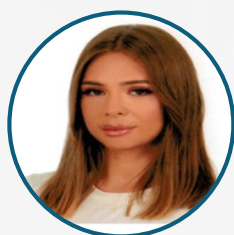


INTERNATIONAL CONFERENCE ON CELL SCIENCE AND REGENERATIVE MEDICINE



**Oliwia Piwocka^{1, 2, 3}, Karolina Sterzyńska⁴,
Agnieszka Malińska⁴, Wiktoria M. Suchorska^{1, 3},
Katarzyna Kulcenty³**

¹Department of Electroradiology, Poznan University of Medical Sciences, 61-866 Poznan, Poland

²Doctoral School, Poznan University of Medical Sciences, 60-812 Poznan, Poland

³Radiobiology Laboratory, Department of Medical Physics, Greater Poland Cancer Centre, 61-866 Poznan, Poland

⁴Department of Histology and Embryology, Poznan University of Medical Sciences, 61-781 Poznan, Poland

A simple recipe on how to obtain multicellular tumor spheroids to explore breast cancer microenvironment

Abstract: Breast cancer research has seen significant advances with the development of three-dimensional (3D) cell culture models that better mimic the tumor microenvironment compared to traditional two-dimensional (2D) cultures. Our study utilized various breast cancer cell lines (T47D, BT474, SKBR3, MM231), co-cultured with cancer-associated fibroblasts (CAFs), endothelial cells (ECs), and macrophages to create multicellular tumor spheroids (MCTSs), presenting for the first time successful tetraculture of 3D breast cancer. These spheroids provide a more realistic model for investigating tumor dynamics, invasion, and drug resistance.

Protocol ensures the generation of uniform MCTSs across different cell lines, preserving oxygen and nutrient gradient. Immunofluorescence and immunohistochemistry analyses revealed distinct patterns of cellular distribution within spheroids. The live/dead assay indicated high viability in all types of MCTSs for 7-14 days. The invasion assay demonstrated significant invasive potential in BT474 and MM231 spheroids, consistent with their clinical aggressiveness. Furthermore, MCTSs exhibited higher resistance to cisplatin than 2D cultures, underscoring the importance of incorporating 3D models in preclinical studies.

This method offers a simplified yet effective approach to MCTS generation, providing a valuable platform for studying breast cancer biology and testing therapeutic responses. The findings highlight the critical role of the tumor microenvironment in cancer progression, making our study a significant contribution to cancer research.

Keywords: tumor-microenvironment, multicellular spheroids, cross-talk, breast cancer, 3D culture, co-culture

Biography: Oliwia Piwocka is a PhD student at Poznan University of Medical Sciences. Despite her age, she is a successful student, highly regarded by her supervisors, and actively involved in academic life. She has published 10 papers with a combined impact factor of 56 and has participated in research internships in Europe and the United States. Oliwia Piwocka is interested in intracellular cross-talk, its research in 3D cell cultures, and the impact of radiotherapy on those interactions.