Investigating the Role of Cancer Treatment in Tumor Progression Using a 3D Type I Collagen Hydrogel Co-Culture Model

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Three-dimensional (3D) cell culture is an emerging technique that allows cells to grow in a way that more closely resembles how they exist in the body. Unlike traditional two-dimensional (2D) cultures, where cells grow flat on a surface, 3D cultures provide a more realistic environment that better reflects natural cell behavior and responses to treatment. Because of this, 3D culture often gives more accurate results than 2D culture alone. Ivermectin and noni extract have recently gained attention as potential treatments for cancer cells, but there is limited research on how these treatments affect cells in a 3D environment. This study aims to compare the effects of ivermectin and noni extract on MCF7 breast cancer cells grown in both 2D and 3D cultures. MCF7 cells were grown using both culture methods and then treated with varying doses of ivermectin and noni extract. Cell imaging and cell counting were used to evaluate changes in cell growth and survival after treatment. By comparing results from 2D and 3D cultures, this study highlights how the culture environment influences treatment response. Overall, 3D culture shows strong potential as a more accurate method for studying cell behavior and testing treatments. Its ability to better mimic real biological conditions can improve the evaluation of cancer therapies and may be valuable for a wide range of cellular and biomedical research applications.

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