

Pharmaceutical Formulations & Drug Delivery

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Infection of piglets with the porcine respiratory and reproductive syndrome virus (PRRSV): a morphological study

Biosurfactants are amphiphilic molecules that possess biological properties such as anti-cancer. Their synthesis by bacterial fermentation can yield large quantities, creating opportunities for the development of low-cost therapeutics. Furthermore, microbial biosurfactant synthesis provides safe “green” routes to low toxicity natural products. Research presented focuses on the natural anti-cancer properties of surfactin, a lipopeptide biosurfactant. The functionality of this molecule enables its use as a scaffold for molecular engineering of its structure to interrogate structure-property relationships to achieve optimum efficacy and minimal toxicity. Surfactin is a negatively charged amphiphile composed of a heptapeptide and β -hydroxy fatty acid. There are multiple regions of interest for modification, including the glutamic and aspartic acid residues as well as the lactone in the peptide ring that can be ring-opened by amine nucleophiles. Modifications thus far focus on conjugating amine functional moieties to glutamate and aspartate that: i) amplify the negative charge, ii) introduce positive charge and iii) present neutral polar entities. By molecular engineering of surfactin analogs, we hope to discover structures with improved anti-cancer activity and reduced toxicity. This presentation will describe how structural modifications of surfactin modulate its cytotoxicity against the MDA-MB-231, a triple negative breast cancer cell line. Its selection is due to a lack of hormonal receptors and the current narrow range of treatment options. Toxicity studies on healthy breast derived fibroblasts and erythrocytes were



Rebecca Miceli

Wheaton College, New York

used to determine therapeutic indices.

Biography

Rebecca is a third-year doctoral candidate at Rensselaer Polytechnic Institute, studying medicinal chemistry in Dr. Richard Gross's laboratory. Her interests include organic synthesis, cancer biology, and pharmaceutical development. She completed her B.A. at Wheaton College (MA). In her free time, Rebecca enjoys cooking, trail running, and spending time outside with friends.

micelr3@rpi.edu