Effects of the Anti-Diabetic Pharmaceutical Metformin on the Behavior Patterns of Danio rerio

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Pharmaceutical pollution poses a growing environmental concern, and Metformin, the fourth most prescribed pharmaceutical in the U.S., is a significant contributor. Despite effective removal in wastewater treatment plants, traces of Metformin persist in freshwater environments, affecting organisms like zebrafish. This study investigates the behavioral impact of Metformin on Danio rerio populations, exploring whether increased concentrations lead to decreased anxiety and alertness within shoals of zebrafish. The hypothesis states that prolonged exposure to high Metformin concentrations would result in altered behavior, demonstrated through varying social behavior tests such as the light-dark maze and social preference tests. The study aims to contribute to our understanding of the correlation between Metformin pollution and zebrafish behavior, crucial for addressing the broader implications on aquatic ecosystems. Results from the light-dark maze tests reveal a consistent trend: zebrafish exposed to Metformin over longer periods of time, prefer lighted areas, with higher concentrations correlating with decreased time in darker sections. The social preference behavior tests support the hypothesis, showing reduced social interaction in tanks with higher Metformin concentrations. In conclusion, the hypothesis is validated, suggesting that prolonged exposure to high Metformin concentrations influences zebrafish behavior, potentially impacting their survival by increasing their susceptibility to predators. This research has broader implications for understanding the environmental consequences of pharmaceutical pollution and underscores the need for preventive measures in pharmaceutical production to safeguard freshwater ecosystems.

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