Preliminary results on prenatal and lactational exposure to PCBs and DDE and pubertal growth and development

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Perinatal exposure to certain chemicals can have profound impacts on later development of the reproductive system; the classic example is diethylstilbestrol. Whether exposure to low levels of ubiquitous enviromental contaminants would have similar effects is not known.

We have been following since birth a cohort of approximately 900 children born between 1978 and 1982 in three sites in the state of North Carolina, USA, to determine effects of prenatal and lactational exposure to PCBs and DDE [1-6]. These children are from the general population and have no special exposure.

There are suggestions that perinatal exposures to PCBs and DDE could affect pubertal development. Members of the DDT family have been shown to have estrogenic and anti-androgenic properties [7-8]. In animal studies, perinatal exposure to PCBs [9-10] or structurally related compounds (PBBs [11], dioxins [12-15]) has permanent effects on various aspects of pubertal development and hormonal status. Shortened penis length has been reported in boys exposed transplacentally to heat-degraded PCBs in the Yucheng poisoning in Taiwan [16]. We are examining pubertal growth and development in the NC cohort to see whether low-level exposures have discernible effects.

Samples of breast milk were collected throughout lactation, as were maternal blood at birth and six weeks, cord blood, and placenta. These samples were analyzed for total PCBs and DDE. Questionnaire information on lactation was collected repeatedly throughout lactation. This allows estimation of both transplacental exposure and exposure through lactation.

Starting in 1993, families have been sent annual questionnaires asking the child's height, weight, and onset of menstruation (if female). We also ask about Tanner stages of pubertal development;

we use a modification of the Tanner scale in which line drawings of secondary sexual characteristics appear as an ordered progression. Either the parents, the child, or both may send information. Children are followed until they reach the final stage on both Tanner scales and, if female, have begun menstruation.

We have information on 600 children. The study is ongoing; 180 children are still being followed in the study as of March 1996. Preliminary analysis of female pubertal stage in relation to prenatal PCB exposure reveals no dose-related patterns. Other preliminary results will be presented at the meeting.

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