Adult exposure to BPA causes activational disruption of estrous cycle and folliculogenesis

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Our society is facing a public health challenge caused by the increasing presence of endocrine disrupting chemicals (EDCs). Bisphenol A (BPA) is a widespread EDC used in the manufacture of polyvinyl chloride (PVC) and epoxy resins. As our group have previously described, an early postnatal exposure to BPA disrupts sexual maturation and pubertal timing, however, its effects on fertility after adult exposure have not yet been studied.

Female Wistar rats were exposed for 15 days to corn oil or a low (25ng/kg/d) or a high (5mg/kg/d) BPA dose subcutaneously at 90 days of age. Animals exposed to both doses showed a disruption of the estrous cyclicity characterized by a decrease in the average time spent in proestrus (BPA-25ng 18.94%±2.19 vs BPA-5mg 16.88%±1.31 vs OIL 23.32%±0.92). We observed a disruption on folliculogenesis characterized by a significant decrease of antral follicles (BPA-25ng 21.42%±2.12 vs BPA-5mg 20.87%±4.16 vs OIL 35.62%±1.23) and increase of atretic follicles (BPA-25ng 24.23%±3.87 vs BPA-5mg 26.18%±6.25 vs OIL 15.49%±0.78). The exposed females showed a regular cycle one month after the last dose of BPA. We did not observe any difference in the frequency or amplitude of GnRH secretion 24h after the end of exposure. We also observed that early postnatal exposure to BPA for 15 days disrupted estrous cycle during adulthood with a decrease in the average time spent in proestrus (BPA-25ng 13.62%±3.37 vs BPA-5mg 12.22%±3.11 vs OIL 18.70%±3.16).

In conclusion, exposure to BPA neonatally or during adulthood disrupts the estrous cycle and folliculogenesis. The effects of exposure to BPA during adulthood might be independent of GnRH secretion. Moreover, the effects of early postnatal exposure to BPA are persistent while exposure to BPA during adulthood appears to cause activational, non-persistent alteration of the estrous cycle.