

Reviewer Report

Title: Chromosome-level genome assembly of *Plazaster borealis*: shed light on the morphogenesis of multi-armed starfish and its regenerative capacity

Version: Revision 1 **Date: 3/28/2022**

Reviewer name: Joseph F. Ryan

Reviewer Comments to Author:

This revision is substantially improved. My recommendation assumes that all data is made available (including raw data, genome assembly, gene models, transcriptome assemblies) in GigaDB and/or another stable repository. I'm including some suggestions for individual sentences in the manuscript below.

1> First sentence. "Plazaster borealis has a unique morphology displaying multiple arms with a clear distinction between disk and arms, rather than remarkable characteristic of Echinoderms"

-- It is not clear what remarkable characteristic is being referred to here.

2> Page 10 LINE 123: "Syntenic relationships analyzed by MCscan [14] also proved their relationship"

-- "proved their relationship" is problematic (grammatically and in meaning). A more succinct replacement might be "Syntenic relationships as inferred by MCscan [14] results were congruent with the phylogenetic results from the STAG analyses."

3> Page 11 LINE 139: "it is expected that genes associated..."

-- This would be stronger and more accurate if written as "we hypothesized that genes associated..." and if that change were made then "To investigate the expanded gene families, we performed expansion and contraction analysis of gene families using CAFE5" (on LINE 140) would be better written as "We tested this hypothesis by performing expansion and contraction analyses of gene families using CAFE5."

4> LINE 147: "It is generally accepted that Notch and BMP signaling are evolutionally conserved and play multiple roles during animal development, especially in regulating body patterns."

-- It would be better to remove "It is generally accepted that" and start the sentence with "Notch and BMP signaling are..."

5> LINE 175: "The signaling pathways detected through expanded gene families"

-- would be better as "The signaling pathways that underwent gene family expansion in the *P. borealis* lineage"

6> LINE 204: GRAMMAR: "known to participate tissue regeneration process"

-- "known to participate in the process of tissue regeneration"

7> LINE 211: "We believe that this high-quality genome will supply a useful..."

-- I believe it too! I would be more certain here. Maybe: "This high-quality genome is a useful..."

8> LINE 329: "transcriptomes with at least 100 amino acids were extracted using TransDecoder"

-- I think the authors meant: "Open reading frames with at least 100 amino acids were extracted from transcripts using TransDecoder"

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