The Effects of Paclitaxel on Cellular Migration and the Cytoskeleton

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THINKING MATTERS

April 22, 2022

02/28/2022 20:36:06 *120*

Updated on April 1, 2022

Title: The Effects of Paclitaxel on Cellular Migration and the Cytoskeleton

Updated Abstract: In a clinical setting, some patients are exposed to an anti-cancer chemotherapy agent, paclitaxel. Cancerous cells undergo rapid, continuous cell division without control. Chemotherapy treatments try to slow and stop the uncontrollable cell division cycles and eliminate cancerous cells in the process. Paclitaxel serves as a treatment for some types of cancers, including lung, melanoma, bladder, and esophageal. Because it targets the cytoskeleton, paclitaxel can also influence cell migration. This project utilizes a cellular migration assay and an immunohistochemistry assay to analyze the effects of paclitaxel on the movement of cells and on the cytoskeleton of neuroglia rat cells with glioma.

Cells were grown in culture to a monolayer and were treated with dimethysulfoxide (DMSO; the paclitaxel solvent) as the control and with 0.4 μM paclitaxel. Removal of a small strip of cells in the middle of the culture induced the remaining cells to migrate across to fill the gap. Cultures were observed and analyzed to establish if the cells either did not migrate, or migrated more slowly across to fill in the scratched gap. Imaging with the microscope allowed us to measure and quantify the migration of cells for a duration of 48 hours. The migration assay provided insights into how cellular movement can be disrupted.

Because one target of these compounds is the cytoskeleton, we also conducted immunohistochemistry on exposed cultures. Cells were fixed and stained with phalloidin to label the actin structures and DAPI to stain the nuclei. Fiji was used to detect morphological changes of nuclei to have a better understanding between structure and function. Images taken using fluorescence microscopy helped us analyze the effects of the chemotherapy agent on the organization, localization, and levels of expression of actin at a cellular level.

Project involved interaction with: Neuroglia Rat C6 Glioma Cells
Keywords: Cancer, Cellular Movement, Cytoskeleton
Discipline(s): Biological Sciences
Presentation Type: Poster Presentation and Oral Presentation
Permission to Publish on Digital Commons: No
Presentation setup needs: I will submit a powerpoint presentation to share it on the projector.
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