

**From:** [iweb.langara.bc.ca](mailto:iweb.langara.bc.ca)

**To:** Scholarly Activity

**Subject:** New submission from RSAF Final Report

**Date:** September 30, 2019 10:03:13 AM

**1. Please introduce yourself – include pertinent background information relating to the topic of your research project. Include your project title.**

My name is Prashant Kumar and I am an instructor in the biology department, I received the RSAF grant in Fall 2018. The title of my project was Development and formulation of novel antimicrobial peptides (AMPs) for activity against *Staphylococcus aureus*. With the advent of bacterial resistance, it has become crucial to find substitutes to conventional antibiotics. Antimicrobial peptides (AMPs) are considered to be viable alternatives, because they are broad spectrum and since bacteria develop little or no resistance towards AMPs. Many studies have designed mutants of natural AMPs to increase the antimicrobial activity of peptides. The project involves the development of new antimicrobial peptide peptides. This will initially involve generating a peptide array by surveying the literature. The minimum inhibitory concentration assay will be used to test the effectiveness of the peptide array against *Staphylococcus aureus* at the Langara microbiology labs.

**2. Please discuss your educational background and your work experience that led you to taking on this research project. If possible, include a quote that helps define your interest in this project.**

I was a student at Langara College in 2009 and completed my associate degree and moved to UBC where I finished my Bachelors in Biochemistry. I decided to pursue a PhD at UBC and finished the program in 2018. Most of my research and publications were based on developing new antimicrobial peptides which can be used for methicillin resistant *Staphylococcus aureus* infections. Knowing the crisis with antibiotic resistance and my previous experience, I decided to work on a project that is involved in designing new antimicrobial peptides.

**3. Please explain the concept for your project in terms that others not in your field would understand, like an executive summary.**

The first part of the project involves the development of new antimicrobial peptide (antibiotics). This will initially involve generating a peptide array by surveying the literature and using software programs such as quantitative structure-activity relationship (QSAR). The effectiveness of the peptide array against *Staphylococcus aureus* was tested at the Langara microbiology labs. The peptides (2-3 peptides) with the best activity will be further studied.

**4. Identify goals and objectives for the project, and how the results may be used, perhaps to solve a problem, or to inform further research in that field.**

The objective of the project was to design a peptide array and find one or two peptides that can be used to further studies. We were able to identify one peptide with moderate activity but the peptide array has not been fully tested yet due to the closure of the T-building in April and May. We are hoping to use the array data and quantitative structure-activity relationship software to predict future sequences and aid other scientists to design better peptides.

**5. Briefly explain the steps taken to conduct the project research, and the results found.**

With the help of the 3 students, we generated the peptide array and are in the process of completing the activity of the entire peptide array. To date we have found one peptide with moderate antimicrobial activity, once we have completed the array, we will have a better understanding of the relationship between the sequence/structure and function of the peptides.

**6. Who else was involved in this project? How did their involvement help? I.e: other faculty, students, community partners**

Three undergraduate students from Langara were involved in the projects and they designed the peptide array and ran most of the antimicrobial assays which was a great help. We were able to design the peptide library and order it from a company in a few months.

**7. What were/are you hoping to get from conducting this research?**

We were able to design an array with 110 peptides and order/receive them from the company. Some peptides still need testing, but a peptide was found with moderate activity. We were also able to provide an opportunity for students to be involved in research which is a valuable experience that will influence their career paths. Hoping to further study some of the peptides in more details and apply for a NSERC external grant.

**8. Can you share any personal stories that made this research experience memorable/valuable?**

It was great to see three 2nd year biology students from Langara to learn and research about antimicrobial peptides. The students also came up with an array of antibiotics that still needs complete testing. Two of the three students transferred into the 3rd year microbiology project at UBC. One of the students is working on the health sciences degree and is continuing with the project this fall.

**9. Do you have any tips/suggestions/ideas for applying this research in your field? Or for others in their field s?  
Or for conducting future research of this kind?**

Similar design of the peptides can be used for the development of anticancer, ant-fungal and anti-inflammatory drugs. I was able to talk about my research to Garyen Chong from the Biology department and he recently also received a RSAF grant. Allow for more time than usual research as both instructors and students are busy with courses and students need extra supervision.

**10. Any final comments? What are the “next steps” for this project? And for you?**

I have applied and thanks to the RSAF Adjudication Committee, I was approved another RSAF this fall. Also planning to apply for external funding such as NSERC soon.

**Please upload any images that will help to showcase your project.**

[big\\_cover-biomolecules-v8-i1.png](#)