The Excitotoxicity Effects of Neotame and Aspartame on the Heart Rate of Daphnia magna

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The purpose of this experiment was to investigate the excitotoxic effects that Neotame and Aspartame may have on the heart rates of Daphnia magna, a common water flea. The hypothesis was that, if Neotame is significantly more potent than Aspartame, then Neotame's excitotoxic effects on the heart rate of D. magna will be greater than those of Aspartame. D. magna were exposed to three concentrations (25, 2000, and 5000 parts per million) of Neotame and Aspartame at two time exposures (two minutes and two hours). Heartbeats were video recorded and slowed down to count and calculate heart rate. Aspartame exhibited a depressive effect on the heart rate at the 5000 ppm level for both the 2-minute and 2-hour exposures. A significant reduction in heart rate was also observed for Neotame at the 2000 and 5000 ppm concentration for the longer two-hour exposures. At the 2-minute duration, Neotame resulted in a significantly reduced heart rate at the 2000 ppm concentration, but the 5000 ppm concentration produced an anomalous elevated rate. These results largely confirm the hypothesis that Neotame has a greater excitotoxic effect at lower concentrations than Aspartame. While these results cannot be directly applied to humans, they suggest that certain health concerns regarding Aspartame may occur at lower concentration levels for Neotame, probably due to its extreme potency. Because Neotame is used in very small amounts in foods and beverages, it need not be disclosed on product labels. Accordingly, understanding the safe limits of exposure is critical to protecting consumers.

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