1. **Characterization Of Normal Cell And Cancer Cell Attachment Using Electric Impedance Sensing**

**Global Integrative Oncology: Use in Cancer Prevention**

This research focuses on the attachment of normal epithelial cells (HaCAT) and cancer epithelial cells (A431), and the effects of Ganoderma Lucidum (reishi), a nutritional supplement, on the attachment of HaCAT and A431 cells. Cell attachment is one of the most important properties of the cell membrane, particularly of the epithelial cell membrane. Cells are held together through direct membrane contact. These contacts are necessary to maintain the structure of tissue. A cancer cell can break through the epithelial sheet with poor attachment and enter the body’s fluid stream, which in cancer may result in metastasis. Ganoderma Lucidum (reishi), a medicinal mushroom has been known to have anticancer properties, which is related to inhibition of the signaling pathway involved with adhesion.

To investigate the cell attachment quantitatively, an electric impedance sensing technique is used. This technique is noninvasive and allows examination of the cell behavior in real time. The impedance system measures the impedance of the electrodes located on the bottom of the cultureware. The impedance of the electrodes increases with cell attachment, as cell attachment limits current flow between the basal membrane and the cell support. In our experiments, two cell lines were used; HaCAT cells (normal human epithelial skin cells) and A431 cells (human epithelial carcinoma cells). To examine the effect of reishi on the cell attachment, cells were treated with three doses of reishi (0.005 mg/mL, 0.01 mg/mL, 0.02 mg/mL). Our data shows that the impedance of HaCAT and A431 cells increases with cell spreading and attachment as expected. Our data shows a distinct behavior for HaCAT and A431 cells; the resistance of HaCAT cells increases over a span of several hours and reaches a plateau whereas that of A431 cells increases and reaches a plateau 10 hours later than HaCAT cells. The data suggests that resihi does not have a significant effect on the resistance of HaCAT and A431 cells.

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