Characterization of pancreatic ductal adenocarcinoma cells in a 3D-cell culture model: focus on epithelial-to-mesenchymal transition

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Three-dimensional (3D) cell cultures provides a key to the information encoded in the tissue architecture, therefore mimicking the functions of living tissues [1]. Considered the key role of epithelial-to-mesenchymal transition (EMT) in carcinoma progression [2], we aimed at analyzing the effect of the 3D-arrangement on the expression of some key markers of EMT in pancreatic adenocarcinoma (PDAC) cells cultured in either 2D-monolayers or in 3D-spheroids by morphological and molecular methods. HPAF-II, HPAC, and PL45 cell ultrastructure was analyzed by transmission electron microscopy. The main EMT markers E-cadherin, β-catenin, N-cadherin, collagen type I (COL-I), vimentin, α-smooth muscle actin (αSMA), Snail, Slug, Twist, Zeb1 and Zeb2 were evaluated by confocal microscopy and molecular methods. Moreover, the expression of cytokeratins was characterized in PDAC cells grown in 2D-monolayers and 3D-spheroids to better understand PDAC cell behaviour. We show important differences in the phenotype of PDAC cells grown in 3D-spheroids or in 2D-monolayers, especially providing additional correlative evidence of EMT marker expression in PDAC cells and contributing to a clarification of the role of EMT in PDAC progression. Considered as a whole, our results suggest that a 3D cell culture model could provide deeper insight into the understanding of the biology of PDAC.

References


Key words

Epithelial-to-mesenchymal transition; pancreatic adenocarcinoma; spheroids; E-cadherin.