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Identification of a novel target that regulates breast cancer stem cells

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There have been significant advances in breast cancer treatment, which have been attributed to the use of targeted therapy in combination with surgery and chemotherapy. However, the tumor-related mortality remained high mainly due to chemoresistance resulting in relapse and metastasis. Chemoresistance is widely believed to be regulated by a small subpopulation of the tumor bulk that possess stem cell-like features and thus are called cancer stem cells (CSCs). We have shown significant association between worse clinical outcome in breast cancer patients, including metastasis and shorter survival, and expression of fascin, an actin-bundling protein. Moreover, we have also reported that fascin is a critical mediator of breast CSCs and chemoresistance, via the activation of focal adhesion kinase (FAK), which is known to directly bind members of the integrin adhesion molecules. Here we have used fascin loss and gain of function approaches to examine if fascin influences integrin expression to regulate breast CSC function. Our results have demonstrated that fascin expression in breast cancer cells is directly associated with increased expression of integrins including: CD49a, CD49C, CD49f, CD29 and CD61. Fascin-mediated integrin expression on breast cancer cells enhances their adhesion, chemoresistance and tumorsphere formation ability. This study supports a role for fascin in the maintenance of breast CSCs via the regulation of integrin expression. The outcome of this study is expected to provide another evidence that fascin targeting may present a new approach for optimal treatment of breast cancer from the root.

Biography

Monther Al-Alwan has completed his PhD in immunology from Dalhousie University and postdoctoral studies from University of Manitoba, Canada. He is a Scientist at the stem cell and tissue re-engineering program (SCTRP) at King Faisal Specialist Hospital and Research Centre and Adjunct Associate Professor at Alfaisal University, Riyadh, Saudi Arabia. Currently, he is actively involved in dissecting the molecular pathways that regulate the function of cancer stem cells and how this is related to chemoresistance and metastasis. He has more than 22 peer-reviewed publications in reputed journals and has been serving as an Editorial Board Member of various international journals.

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