The Effect of Endocrine Disrupting Chemicals on the Social Behaviors of Lontra canadensis (North American River Otter)

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The introduction of endocrine disrupting chemicals (EDCs) to habitats of the North American river otter has had a profound impact. Exposure to dangerously high levels of these EDCs has led to negative physiological effects in otter reproductive systems. Scientists have shown similar reproductive effects in humans. Otters can serve as a sentinel species for humans, providing advance warnings of contaminant dangers. Previous invasive methodologies have exposed vertebrates to EDCs, resulting in decreases in aggression. This project analyzed otter call types as a proxy for behavior. This was a humane way to non-invasively determine the behavioral states of the otters. Camera trap footage was obtained at three sites across America containing varying EDC levels–Alaska, California, and New York. A software program was used to produce visual otter call spectrograms. These spectrograms were classified into specific call types that correlate to otter behavioral states. This study found high levels of EDCs were associated with a 28.62% decrease in aggressive calls (**p=0.01). Significantly, there was a total loss of some calls that are important in otter mating behavior. These results suggest that otter testosterone levels are decreasing, resulting in a feminization that could decimate otter populations. There are also worrying implications for human health. Utilizing aggressive behavior loss as an indicator of dangerous EDC contamination, we can apply this method to focus remediation efforts. Future research could use non-invasive hormone monitoring to verify the decline in otter testosterone levels in ecosystems with high EDC levels without contributing to their suffering.

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