Peer Review File

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Reviewer A

This study is only an expanded interpretation of the role of factors previously studied in the field of bioinformatics, which is of little significance.
The specific comments are as follows:
(1) In lines 87-88, the author stated that GINS1 has been previously studied as a factor for diagnosing poor prognosis in synovial sarcoma, so this factor has no novelty in the field of bioinformatics, even if the disease type discussed by the author is different from synovial sarcoma. This study only expands the content of previous studies on diseases, and has little value.
Reply: We thank the reviewer for this insightful comment. It is precisely because of the previous study about the value of GINS1 on the prognosis of synovial sarcoma that inspired our interest in the impact of GINS1 on all sarcoma diseases. For the first time, we explored the role of GINS1 in the prognosis of sarcoma by bioinformatic analysis. The results of our research confirmed our hypothesis and may provide a biological target for the treatment of sarcoma in the future.
(2) The introduction is too short to clarify the significance of this study.
Reply: Thanks for the reviewer's suggestion. We have enriched the Introduction section to highlight the significance of our study.
Changes in the text: Modified as advised (see Page 3, line 91-96).
(3) The entire study only verifies the relevant effects in the field of bioinformatics, lacking validation at the mRNA and protein levels in cells or animals, such as qPCR or WB experiments. Current predictions are only model predictions, which cannot explain their correctness, even if the author makes relevant explanations in terms of limitations.
Reply: We thank the reviewer for this insightful comment. This is a specialized bioinformatics study and our results were based on bioinformatic analysis. In the further, we will conduct cellular and animal experiments to verify our findings.
(4) "The subheadings of methods and results do not need to be preceded by a "#".
Reply: We appreciate the reviewer's attention to detail. The "#" before the subheadings of methods and results has been removed.
Changes in the text: modified as advised in the Methods and Results sections.
(5) In line 238-238, the author once again stated that GINS1 has been studied many times in cancer diseases, so it again stated that the novelty of this study is poor.
Reply: We thank the reviewer for this comment. Previous studies have shown that GINS1 may be a key biomarker for poor prognosis in malignant tumors, but to our knowledge, there is a lack of research about its role in sarcoma, especially its significance in the prognosis of sarcoma.
(6) The discussion was not thorough enough, basically a repetition of the results, and no valuable content was discussed.
Reply: We thank the reviewer for the comment. In the discussion section, we have analyzed and explained these important results and extended their significance in our study to reach our

conclusions.

(7) The language of the article needs further polishing.

Reply: Thanks for the reviewer's suggestion. We have checked our manuscript for many times to try to avoid errors. Thank you again for your patiently reading.

Reviewer B

The paper titled "Identification of GINS1 as a potential prognostic biomarker for sarcoma using bioinformatic analysis" is interesting. These results indicate that GINS1 may be a promising prognostic biomarker and therapeutic target for sarcoma. However, there are several minor issues that if addressed would significantly improve the manuscript.

It is recommended to increase the evaluation of the correlation between GINS1 expression and prognosis and clinicopathological factors in patients with sarcoma.

Reply: We thank the reviewer for this insightful comment. The data of GINS1 expression and prognosis of patients with sarcoma were obtained from the TCGA database, which lacks of the clinicopathological information. Currently, we are collecting the clinicopathology and prognosis data of patients with sarcoma in clinical work for the future study.

There have been many studies on GINS1 in cancer. What is the difference between this study and previous studies? What is the innovation? These need to be described in the introduction.

Reply: Thanks for the reviewer's suggestion. We have modified our text as advised. As shown in the Introduction section, previous studies have shown that the overexpression of *GINS1* is related to cancer development, invasion, and worse survival of multiple tumor types (see Page 3, line 86-88). However, according to our knowledge, there is a lack of specialized study on the prognostic impact of GINS1 on all sarcoma types. For the first time, we attempted to explore the role of GINS1 in the progression and poor prognosis of sarcomas by bioinformatic analysis (see Page 3, line 91-95).

In the introduction of the manuscript, it is necessary to clearly indicate the molecular characteristics of sarcoma.

Reply: We thank the reviewer for this comment. As shown in the Introduction section, sarcomas are a heterogeneous group of malignancies arising from mesenchymal tissues, containing more than 100 histological subtypes of sarcomas. This diversity results in the complexities of personalized therapies (see Page 3, line 66-70).

It is suggested to increase the function research of GINS1, which may be more meaningful.

Reply: We thank the reviewer for this insightful comment. Due to the limited data from the TCGA database, we could not perform the function research of GINS1. But we would do it via cellular and animal experiments in the future.

The introduction part of this paper is not comprehensive enough, and the similar papers have not been cited, such as "A comprehensive bioinformatics analysis to identify a candidate prognostic biomarker for ovarian cancer, Transl Cancer Res, PMID:3511647". It is recommended to quote this article.

Reply: Thanks for the reviewer's suggestion. We have quoted this article as advised (see Page 12, line 377).

There are a variety of genes that can regulate sarcoma. Why did the author choose GINS1 for

research? Please add relevant content to the discussion.

Reply: We thank the reviewer for this comment. The GINS complex comprises the GINS1, GINS2, GINS3, and GINS4 genes, among which GINS1 plays an important role in the prognosis of patients with synovial sarcoma, which inspired our interest in the impact of GINS1 on all sarcoma types. We have added the relevant content to the Discussion section (see Page 8, line 243-245).

This study is based on bioinformatics analysis. It is recommended to increase in vivo and in vitro experimental studies, which may be more meaningful.

Reply: We thank the reviewer for this insightful comment. This is a specialized bioinformatics study and our results were based on bioinformatic analysis. In the further, we will conduct in vivo and in vitro experiments to verify our findings.

