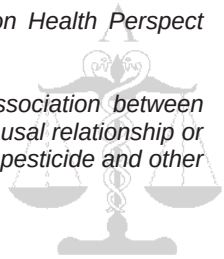
BfR Expert Opinion No. 033/2006, 27 June 2006

Pesticide exposure and Parkinson's disease (PD): BfR sees association but no causal relationship

The German risk assessment institute concludes that there is a statistically significant association between exposure to pesticides and development of Parkinson's Disease. There is insufficient evidence to determine the mechanism of this association.

We recently reported the results of a UK review on this subject based on *Environ Health Perspect* (2006). Vol.114 p 156–164:

> *At present, the weight of evidence is sufficient to conclude that a generic association between pesticide exposure and PD exists but is insufficient for concluding that this is a causal relationship or that such a relationship exists for any particular pesticide compound or combined pesticide and other exogenous toxicant exposure.*



The current report from BfR is summarised as follows:

> *The epidemiological studies evaluated point to an association between exposure to pesticides and Parkinson's disease. However, up to now it was not possible to identify either one individual pesticide or a combination of different pesticides as the trigger. Even if individual pesticides may influence dopamine status, a biological plausibility cannot be sufficiently determined in experiments which could explain the onset of Parkinson's disease. Hence a causal relationship between pesticide intake and the onset of the disease in humans cannot be confirmed at the present time.*

In our view, these summaries are substantially the same; the BfR report is more explicit on the interpretation of lab work looking at brain function.

BfR finds a weak to moderate association between exposure to pesticides in general and PD. When analysed as a function of specific types of pesticide (e.g. herbicide vs insecticide) the associations disappear. Associations are not found with specific formulations e.g. paraquat. The available conclusion is limited to there being some unknown reason why people who are exposed also have a higher rate of PD.

Some pesticides (e.g. MPTP, Maneb, Retenone and paraquat) do induce PD like states in test animals. These symptoms can be the result of permanent brain damage caused by that pesticide. Cumulative gradual damage could also result in PD like illness. However, detailed examination shows they are not selectively damaging to the relevant part of the brain for PD in humans and/or that they don't produce all of the PD symptoms.

Comment

Although much the same evidence was systematically reviewed in both cases it is still reassuring to note that the same conclusions were reached. The overall evidence for an association between pesticide exposure and PD is relatively weak but has been consistently reported in recent studies.

Occupational exposure to pesticides is subject to COSHH and there are short term consequences that should be avoided.

If it turns out that pesticides or specific pesticides cause or aggravate PD then it is likely that the latency period would be several decades, by which time records of safety procedures may be lost, especially as much of the labour involved would be transitory. Records of short term effects of exposure would probably be of more use in establishing whether or not there had been any exposure.

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