



# Pre-operative Status of Gut Microbiota Predicts Post-operative Delirium in Patients With Gastric Cancer

Meiru Jiang and Wenfei Tan\*

Department of Anesthesiology, The First Hospital of China Medical University, Shenyang, China

**Keywords:** gut microbiota (GM), post-operative delirium (POD), 16S rRNA, principle coordinate analysis (PCoA), PCA, gastric cancer

## OPEN ACCESS

### Edited by:

Diansan Su,  
Shanghai Jiao Tong University, China

### Reviewed by:

Fuzhou Hua,  
Second Affiliated Hospital of  
Nanchang University, China  
Xuesheng Liu,  
First Affiliated Hospital of Anhui  
Medical University, China

### \*Correspondence:

Wenfei Tan  
winfieldtan@hotmail.com

### Specialty section:

This article was submitted to  
Psychopharmacology,  
a section of the journal  
Frontiers in Psychiatry

**Received:** 14 May 2022

**Accepted:** 10 June 2022

**Published:** 07 July 2022

### Citation:

Jiang M and Tan W (2022)  
Pre-operative Status of Gut  
Microbiota Predicts Post-operative  
Delirium in Patients With Gastric  
Cancer. *Front. Psychiatry* 13:944236.  
doi: 10.3389/fpsy.2022.944236

## INTRODUCTION

We read with great interest the recent article by Liu et al. (1) and congratulate the authors for their innovative analysis of the pre-operative gut microbiota between patients with and without post-operative delirium (POD). This article included very important clinical data for early diagnosis and determination of the treatment for POD. However, there are some important points of concern.

First, we wonder about the sample size. Research on the correlation between gut microbiota and perioperative cognitive dysfunction, especially for humans, is still rare. Hence, the method used to determine the minimum sample size is yet to be ascertained. Therefore, using the distribution of that metric in published but related studies is the first step to estimating the sample size (2). Since we found that related studies included over 80 sample sizes (3) to increase the reliability of the results in most cases, we are concerned that only 20 fecal samples in each cohort may be unable to completely show the differences in gut microbiota between the two cohorts.

Moreover, all the patients in this trial underwent general anesthesia, but Hu Liu et al. limited the drugs in anesthesia induction and post-operation without during the operation-which could influence the morbidity of post-operative delirium significantly (4). Thus, we suggest that increasing the sample size or limiting the anesthetics during operation might higher the qualification of the results if the author chose not to determine the use of anesthetics during the operation.

Second, we are also curious about the incomplete  $\beta$ -diversity analysis results in Figure 2. We noticed that the author used Principal Component Analysis (PCA) in Figure 2A and Principal Coordinates Analysis (PCoA) in Figure 2B but missed the percent of PCA 1 and PCoA 1 and their quiety of explanation on the X-axis equally and marked the PCA 2 and PCoA 2 on the Y-axis only, which should not be omitted (5). We expect the author to add these analyses in Figure 2 for the readers.

Furthermore, we searched the registration number (ChiCTR200030131) on the Chinese Clinical Trial Registry given by the author but failed to find any registered trail. We hope that the author could proofread this to confirm.

Our research team has been studying the "brain-gut" axis and submitted one similar study on clinicaltrials.gov in 2020 (NCT04316910), but it was unfortunate that the plan has been

delayed because of funding issues. However, Hu Liu et al. derived a more original research study compared to ours. Therefore, we are very excited to read this article and sincerely hope that Hu Liu et al. can achieve greater academic success in this field in the future.

## REFERENCES

1. Liu H, Cheng G, Xu Y, Fang Q, Ye L, Wang C, et al. Pre-operative status of gut microbiota predicts post-operative delirium in patients with gastric cancer. *Front Psychiatry*. (2022) 13:852269. doi: 10.3389/fpsy.2022.852269
2. Casals-Pascual C, González A, Vázquez-Baeza Y, Song SJ, Jiang L, Knight R. Microbial diversity in clinical microbiome studies: sample size and statistical power considerations. *Gastroenterology*. (2020) 158:1524–8. doi: 10.1053/j.gastro.2019.11.305
3. Yang Z, Tong C, Qian X, Wang H, Wang A. Mechanical bowel preparation is a risk factor for post-operative delirium as it alters the gut microbiota composition: a prospective randomized single-center study. *Front Aging Neurosci*. (2022) 14:847610. doi: 10.3389/fnagi.2022.847610
4. Mei X, Zheng H-L, Li C, Ma X, Zheng H, Marcantonio E, et al. The effects of propofol and sevoflurane on post-operative delirium in older patients: a randomized clinical trial study. *J Alzheimers Dis*. (2020) 76:1627–36. doi: 10.3233/JAD-200322
5. Zhang J, Bi JJ, Guo GJ, Yang L, Zhu B, Zhan GF, et al. Abnormal composition of gut microbiota contributes to delirium-like behaviors after abdominal

## AUTHOR CONTRIBUTIONS

WT contributed to the conception and the review of the manuscript. MJ wrote the first draft and contributed to the editing of the manuscript. Both authors contributed to manuscript revision, read, and approved the submitted version.

surgery in mice. *CNS Neurosci Ther*. (2019) 25:685–96. doi: 10.1111/cns.13103

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**Publisher's Note:** All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Copyright © 2022 Jiang and Tan. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.