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**Utilizing Functionalized Nano-Patterned Surfaces as a clue to Cell Metastasis in Prostate and Breast Cancer** JAMES MATTHEWS, LYNDON BASTATAS, Texas Tech University — There is a direct relation between the survival of a patient diagnosed with prostate or breast cancer and the metastatic potential of the patient's cancer. It is therefore extremely important to prognose metastatic potentials. In this study we investigated whether the behaviors of cancer cells responding to our state of the art nano-patterns differ by the metastatic potential of the cancer cells. We have used lowly (LNCaP) and highly (CL-1) metastatic human prostate cancer cells and lowly (MCF-7) and highly (MB231) metastatic breast cancer cells. A surface functionalization study was then performed first on uniform gold and glass surfaces, then on gold nano-patterned surfaces made by nano-sphere lithography using nano-spheres in diameter of 200nm to 800nm. The gold surfaces were functionalized with fibronectin (FN) and confirmed through XPS analysis. The CL-1, MCF-7, and MB231 cells show similar proliferation on all surfaces regardless of the presence of FN, whereas LNCaP show a clear preference for FN coated surfaces. The proliferation of the LNCaP was reduced when grown on finer nano-scaffolds, but the more aggressive CL-1, MB231, and MCF-7 cells show an abnormal proliferation regardless of pattern size. The difference in adhesion is intrinsic and was verified through dual fluorescent imaging. Clear co-localization of actin-vinculin were found on CL-1, MCF-7, and MB231. However LNCaP cells showed the co-localization only on the tips of the cells. These results provide vital clues to the bio-mechanical differences between the cancer cells with different metastatic potential.

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