Reviewer’s report

Title: The aluminum concentrations in central and peripheral areas of malignant breast lesions do not differ from that in normal breast tissues

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Reviewer: Philippa Darbre

Reviewer’s report:

This paper reports a study measuring levels of aluminium in human breast tissue using graphite furnace atomic absorption spectrometry which adds to the literature on aluminium levels in the human breast. Levels of aluminium are compared in samples of tumour tissue taken from the centre and periphery of the tumour with samples of unaffected tissue in the same breast.

Major compulsory revisions:

• The paper seems to be very critical of all previous work and the statement on lines 3-4 of the abstract is unjustified (“the lack of specificity of the techniques used up until now may have led to false conclusions”) and unless justified should be removed. Some previous studies used also the technique of graphite furnace atomic absorption spectrometry as the current study and it is not made clear why all previous use of this technique was inadequate.

• The literature review is rather selective in citation. For example, the only epidemiological study measuring amount of antiperspirant used in relation to breast cancer is not cited (McGrath 2003. An earlier age of breast cancer diagnosis related to more frequent use of antiperspirants/deodorants and underarm shaving. Eur J Cancer prevention 12: 479-485.).

• Since the data are not published in full, it is not possible to see whether the data form a normal distribution to justify the current statistical analysis or whether non-parametric analysis would have been more appropriate. It would be very interesting to simply publish the full table of raw results or to construct a figure with the range of measurements. However, at the very least, a statement that the data conform to a normal distribution needs to be made if averages are to be used rather than median values. This in itself would be different from many other measurements made in breast tissue, not only for aluminium but organic xenoestrogens.

• It is not clear why Tables 3-5 have categorized aluminium levels into three groups or how the rationale for the three groupings was decided. Since values have been measured for each sample, these results should be re-analysed using the full range of numbers which are not artificially grouped.

• The end of the second paragraph of the discussion states that “In our study, by contrast, the aluminium concentration did not differ across breast quadrants”. However, the location of the tissue samples is not clearly described in the manuscript and as far as I can read, the quadrant location is not given or any
analysis described in relation to breast quadrants. I cannot even find whether the peripheral or normal tissue was sampled from the axillary or sternal side of the tumour or which quadrants the tumours were located in? It is also not clear whether the current samples were total tissue or whether fat had been removed – this is relevant if results are to be compared to reference 4.

Major revisions needed but more specific:
• The levels of aluminium cited in the abstract should be given with an estimate of error as in Table 2.
• The statement in line 2 of the results and in the legend to Table 2 “normal portions of the tumor” does not make scientific sense.

Comment for consideration by the authors:
• Since the manuscript cites and critically appraises previous studies, it would be helpful in the discussion to tabulate how levels of aluminium measured here relate to levels in other studies. Agreed that values are cited in different units in different papers, but it is not hard to convert from gm to moles or to find at least an estimate of equivalents from wet tissue weight to dry tissue weight.

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I am an author on several of the references which they cite.