Project #01R: **Julie Babensee** and **Ying Luo**: *Carbohydrate Microarrays for High-Throughput Analysis of Dendritic Cell-Glycan Interactions*

As an essential component in living organisms, glycans have been found to mediate important fundamental biological processes including host-pathogen interactions and immunological responses. However, our current ability to detect and manipulate the complex glycan-cell interactions has been rather limited. By combining the expertise and techniques of the Luo and Babensee laboratories, we started a challenging research project to explore strategies to fabricate carbohydrate microarrays suitable for analyzing multivalent glycan ligand-receptor interactions with functional effects on immune cells. With the support of one year of funding through the GT/Emory-PKU BME Collaborative Research Seed Grant Program, we have developed key methodologies to advance our research goals, and herein we propose a renewal of this project. In the past year, we have devised the chemistry to synthesize monosaccharide conjugates for surface modification, and have also developed and validated a high throughput methodology to assess human dendritic cell (DC) responses to engineered biomedical surfaces. Through this renewal funding we will continue the original plan and develop carbohydrate microarrays for presenting glycan ligands in well-defined local spatial arrangements. By creating combinatorial presentations of monosaccharide ligands in the array format, we will investigate in a high-throughput fashion how the phenotype of human DCs will be affected by materials. The prototypic carbohydrate microarrays and high-throughput methodology could potentially open the door for us to develop advanced functional materials/therapeutics, which will include non-immunogenic biomaterials for applications in medical devices and tissue engineering, and adjuvants for vaccine delivery.