

Biotelligences Fortnight

Issue 7 (November 25 2014): Leclercq S. et al PNAS

Alcohol-dependence and gut microbes

For this Biotelligences Fortnight, we have chosen an article by Leclercq and colleagues published in *PNAS* in October 2014 (PMID: 25288760). The authors explore the connection between an altered intestinal physiology (permeability and microbial populations) and behavioural symptoms of alcohol dependence (AD) in patients. This research is consistent with the growing body of evidence that indicates an impact of gut microorganisms on psychiatric disorders. The results suggest that the increased intestinal permeability observed in a subset of AD patients is associated with alteration in intestinal flora, which might be linked to behavioural symptoms of AD (craving, depression and anxiety). The study is largely correlative and it needs further clarification of the role played by gut microbiota in AD. Nevertheless, the article has sound biostatistics, in particular its high standards of analysis and the quality of information disclosure. We especially liked: **(1)** the statistical paragraph with a detailed description of the software used, together with a detailed description and justification of tests and their justifications; **(2)** the disclosure of data log-transformation to generate normality in data distribution; **(3)** the appropriate use of non-parametric Kruskal-Wallis test when the assumption of normality was not met; **(4)** the correction for multiple comparisons throughout the study using parametric analysis of variances (ANOVA) or Kruskal-Wallis test, alongside the disclosure of the post-hoc procedure (Bonferroni, which strictly speaking, is not a post-hoc test as it simply adjusts the alpha threshold to the number of Student's t-tests performed); **(5)** the verification of normality and homoscedasticity using Kolmogorov-Smirnov and Levene tests; **(6)** the frequent use of scatter plots, which maximizes the amount of information communicated to the reader; **(6)** the presence of a "Study Limitation" paragraph in the discussion, which particularly emphasizes and explains the relative small sample size in the investigations of gut microbiota.

As already mentioned in previous issues (Issue 3 and 6), there is no consensus among statisticians regarding the use of Kruskal-Wallis test when variances are not equal (heteroscedasticity), but the absence of a consensual substitute leads us to opinion that the use of the Kruskal-Wallis test cannot be regarded a mistake.

Despite the high quality of the statistics in this manuscript, there are a few imperfections. Firstly, information regarding the chosen alpha threshold (presumably 0.05) is absent and the exact p-values are missing for the most part. Secondly, the nature of the error bars displayed in the figure is unknown. Finally, the precise nature of the tests used in each figure is vague (i.e. which graph corresponds to a parametric ANOVA or non-parametric Kruskal-Wallis).

In conclusion, with the exception of these aforementioned flaws, this article has high standards in biostatistics.

The Biotelligences team