Reviewer's report

Title: Assessment of insulin resistance by a 13C glucose breath test: a new tool for early diagnosis and follow-up of high-risk patients

Version: 1 **Date:** 15 October 2009

Reviewer: Richard Z Lewanczuk

Reviewer's report:

This is a well written manuscript of significant interest. Methodology is generally sound, but analysis of the data is questionable.

Major Compulsory Revisions

1. The data analysis and presentation are totally confusing. What do the points in figures 1-4 represent? Are they individual time points in an individual? If so, they should be identified and labelled as such. More importantly, however, is the point of the 4 figures. If the purpose of this study was to assess the suitability of the described GBT as a measure of insulin resistance, then results of the GBT, however determined, should have been compared with comparable results of of other measures of insulin resistance, not with glucose or insulin values from individual time points. Such results are meaningless. Similarly, carrying out correlation or regression analysis, within subjects, is also virtually meaningless - it stands to reason that higher blood glucose levels would be inversely correlated with breath results. Rather, the authors should correlate results of all 20 subjects using GBT parameters as one variable and other measures of insulin resistance as the second variable. The analysis must be completely re-done. Not that there may not be significant results, but the current results don't mean anything.

2. In keeping with the point above, exercise as a mechanism to reduce insulin resistance, should be assessed by single GBT variables and compared to other methods of insulin resistance. In other words, how did exercise change the variable compare to e.g. HOMA 90? Correlation as presented here is meaningless as well.

Minor Essential Revisions

1. It is unclear how correlations were done. For example, comparing HOMA B 120 to CPDR 30 leads me to believe a correlation matrix was constructed. Thus, how were multiple, repetitive correlations statistically handled to rule out chance? (i.e. the correlative equivalent of multiple comparisons)

2. In section 2.2, 3rd last sentence, "frequently determined" should be defined

3. The difference between PDR and CPDR should be better explained in 2.3

4. The meaning of the second sentence of 2.3 is unclear

5. The entire 3.6 section is unclear

6. Why is HOMA B 120 correlated with CPDR 30? What is the rationale for doing this comparison vs the logical 120 vs 120 comparison?

7. The authors need to be careful about the use of R vs r when indicating correlation

8. The results are NEGATIVELY correlated; the authors' use of the term "correlated" implies a positive correlation

Statistical Review - authors must address minor essential revision #1

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Declaration of competing interests:

none