

Delayed Pregnancy in NMRI Mice Treated with PCB: 2,2'-Dichlorobiphenyl

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In a previous paper we have shown, that in mice the development of fetuses was retarded at the 18th day post conception (p.c.), when the dams were treated with 2,2'-Dichlorobiphenyl during the period of blastogenesis (TÖRÖK 1973).

Therefore a more extensive study was undertaken to investigate the biological significance of this finding. As a part of this study the present experiment was planned to compare the length of pregnancy of normal with that of 2,2'-Dichlorobiphenyl treated dams.

Experimental

Male and female mice of the strain NMRI were caged together between 9 and 11 a.m. The females with vaginal plug were selected and randomized into three groups. We designated 9 a.m. of the next day as the beginning of the first day p.c.

After dilution in sesame oil the 2,2'-Dichlorobiphenyl was given per os on days 1 - 3 p.c. at a dose of 375 mg/kg/day to the animals of group II or 750 mg/kg/day to the animals of group III respectively. Group I (controls) remained untreated.

The animals were checked for parturition at 9 a.m. daily beginning at day 17 p.c.

Parturition was dated to the day before observing the complete number of neonates.

Results

The results of our experiment are demonstrated in Table I. It may be seen, that pregnancy was delayed following the administration of Dichlorobiphenyl. The extent of prolongation was dependent on the dose applied. Concerning the day of parturition the differences between I - II, I - III and also between II - III showed to be significant ($p < 0.005$) by t-test.

TABLE

Experimental Group	mg Dichlorobiphenyl per day, per kg	Dams with vaginal plug	Dams with litter	Mean litter size	Mean duration of pregnancy in days
I	0	37	26(70%)	11.5	18.2
II	375	18	11(61%)	7.9	19.4
III	750	38	5(13%)	4.8	21.8

The occurrence of delayed pregnancy after dosage of 375 mg Dichlorobiphenyl/kg/day on the days 1 - 3 p.c. could also be confirmed in another experiment, in which three of five pregnant females gave birth on the 19th day p.c. and the fetuses of remaining dams were delivered on the 20th day by cesarian section.

Further data given in Table I are the numbers and percentage of dams carrying litter and the mean litter size. In group II and III a small litter size per dam and in the group III also a low percentage of dams carrying litter were observed.

This is in agreement with the results of other own investigations, in which the dams were treated with the same doses of Dichlorobiphenyl as in the present study. However the uterine content of these animals was checked at the beginning of the 18th day p.c. before any parturition could take place. In groups with treatments corresponding I, II and III, implantation was ob-

served in about 90, 90 and 40 percent of the dams respectively; approximately 11, 8 and 5 living fetuses per dam (carrying living fetuses) could be found (paper in preparation). Furthermore those investigations have indicated that small litter size in experimental groups II and III is due to a high mortality of embryos and in group III to the low implantation rate additionally.

Discussion

Preliminary experiments have indicated, that the retardation of kyematogeny mentioned above as well as the prolongation of pregnancy are caused by a delayed implantation. The way by which delay is initiated does not become clear from our own investigations.

However, SMITH and BIGGERS (1968), WHITTEN (1955) and YOSHINGA and ADAMS (1966 a and b) have shown, that estrogen is essential for nidation.

On the other hand an enhanced hepatic catabolism of estrogens after PCB treatment was observed by RISEBROUGH et al (1968) and by NOWICKI and NORMANN (1971) in vitro. Therefore the delay of implantation could be explained by a transitory insufficiency of sexual hormones. Hence, even if the length of the postimplantation periods remains normal the whole course of pregnancy including the day of birth would be delayed relative to the untreated controls.

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