

Reviewer Report

Title: Carbon-based archiving: the current progress and future prospects of DNA-based data storage

Version: Revision 1 **Date:** 4/19/2019

Reviewer name: King L Chow, PhD

Reviewer Comments to Author:

The manuscript by Ping et al. aims to review the current status of DNA based data storage, archiving and retrieval. The review comes timely and covers some latest information available. The scope of coverage is appropriate. However, the content appears to be rather sketchy providing references, citing examples without properly describing the core principles and limitation of the methods. It seems to fit well for readers working closely in the community of DNA data storage areas, but for readers or GigaScience with a broader interest, the review may not provide sufficient depth for a good understanding of the progress of the field. Some suggestions include:

1. Page 3, Advantage of using DNA for storage would also include: easy amplification in vivo by live cells at very low cost, and possible amplification in vitro by enzymatic reaction, e.g., PCR or linear amplification in silico. Both approaches can be used to scale up the backup copy production. One should also consider the possible employment of repair system for correcting errors.
2. Page 5-10, the description of the coding schemes is quite sketchy. The outline for each approach was brief and was not well illustrated by the panels in the figure 1 and 2. Better schematics may help, without the need to go back to the original papers to make detailed comparison.
3. Page 10-12, in vivo and in vitro storage of the information - a thorough comparison of the pros and cons would be helpful, instead of factually describing what methodology is available. The error generated in vivo by mutation should be contrasted to the error in DNA synthesis technology to evaluate the limitation of these tools.
4. Page 13, line 4-10. A very typical way of this review in describing methodology citing the previous reports without describing the details and contrasting the differences sufficiently. It does not serve the purpose of a proper analysis of how each method advances the development of storage.
5. Page 14, sequencing accuracy issue was discussed concerning the data retrieval process. While table 1 summarizes the factual information of the technology available, no clear evaluation of the future direction is given, same as pointed out in (4) above.
6. Fig. 4, the appending figure has no label of Y axis.

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