Reviewer's report

Title: Neuropsychological effects of chronic low-dose exposure to polychlorinated biphenyls (PCBs)

Version: 1 Date: 11 April 2005

Reviewer: Birger Heinzow

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General
In this paper, the importance of PCB blood determinations following potential exposure is demonstrated, and a congener specific application is used to assess the role of specific PCB congeners or classes of congeners in mediating neurotoxic outcomes.

From a statistical view, attempts to determine the role of individual congeners in mediating outcomes are corroborated by the fact that concentrations of individual congeners are highly correlated with each other and with total PCBs. In this study the unique role of congener 28 and 52 is shown, due to the fact that specific and unusual air-borne exposure has been identified that bears a different profile in comparison to food-borne PCB pattern.

PCBs are mixtures of multiple congeners, and different congeners may have very different actions but their relative potency to produce nervous system effects is unknown. From experimental work exposure to a single, relatively high dose of PCBs decreases the content of several brain neurotransmitters, while repeated exposure to lower PCB doses appears to affect brain DA metabolism, and can alter a number of physiological processes that may be important for developmental toxicity. This study addresses adults with a long-term exposure history and a different mechanism of neurotoxicity as in the developing brain must be considered. The study by Peper et al is well written and has used a wide array of current neurotoxicity testing tiers and hence produced multiple results and deserves publication to stimulate further research. However as the authors point out, the power of the study is limited and findings should only be seen as preliminary and speculative. It would be interesting to continue with this type of study in children (exposed in schools and with a larger sample) and heavily exposed workers.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

1. In the tables the BMI is used in an unfamiliar manner [T-value], I am curious if this indicates a state of severe obesity in the participants or if it is a term referred to as the ‘T value’ to determine the normal body weight for given height, thus a T value gives the ideal body weight in kilograms, and is equal to height excess to 1 metre in centimetres. Most often the Body mass index (BMI) is a measure of body fat based on height and weight that applies to both adult men and women and expressed as : BMI [kg/m²]. I would like to see how does this compare to the study data? Where I calculated from table 1 for the exposed group 25 and for the controls 23, thus indicating no difference an no obesity.
2. The last statement in Results that "differences were found in behavioral variables" would be more appropriate worded as no statistical differences were found ... Unless I interpret the values wrongly (given in parenthesis).

Discretionary Revisions (which the author can choose to ignore)

A noteworthy finding is the fact that the exposed group, especially the subgroup of 16 (12+4) displayed a significantly elevated PCB-exposure not only for PCB 28 and 52, what is expected, but also for the highly chlorinated congeners, which do not occur in indoor air. This might point to differences in metabolism or distribution, or is just coincidence. Please comment.

What next?: Accept after minor essential revisions

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.