The Effects of Deuterium Oxide on the Regeneration Rates of Planarians and on the Growth Rates of Watercress Plants

Wu, Kunling (School: Keystone School)
Bobbala , Aadhya (School: Keystone School)

Deuterium is a rare, stable hydrogen isotope that can affect organisms in various ways, such as their cellular metabolism, cell structure, and rates of cell division. To understand the extent to which deuterium-enriched water affected organisms, the researchers further investigated its impacts on the regeneration rates of planarians (Dugesia dorotocephala), as well as on the germination and growth rates of watercress (Nasturtium officinale). Approximately 480 mL of deuterium-enriched water (with a deuterium concentration of 0.18%, which was 12 times more than that of normal distilled water) was derived from distilled water through the electrolysis process. 20 planarians were cut into halves, divided into four groups, and placed in either environments of distilled or enriched water to examine regeneration rates. Likewise, approximately 100 watercress seeds were sowed into four pots and were watered with either distilled or enriched water to examine their germination and growth rates. After data collection and analysis, the researchers observed that planarian tissues and watercress sprouts had overall experienced more growth living within or absorbing distilled water than with deuterium- enriched water. However, watercress sprouts growing in one of the experimental pots that were watered with deuterium-enriched water had a considerably higher average height than those growing in either pot watered with distilled water. The researchers concluded that deuterium-enriched water generally slowed down the rates of cellular growth and division of planarians and watercress but may have induced metabolic stress on certain organisms and thus had the potential to irregularly enhance their development.

Awards Won: