

Weight of the Science Offers Little Basis for Links Between OP Exposure and Reduced IQ

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Despite media attention to three recent publications, the weight of the scientific evidence from decades of research offers little support for claims that exposures of pregnant women to organophosphate pesticides (OPs) could lead to their children having reduced scores on IQ or developmental tests. The publications in question reported small differences in performance on test scores by the children of three groups of women with higher-than-average OP exposures based on the levels of OP-related breakdown products in maternal blood or urine when the women were pregnant.

However, childhood IQ and development are strongly influenced by the complex interaction of many long-established factors (e.g., maternal intelligence, maternal education, quality of the home environment, etc.) which the researchers could only control for imperfectly. The differences in test scores between children with presumed high vs. low OP exposures were small enough to fall within test-retest variation and could easily have resulted from the interactions of other factors. Additionally, there are no established toxicological mechanisms that could explain how these differences in test scores could be produced by OP exposures, despite extensive animal research over the course of decades.

Dow AgroSciences has closely evaluated earlier work by these three groups of researchers. (See <http://www.chlorpyrifos.com/dow-analysis-science.htm> for a full discussion.) We will summarize our evaluation of these three new publications on this site as well once we have completed a thorough scientific review.

Based on our initial review, we believe that the limitations of these three new publications are similar to those found in the previous work. We offer the following points – to be supplemented later – by way of perspective on these three recent publications.

- Two of these studies are not specific to our product chlorpyrifos. Rather they used organophosphate breakdown products in the urine of pregnant women as a measure of exposure and then assessed the performance of their children on standardized tests, years later. The researchers have acknowledged that these metabolites in urine could have come from any organophosphate insecticide.
- Several of these same study authors some years previously made a similar attempt at correlating levels of the chlorpyrifos-specific metabolite TCPy with test score performance. Based on this evaluation, the researchers reported finding no ill-effects associated with this chlorpyrifos-specific measure. Since that time, these researchers have not reported TCPy measurements in the these studies.
- It is important to note, however, that in using pesticide breakdown products in urine as a measure of exposure to pesticides, these researchers have made a tenuous assumption. Pesticides don't just break down in the human body; they also break down in the environment which means that the exposures being measured based on urinary metabolites may not have been exposures to pesticides at all but rather to breakdown products in the environment before maternal exposure could take place.
- This is important because the validity of the findings of these two studies hinges on whether the researchers were able to classify these children accurately in terms of high vs. low exposure based on only one or (at most) two urine samples during each mother's pregnancy and with analytical testing offering no direct measure of actual pesticide exposure.

- The one study that is specific to chlorpyrifos looked at the active ingredient in umbilical cord blood and also has many problems, including issues with exposure assessment, dose-response, potential unconsidered effects from blood lipids and polycyclic aromatic hydrocarbon exposures, and difficulties in controlling for exposure to tobacco smoke. (See the following for a detailed discussion of the problems noted with previous work <http://www.chlorpyrifos.com/dow-analysis-science.htm>.)

Furthermore, even if these studies had been conducted in a way allowing greater confidence in their findings, their results could not be translated to present-day exposures given changes in the use of these products since that time.

Finally, given that these researchers have tried to use their findings to raise concerns about consumer exposures to pesticide residues on food, it is important to recognize that all three of these groups of women had exposures that were significantly greater than would be expected from pesticide residues in the diet, making attempts to extend these already dubious findings to consumer settings inappropriate.

Given the inconsistency of this research with the weight of previous findings derived from many well-conducted toxicology studies, Dow AgroSciences alerted EPA nearly two years ago of the need to convene an independent scientific review of the raw data behind the Columbia University study and the Berkeley University study. Thus far, we have been disappointed to find that, despite repeated requests from both Dow AgroSciences and EPA, the researchers have been reluctant to share their data for a full and independent scientific evaluation.

With regard to chlorpyrifos, the product has been on the market for more than 40 years. Authorized uses are determined by detailed, science-based evaluations by regulatory authorities charged with the protection of public health. All product registrations are supported by four decades of experience, health surveillance of manufacturing workers and applicators and more than 5,000 studies and reports relating to human health and the environment. No pest control product has been more thoroughly tested.

Ongoing regulatory scrutiny is expected with pesticide products. Dow AgroSciences is prepared to meet data requests from regulatory authorities to address these new findings in light of the extensive research on the product that has already been conducted.