Abstract

Multicellular tumour spheroid (MCTS) are spherical aggregates of cancer cells that can mimic the tumour microenvironment (TME) conditions. This morphological change may influence cellular behaviour such as proliferation, epithelial-mesenchymal transition (EMT), and exosomal secretion. This study aims to characterise the MCTS formed from breast cancer cell line, MCF7 and MDA-MB-231-LM2 based on their proliferation and EMT markers as well as exosomal characteristics. To elucidate this, MCTS were cultured on poly-HEMA-coated dishes with both RNA as well as exosome samples collected 72 hours post-seeding. Western blot, quantitative polymerase chain reaction (qPCR), and nanoparticle tracking analysis (NTA) were performed to assess the difference between MCTS and their wildtype (WT) counterparts. Findings suggest that MCF7 MCTS had a more compact and spherical structure compared to MDA-MB-231-LM2 MCTS. Both MCTS exhibited slower proliferation capacity with increased expression of EMT markers. Although MDA-MB-231-LM2 MCTS secreted larger and higher numbers of exosomes, MCF7 MCTS displayed otherwise. These findings reveal that MCTS formation can alter cellular behaviour and can be a relevant disease model to investigate further about cancer's metastatic potential.

Keywords: breast cancer, multicellular tumour spheroid (MCTS), epithelial-mesenchymal transition (EMT), sphere-formation assay (SFA), exosomes