New Home Hazard: Exploring Flexible Flooring Cytotoxicity

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The purpose is to determine if volatile organic compounds (from flexible vinyl flooring) play a role in the creation of aberrations in cellular function, growth and morphology that might be correlated in creating symptoms associated with autism. Planarians were utilized as a model to explore the impact of degassed volatile compounds on regeneration rates and changes in morphology. PC-12 cells were also exposed to vinyl flooring compounds and axonal growth was compared to determine toxic effects. Dose dependency was also examined. Methods included creating vinyl flooring stock solution by heat 250 g of vinyl flooring through a double boiler system. The solution was tested on cut worms. PC-12 cells were cultured in a suspension with 12 mL of media. For differentiation, cells were passaged and 2.5ul of NGF was added to 5mL of media as well as the different concentrations of vinyl flooring. The data shows volatile compounds were off-gassed at ambient temperatures into a water trap in a dose dependent fashion; longer exposure time resulted in a more toxic solution. Regeneration rates and morphology of planarians exposed to these compounds were all impacted in a negative and dose dependent fashion. Numerous mutations which affected eyes and retinal placement were commonly noted. PC-12 cells exposed to the highest concentrations of vinyl flooring compounds fascinatingly had the highest average axon growth. These effects may possibly be associated with symptoms which define autism spectrum disorder.

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