Identification of chemical inducers of metastasis-related cell differentiation events using peptide microarrays

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Poster Presentation Abstract:

The epithelial-mesenchymal transition (EMT) is a key indicator of cancer progression and metastasis *in vivo*. The most important inducer of EMT is activation of the transforming growth factor beta (TGF-β) pathway. In addition to initiating EMT, TGF-β is able to cause cancer cells to switch cell states from the non-stem cancer cell (NSCC) to the more invasive and tumorigenic cancer stem cell (CSC) state. Investigation into factors that can activate the TGF-β pathway, and thereby initiate EMT or the NSCC-to-CSC conversion, is therefore of critical importance.

It is well known that the chemical environment immediately surrounding the cell determines cell differentiation events. Small molecules such as peptides, then, can induce such events in cells that are bound to the peptides. In this project, we aimed to identify peptide ligands that were able to induce EMT in cells adhered to the peptide surface. Five peptides previously discovered through phage display (panning against MDA-MB-231 cells) along with three control peptides, were printed onto gold-coated glass slides in a patterned array using a DNA microarray printer and tested against NMuMG cells. The arrays of cells were then fixed and stained for eCadherin (an epithelial marker). We found that after four days of culture on the peptide-modified surfaces, eCadherin levels were decreased on two of the five test peptide surfaces, as well as in both of the positive control peptide surfaces, suggesting that those cell populations underwent EMT. Future studies will indicate whether these peptides can additionally induce the NSCC-to-CSC conversion.

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