

Characterization and comparison of MDA-MB468 cancer stem cell properties in 2D and 3D culture

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Abstract

Aim and Background: The cancer stem cell model postulates that a small subset of cancer cells with stem like properties drive tumor initiation, progression and drug resistance. Since Three-dimensional (3D) in vitro models provide a well-defined environment for cancer research in contrast to the complex host environment of an in vivo model, our aim in this study is to compare cancer stem cell properties in 3D and 2D culture.

Materials and methods: MDA-MB468 Cells cultured in 2D and 3D culture were compared for their colony formation and spheroid formation efficiency, stemness markers expression (CD133, CD44) by flowcytometry and stemness gene expression (Oct4, Sox2, Nanog, Aldh, Cmyc) by Real time PCR.

Results: Cells cultured in 3D showed no significant difference in colonogenic and spheroid forming capacity in comparison with those cultured in 2D. While Cells in 2D showed higher proportion of CD133+ phenotype than those in 3D (98.55 ± 0.34 vs. 52.69 ± 5.84), no significant difference was observed in CD44+ expression. Additionally, stemness genes including Aldh, Cmyc, Oct4, Nanog, and Sox2 were strikingly down regulated in 3D culture.

Conclusion: We demonstrated that 3D culture which could mimic the tumor architecture and in vivo conditions decrease cancer stem cell properties of MDA-MB468 cell line.

Key words: Cancer stem cell, 2D culture, 3D culture

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