### Reviewer Comments to Author:

Review of "Genomic bases for colonizing the freezing Southern Ocean revealed by the genomes of Antarctic toothfish and Patagonia robalo"

This manuscript sequences the genome and transcriptome of Antarctic toothfish and its closest temperate relative, the Patagonian robalo. The authors detect >200 protein gene families that have expanded with functions in stress response and freeze resistance. The amount of work conducted in this study is impressive. I applaud the authors for estimating the genome size using both the k-mer frequency distribution and flow cytometry to compare to the final assembly lengths. I am particularly interested in the expansion of transposable elements correlate to notothenioid diversification. I find no major flaws with the study, but would like to see more detail on the assembly steps (e.g. parameters tested and used in SoapDeNovo and SSPACE).

Minor comments:

Suggest a review for spelling and English grammar throughout the paper.

L69: is the >90% catch from commercial fisheries?

L141: do the authors know why both the scaffold and contig N50 lengths are so much lower in robalo compared to toothfish?

In Fig. 4 "kidney" is spelled incorrectly on the "caudal kidney" label

## Methods

Are the methods appropriate to the aims of the study, are they well described, and are necessary controls included? Choose an item.

## Conclusions

Are the conclusions adequately supported by the data shown? Choose an item.

## Reporting Standards

Does the manuscript adhere to the journal's guidelines on [minimum standards of reporting?](#) Choose an item.

Choose an item.

## Statistics

Are you able to assess all statistics in the manuscript, including the appropriateness of statistical tests used? Choose an item.

### **Quality of Written English**

Please indicate the quality of language in the manuscript: Choose an item.

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