Biotelligences Fortnight

Issue 1 (June 5 2014): Neuner et al. Nature Communications

Synuclein, neurogenesis and olfaction

Biotelligences Fortnight aims to showcase a recently published high impact article chosen by us, based mostly on the quality of experimental design, statistical analysis and presentation. Biotelligences Fortnight is released every two weeks or so in the form of a summary that highlights the major points that have appealed to us in the article as well as possible points that we think could have been improved. It is not an all-inclusive collection of statistical details but rather a guide for your own research. We are happy to receive suggestions from your recent reading.

For this first issue, we selected a recent article from Neuner and colleagues published in *Nature Communications* on May 28 2014 (PMID: 24867427). This work suggests that a pathological form of alpha-synuclein (incriminated in Parkinson's disease) interferes with the functional integration of adult-born neurons in the mouse olfactory bulb including survival, branching and proper synaptic integration. There is a distinct lack of any behavioural demonstration of olfactory impairment but these experiments are shown in an accompanying article recently published by the same group (PMID: 24488133). The standards of statistical analyses and presentation are uncommonly high. We particularly appreciated: **(1)** The presence of a comprehensive statistical paragraph, which includes disclosures of experimental blinding and randomization as well as the alpha value (0.05); **(2)** The corrections made for multiple comparisons using one-way or two-way analyses of variances (ANOVA) followed by Tukey-Kramer test (which does not mathematically requires equal sample sizes) or Bonferroni tests respectively; **(3)** The proper use of errors bars with standard error showing precision of measure (counting for instance) and standard deviation showing variability (for quantification of biological parameters); **(4)** The disclosure of exact p-values, sample sizes and errors in every caption and in the text (rather than a sole significance as seen in the majority of articles), which altogether allow the reader to draw their own conclusions.

It should be noted that the statistical package used for analysis is not disclosed, although we consider this a rather minor shortfall. In addition, the experimental power may be too low to compare Control and a-SYN KO samples in Figure 1, 2 and 3. However, we also understand that statistical requirements challenge material constraints (ethics, feasibility, costs...) and especially the need to reduce the number of experimental animals used.

In conclusion, despite some minor flaws, the authors made an educated and transparent use of biostatistics in this article.

The Biotelligences team

Comment from the authors:

"We are delighted to hear that our research article was chosen for nomination and thank the biostatistics experts from Biotelligences for their judgment of our statistical design and valuable suggestions for further studies."

Prof. Dr. Jochen Herms