

Reviewer Report

Title: **The genome of golden apple snail *Pomacea canaliculata* provides insight into stress tolerance and invasive adaptation**

Version: **Original Submission** Date: 3/12/2018

Reviewer name: **Takeshi Takeuchi**

Reviewer Comments to Author:

In their manuscript Liu et al. reported the genome sequence of the golden apple snail *Pomacea canaliculata*. They constructed chromosomal-level genome assembly using HiSeq, PacBio, and Hi-C sequencing technologies. They also tested differential gene expression under various environmental stress, showing many genes are responded to maintain homeostasis. In addition, they sequenced gut metagenome of the snail for the first time, implying that microorganisms contribute to digestion and resistance to xenobiotics of the host animal.

I think the massive data provides fundamental information to understand the biology of the animal as well as molluscs, therefore the study is valuable to be published in the journal *GigaScience* after some corrections.

Overall, the methods are appropriate, but description and interpretation of the results look not sufficient in some points as shown below.

P. 5, lines 94-96

"such as California sea hare, Pacific oyster, Pearl oyster,..."

should be "such as the California sea hare, the Pacific oyster, the pearl oyster,..."

There are many mistakes like this. I won't mention all of them. Please consult professional English editor before submitting the revision.

P. 7, lines 148-150

"genes from seven related species..."

In fact eight species including *Pinctada fucata* were analyzed in figures 2a and 4a. Takeuchi et al.(2016, *Zoological Letters*, 2:3) and Luo et al.(2015, *Nature Communications*, 6, 8301) should be referred for *P. fucata* and *Lingula anatina* genome data, respectively.

In addition, please carefully correct scientific names in Abbreviations and figures.

"*Lottia gigantean*" should be "*Lottia gigantea*"

"*Aplysia californica*" should be "*Aplysia californica*."

"*Lingula anatine*" should be "*Lingula anatina*"

P. 9 178-179

From the results I could not understand how the idea that the "DNA/hAT-Charlie TEs... promote the potential plasticity in the stress adaptation" came. This hypothesis can be tested using the present RNA-seq data, by checking whether the TEs are up-regulated under the stresses.

P.11 lines 232-236

The authors claimed that the *P. canaliculata* CYP gene family expanded compare to other molluscs. But the gene expansion of CYP looks common among molluscs. The number of the gene in *P. canaliculata* didn't significantly stand out from other molluscs (for example *P. canaliculata* has 157 genes and the Pacific oyster has 135). A molecular phylogeny in Fig 4a shows that lineage-specific gene expansion of CYP occurs not only in *P. canaliculata* but also other molluscs.

P. 17 lines 346-354

"The rich phenotypic... in laboratory."

These sentences should be move to Introduction.

P. 18 lines 380-381

"total messenger RNAs"

Total RNA or messenger RNA?

P. 21 line 445

Please cite the literature of "previous results."

Figure 2

The title "Evolutionary genomic analysis between *P. canaliculata* and other molluscs" is not appropriate because *Lingula* is a brachiopod.

Figure 4

Method for molecular phylogeny construction of CYP genes should be described.

Figure S1

Which K-mer size used?

Table S4, S5, and S7

It is not reader-friendly to show the huge data in a table. I couldn't recognize what is the message of the data. Why not visualize the data in a heat map like Fig4b.

Table S9

What "Mean" and "SD" indicate? E-value of blast results? Please describe.

Methods

Are the methods appropriate to the aims of the study, are they well described, and are necessary controls included? Yes

Conclusions

Are the conclusions adequately supported by the data shown? Yes

Reporting Standards

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

Choose an item.

Statistics

Are you able to assess all statistics in the manuscript, including the appropriateness of statistical tests used? There are no statistics in the manuscript.

Quality of Written English

Please indicate the quality of language in the manuscript: Not suitable for publication unless extensively edited

Declaration of Competing Interests

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