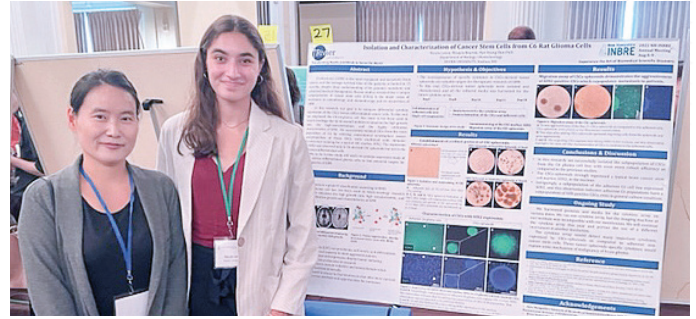
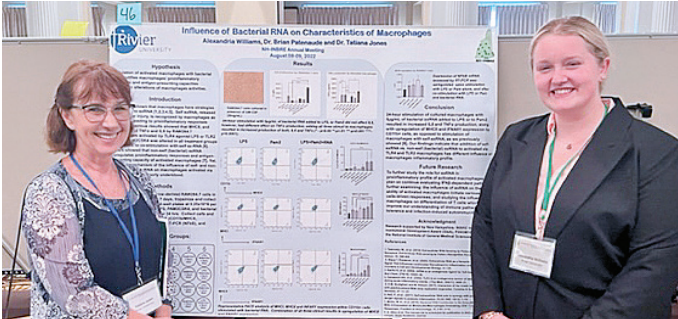


Research Investigations and Outcomes

Advancing Modern Healthcare

Faculty-student biomedical research builds confidence and foundational skills necessary to advance healthcare.



Rivier professors Dr. Tatiana Jones and Dr. Hye Young Shin received 2022 New Hampshire INBRE (IDeA Network of Biomedical Research Excellence) grants to conduct biomedical research with their students. The NH-INBRE program expands and enhances biomedical research within the state; it provides opportunities for promising undergraduate students to experience top-level training while working alongside research faculty. Students Alexandria Williams '24 and Nicole Lezon '22 received paid summer internships through the grant and worked as full-time researchers. Both students presented their research at NH-INBRE's annual meeting, a statewide gathering for researchers to present their projects and findings.

Research Findings

Project Title: Extracellular RNA upregulates proinflammatory profile of macrophages stimulated with TLR2 and TLR4 agonists.

Researchers: Dr. Tatiana Jones, Assistant Professor of Biology, and Alexandria Williams '24

Investigation: This research project investigated the role of extracellular (ex)RNA in setting the stage for inflammation and healing. We hypothesized that stimulation of activated macrophages (tissue cells) with non-self exRNA, a foreign substance capable of triggering an immune response, would result in upregulation of MHCII expression and increased production of TNF α and IL6. These substances contribute to the body's defense against infection and tissue injury.

Outcomes: The hypothesis was confirmed. Stimulation of macrophages with bacterial exRNA in the experiments resulted in upregulation of MHCII, increased production of TNF α and IL6, and most importantly in upregulation of Interferon A Receptor 1, which are key contributors to effective antiviral responses. Research results prompted a project proposal to develop a deeper understanding of cellular alterations in live tissues where different types of cells interact. Alexandria Williams continues working on this research project through an Immunology course. Next year, this research will become the focus of her Senior Research Project.

Project Title: Detection of Differential Cytokine Expressions in Cancer Stem Cells of Rat glioma and Human glioma cell lines, and its application in finding therapeutics.

Researchers: Dr. Hye Young Shin and Nicole Lezon '22

Investigation: The long-term goal of the research is to detect differential cytokine (substances secreted by certain cells of the immune system that have an effect on other cells) expression in cancer stem cells (CSCs) of C6 rat glioma cell line, and ultimately to pursue its application as potential therapeutics for glioblastoma (GBM). Due to its aggressiveness and high recurrency after surgical removals, radiation, and chemotherapies, GBM is the most fatal brain cancer. In recent research, CSCs have been identified as the major culprit of the resistance of GBM to any kind of therapeutic treatments.

Outcomes: The reproducible and reliable method to isolate CSCs from C6 glioma cells was successfully established. CSC-spheroids were isolated from other cancer cell populations by utilizing conventional neurosphere formation protocol, and the expression of a typical CSC marker SOX2 was confirmed. Proteome Cytokine array successfully detected the overexpression of crucial and specific cytokines of the CSCs as compared to the regular cancer populations. Further research will be conducted to validate the CSCs-specific cytokines as potential targets for the drug discovery of GBM.