Antihistamines affect thermoregulation and orientation in the freshwater snail *Planorbarius corneus*

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Allergies are on the rise and more and more people are suffering from sneezing, coughing, itching or other vexing symptoms, commonly known as hay fever. To counteract against those symptoms antihistamines like Diphenhydramine (DPH) are commonly prescribed and used. Histamine is responsible for the allergic symptoms, DPH counteracts with histamine and reduces allergic reactions. Unfortunately, DPH is not fully metabolized in the human body, and it is also poorly degraded in sewage treatment facilities and very persistent in the environment. Due to the permanent efflux and persistency antihistamines like DPH should be considered as contaminants that may possess risk to the aquatic ecosystem.

Besides inducing allergic reactions in humans, histamines are known to be neurotransmitters in different species from mammals to invertebrates. For example, the importance of histamine as a neurotransmitter has been shown in invertebrates, and it has been suggested that antihistamines interact with histamine receptors and interfere temperature regulation system in invertebrates.

The objective of my work was to analyse the effects of the antihistamine DPH on the thermoregulatory behaviour and mobility of the freshwater snail *P. corneus*. To answer this question I performed two thermoregulatory and one righting time experiment. The righting time is defined as the time required of an organism to right itself after it has been turned upside down. Freshwater snails are ectotherms and rely on their surrounding temperature, and therefore behaviour plays an important role for regulating their body temperature.

Before each experiment, I exposed the snails for 24 hours to three antihistamine DPH concentrations (10, 100 and 1000 µg/L). In the first thermoregulatory experiment, I placed the freshwater snails into a water filled temperature gradient. Snails could choose their preferred surrounding temperature in the gradient and were monitored for 24 hours. In the second thermoregulatory experiment I placed the snails into a water bath at 21°C. The temperature was slowly increased to determine the temperature at which snails lose their attachment to the surface. This point is also called the maximum critical temperature. For the righting time experiment, I tested each individual for righting ability before and after the 24 hour exposure to DPH.

The preferred temperature of freshwater snails was not affected. In contrast, exposure to DPH increased maximum critical temperature and righting time significantly. My results show that analysing the righting response might be a useful behavioural endpoint to test for pharmaceuticals. Using thermoregulatory behaviour as an endpoint to test for pharmaceuticals might need further investigations.

Degree project in Biology, Master of Science (2 years), 2017
Examensarbete i biologi 45 hp till masterexamen, 2017
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