Fluorescence Imaging Reveals a Potential Association of Laminin Receptor with SUMO Machinery

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Laminin receptor (LR) is a protein overexpressed in cancer. LR contributes to tumor-cell migration and proliferation, and restructures laminins to increase aggressiveness and gene expression of tumor cells. Thus, the abundance of the receptor is a reliable determinant of tumor severity. Little is understood about how LR enhances aggressiveness of tumor cells.

To gain insight into the behavior of laminin receptor, we genetically fused a red fluorescent protein to LR (LR-mCherry2). We confirmed the orientation and insertion of the gene via restriction digests. Using high-throughput live cell imaging, we determined peak expression time and number of positively transfected cells for LR-mCherry2 and mCherry.

Because there is evidence that laminin receptor is associated with SUMO (Small Ubiquitin-Like MODifying) proteins, we explored the hypothesis that SUMO proteins and SUMO machinery were associated with LR in the cell. A second set of proteins, SENPs (SUMO-Sentrin Specific Proteases), are responsible for removing SUMO when their addition is no longer required. We cotransfected PC-3 cells with LR-mCherry2 or mCherry2 and one of four EGFP fused SENPs (SENP 2, 3, 5, or 6).

After live cell imaging, consecutive images were compiled into movies that revealed localization patterns for SENPs and LR-mCherry2. Interestingly, we found that LR-mCherry2 was expressed throughout the cell but it was strongly associated with SENPs in the nucleus. This suggests that the LR may interact with SUMO machinery in the nuclei of prostate cells.

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Michael was born in Nashville, Tennessee, and was raised in Merrillville, Indiana. In 2015, he graduated from Merrillville High School within the top ten percentile. He also graduated with honors. In High School, he was an active member of the National Honor Society, Merrillville Pirate Athletic Council, and played Varsity Golf all four years. During the summer, he is a golf instructor at Innsbrook Country Club. He teaches children from the age five to fifteen how to play golf.

He is currently a rising sophomore at Purdue University and is an active member of the Iven C. Kinchloe Jr. Chapter of Silver Wings; a ROTC-Civilian Volunteer group that participates in a variety of volunteer service activities such as, volunteering at NATCON and the Purdue 25-K. Last fall, he began a research assistant position in the lab of Marxa Figueiredo in the Basic Medical Sciences Department in the College of Veterinary Medicine.

He is studying Biochemistry with a focus in Chemistry and a minor in Biology. After completing his Bachelor of Science degree, he would like to pursue a Ph.D. in Biochemistry and research how diseases interact with the immune system in order to help treat or prevent disease.