The matrix component influences drug sensitivity difference between MCF-7 cells in 2D and 3D cultures

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Enhancing the alignment of preclinical models with how cancer manifests in humans could help reduce the high failure rate of new cancer therapies in clinical trials. Recently, three-dimensional (3D) tumour cultures in vitro have gained renewed attention due to their higher resemblance to in vivo tumours compared to cells grown in monolayers (2D). To identify cancer functions that were active in 3D cultures rather than in 2D, we compared the doxorubicin treated of MCF-7 cell line grown under both conditions. As predicted by Ingenuity Pathway Analysis (IPA), the protein family in the synthesis of DNA, in the cell cycle checkpoints, in the DNA double strain break response, in the nucleotide excision repair, senescence pathway, apoptosis signalling network and cellular response to hypoxia network expression level were decreased in 3D cultures compared to 2D cultures in vitro. These findings advance our understanding of how culture models impact protein expression and provide valuable insights into drug sensitivity mechanisms, helping to improve the success rate of new cancer therapies in clinical trials.