Thursday, May 1, 2014
12:15 pm in Room 1315

Analytical Seminar

"Characterizing the Proteome of 3-Dimensional Cell Cultures"

3D cell cultures are valuable *in vitro* model systems for biological research. While simple and quick to grow, 3D cultures recapitulate the physiology of their source tissue. For example, when cancerous cell lines are grown in 3D, the resulting structures capture many of the molecular and pathophysiological aspects of tumors. These cultures provide higher-throughput, more cost-effective, and quicker alternative model systems than animals. We have developed an approach to examine endogenous protein distributions in 3D cell cultures via MALDI imaging mass spectrometry (MALDI-IMS). We are currently expanding our methodology to examine the uptake and penetration of clinically administered drugs into the 3D structures. While we developing our approach with a well-known drugs, our approach can be expanded to novel therapeutics. We have examined analyte distributions in 3D cultures of the human colon carcinoma cell line, HCT 116. We observed m/z values differentially expressed across the HCT 116 cultures by MALDI imaging mass spectrometry. For example, we detected multiple species distributed across the entire structures, while a species corresponding to 12828 Da was detected predominately in the necrotic center cells. Using MS/MS approaches, we have identified specific proteins localized to distinct regions of the 3D structures. We are currently generating inducible cell lines to knockdown expression of key cell adhesion proteins implicated in metastasis. With these cell lines, we will reduce expression of cell adhesion proteins in our 3D cultures. We will then map the resulting changes in protein distribution and abundance with IMS as we model the metastatic process in vitro. In tandem, we have also characterized the proteomic and phenotypic response of the 3D cultures to drug treatments. Beginning with the drugs Oxaliplatin and Irinotecan, we treated the 3D cultures and evaluated **. . . For more information, please attend the seminar!**

Professor Amanda Hummon

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