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An investigation of the effects of low concentrations of Chlorpyrifos on epididymal sperm maturation in rats

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The present study investigated effects of extremely low concentrations of Chlorpyrifos (Pyrimec) to reproductive structure and function of male rats. First, a group of animals (4 groups; n=10) were given oral dose of 0.6(T1), 0.25(T2), 0.125(T3) mg/kg/body weight, every other day for 14 days. They were sacrificed on the 14th day, testicular and epididymal sperm number and motility were recorded. Second, a group of male rats (4 group, n=6) were gavaged either Chlorpyrifos (3.2 mg kg/BW) or distilled water only (control animals). Treated animals were sacrificed at 7-day intervals post-treatment until 21st day. Testicular and epididymal sperm count and motility was recorded.

Results showed total sperm counts of treated groups were significantly reduced than those of control group. Although caput total sperm count was not significantly different in treatment groups T1 and T2 it was significantly reduced in treatment group T3 (P<0.05). Proximal and distal cauda sperm counts were significantly different to those of control group for all treated groups (P<0.05). There was a significant increase in percentage of immotile sperm in proximal and distal cauda (P<0.001). From distal corpus to distal cauda sperm motility parameters were decreased. In the second group of study, testicular sperm count showed a significant decrease (P<0.05) until the day 21st. Similarly there was a significant loss (P<0.05) of epididymal sperm motility. Histological observations in treated groups showed a significant (P<0.05) reduction in the thickness of cauda epididymal epithelium, while microvilli of cauda epididymis of all treated groups have disappeared. It is clear that at least some of the observed effects were a result of structural hence functional changes of epididymal epithelium due to Chlorpyrifos exposure. We conclude that effects of Chlorpyrifos may be inversely dose dependent on the reproductive system in rats. In low concentrations epididymal epithelium structure is affected and thereby epididymal functions on sperm maturation were in jeopardy.

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