Reviewer C

1. Please check the below Keyword. You choose it as a Keyword but it cannot be found in the main text.

48 **Keywords:** R project; bioinformatic analysis; prognostic biomarker; sarcoma; *GINS1*

Reply: We have removed the keyword "R project" (see Page 2, line 50).

2. The main text should be structured with Introduction, Methods, Results, Discussion, and Conclusions. Please add **#Conclusions** section.

Reply: We have added the Conclusions section (see Page 10, line 295).

3. Table 1:

Please add unit for Age.

Age	≥60	140	54.69
	<60	116	45.31

Reply: We have added unit for Age in Table 1 (see Page 14, line 446).

4. Figure 1:

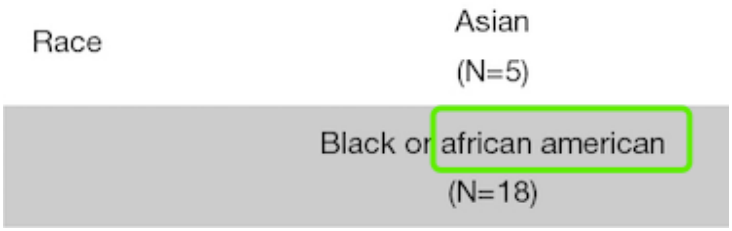
1) Please indicate the meaning of ns in the legend.

2) Please indicate the full name of "TPM" in the legend.

Reply: We have indicated the meaning of "ns" and the full name of "TPM" in the legend (see Page 17, line 465-466).

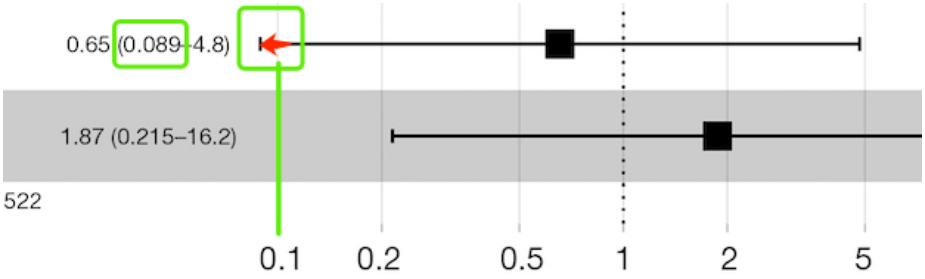
5. Figure 3:

1) Please revise "african american" to "African American".



Reply: We have revised “african american” to “African American” (see Figure 3).

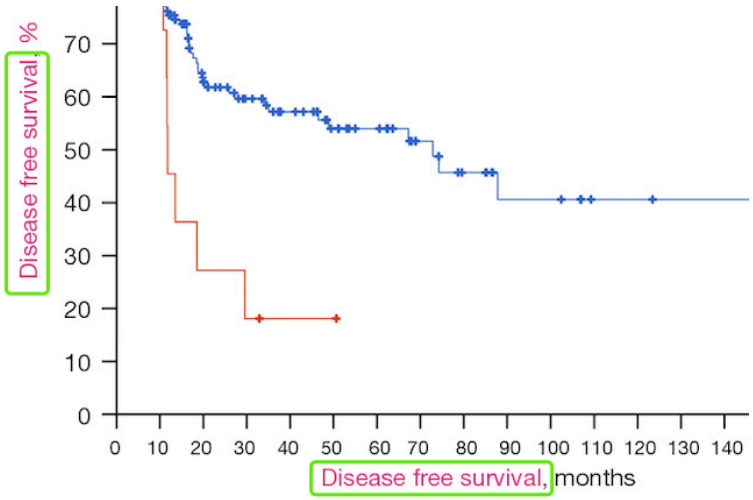
2) In Figure 3B, to standardize the results, the part that exceeds the horizontal coordinate (0.1) should be indicated by arrow (as below). Please revise.



Reply: We have revised Figure 3B as advised (see Figure 3).

6. Figure 4:

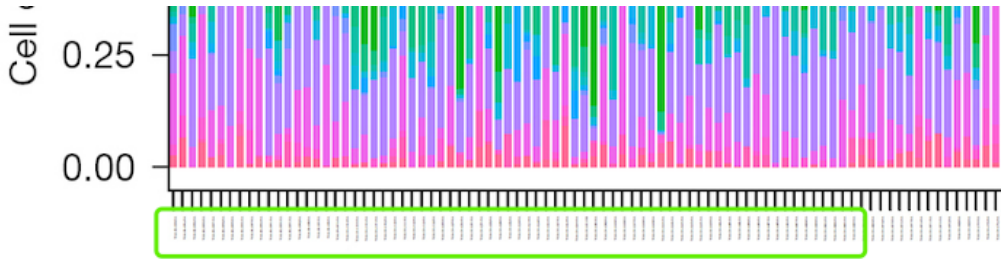
Please revise “Disease free survival” to “Disease-free survival” and modify the color of words from red to black.



Reply: We have revised “Disease free survival” to “Disease-free survival” and modify the color of words from red to black (see Figure 4).

7. Figure 5:

1) Figure 5A: the words in the x-axis are too small and not clear. Please provide Figure 5 in higher resolution to us.



Reply: We are so sorry that the words in the x-axis of Figure 5A are too small and not clear. As a supplement, we have sorted out these words in a PDF file (see Supplement 1).

2) Please indicate the meaning of *** and ns in the legend.

Reply: We have indicated the meaning of "***" and "ns" in the legend (see Page 21, line 491).