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Assessing the ecotoxicity of ofloxacin: Effects on swimming behaviour and morphophysiological endpoints in *Daphnia magna*

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Abstract

Background: Ofloxacin (OFL) is a widely used fluoroquinolone antibiotic that is frequently detected in aquatic environments due to its persistence and limited removal in wastewater treatment plants [1]. Its environmental presence raises concerns about potential adverse effects on non-target organisms. **Objective:** This study aimed to evaluate the ecological risk of OFL in *Daphnia magna* as a freshwater invertebrate model, by examining swimming behaviour and morphophysiological endpoints. **Methods:** *D. magna* neonates (<24 h) were exposed to an environmentally relevant (1 µg·L⁻¹) and a 100-fold higher (100 µg·L⁻¹) concentration of OFL for 9 days, with 5 replicates per treatment. After exposure, swimming behaviour (swimming speed, swimming activity, and total distance) was determined by analysing 1-min video recordings. Additionally, morphophysiological parameters (body size, heart size, and area) were also evaluated. **Results:** Results showed a significant reduction in both swimming speed and activity at the highest concentration (100 µg L⁻¹), indicating an impairment of locomotor activity, a behavioural alteration previously documented in *Daphnia* exposed to OFL and other fluoroquinolones [2, 3]. However, no significant changes were observed in total distance travelled. Furthermore, a significant decrease in body size was registered at both tested concentrations, aligning with morphological impairments reported for similar antibiotics [2, 3]. **Conclusions:** These findings revealed that OFL can impair swimming activity and highlighted that even environmentally relevant concentrations may interfere with the normal development in *D. magna*. Further studies are currently ongoing to elucidate the mechanisms underlying these sub-lethal effects and their ecological implications.

Keywords: ofloxacin; *Daphnia magna*; sub-lethal effects

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