Using Cellular Techniques To Assess Bioindicator Plants' Response to Environmental Pollutants

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In our world, there is concern about environmental quality, including the impact of air pollution, and to a lesser extent, ionizing radiation. The Purple Heart Spiderwort (Tradescantia pallida) is known to respond to low levels of environmental pollutants such as SO2 or radiation through mutations in the stamen hair cells which form micronuclei. The purpose of this project is to use microcellular as well as macrocellular techniques to assess the environmental damage in these bioindicator plants. An ionizing radiation testing experiment was set up using a Fiestaware plate (gamma rays) as well as a SO2 test chamber. The control blossoms have been harvested from both experiments and the stamen hair cells were observed using a cellular technique to stain the nuclear material. Previous research has shown that the mutations occur in the stamen hair cells. It was these cells which were observed. The DAPI stained the nucleus of the control cells and no micronuclei were observed. The experimenter is currently in the process of harvesting test blooms as they appear and will continue to collect data over the next several weeks. Evaluation of this data will allow the researcher to accept or reject the hypothesis. Future research could involve other cellular techniques which might indicate an environmental assault. For example, dicentric chromosomes form in humans when exposed to radiation. Is this true for T. pallida also? The researcher might include advanced observation of these stamen hair cells using TEM or SEM techniques.

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