

# Undergraduate Student Perspective - Undergraduate research student interview



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**Tell me a little about your research, and the broad goal.**

*Title: Bacteriophage control of Salmonella enterica in artificially contaminated 1%, pasteurized milk*

The genus *Salmonella* is made up of over 2,500 serovars between two species: *Salmonella enterica* and *Salmonella bongori*. *Salmonella* spp. are the number one causative agent of food-borne illnesses in the United States. Consuming food that is contaminated with *Salmonella* can cause a condition known as Salmonellosis. Salmonellosis, also known as food poisoning, occurs when *Salmonella* spp. enter the intestinal tract and invade the epithelial cells of our small and large intestines. It is characterized by vomiting, diarrhea, fever, and abdominal cramps. Usually this infection will only last up to 48 hours but in the immunocompromised community, this can be life threatening. If a person's immune system is not able to fight off the *Salmonella* infection, then the bacteria will enter the bloodstream and cause a systemic infection which can be fatal. An infection of the intestinal tract cannot be treated with antibiotics. Treatment with antibiotics can leave the patient vulnerable to more infections of the GI tract. However, if antibiotics were a treatment option, they would be ineffective against a *Salmonella* infection. *Salmonella* spp. are resistant to multiple antibiotics leaving only a few that can be used to treat these infections. Alternatives to antibiotics are needed to treat infections where the bacteria are resistant to all antibiotics. Bacteriophages are known as the "viruses of bacteria". Bacteriophage, also known as phage, insert their genetic material into their hosts, hijacking their DNA synthesis machinery in order to produce more phage inside the host cell. There are two forms of bacteriophage, lytic and lysogenic. Both phages hijack their hosts in the same way, but how long it takes to kill the host is where these two differ. Lytic phage get their name by causing the host cell to lyse after producing more phage. Lysogenic phage will incorporate their genome into the hosts and not cause lysis until a switch is made. There is no set time for how long a lysogenic phage will keep the host cell alive but once the switch is made, the host cell will produce more phage eventually causing itself to lyse. Bacteriophages have been considered an alternative to antibiotics because of this lytic ability to kill their hosts. The goal of this project is to isolate and characterize bacteriophage

from a raw milk environment to use as a biological control of *Salmonella* enterica contamination of food products.

We expect to see that the bacteriophage are able to control *Salmonella* contamination at a low density but as the density increases, the phage becomes less effective. We also expect that the bacteriophage will have a higher affinity to the S1 (unknown *Salmonella* species we isolated from the farm) bacteria than it does to the lab grown *Salmonella* enterica .

**Can you give a brief overview of some of your daily activities in the lab?**

Each day I go to to the lab and subculture set of S1 and S. enterica with TSB tubes. If we are out of material we need, I usually make sets of TSA plates and TSB tubes. Each day's task depends on what we have going on in the lab at a particular time.

**How has working in the lab helped to better prepare you for your future?**

From just in the lab this semester I have gained some confidence on what it takes to be a Microbiology student and work in a Microbiology lab. Also, working in the lab I feel has gotten me ready for my MS program and what it takes to be a scientist and also with having the experience in the lab will increase my chances of getting into medical school.

**What are some limitations that you seem to be facing in this pandemic regarding your research?**

Some limitations we faced during this pandemic are noting having in materials and phages we need for experiment not getting delivered time due to the pandemic, also due to the pandemic the amount of time we are allowed in lab is limited in other to accommodate all students doing research to help reduce the numbers of students allowed in the lab at a given time.

**Do you foresee these limitations changing anytime soon or do you think research has forever been changed due to COVID-19?**

I think the limitations we are currently facing could change. We have a vaccine for this virus and the pandemic is over. With that being said I do not think research is forever changed due to COVID-19 because I believe a good scientist/ researchers should be able to accommodate changes and be able to work around these unplanned changes but change is the only constant time in life.

**What is some advice that you would give a new undergraduate researcher that would have helped you be better prepared for your research experience?**

- Do not wait till your last year of your undergraduate degree to start research.
- Failure is part of being a researcher
- Don't be afraid to ask professors to work in their labs from your first of your undergraduate career.
- Take initiative and work hard.
- Don't be afraid to ask questions if unsure.

**Do you have any further comments about Fine Focus or undergraduate research in general?**

I would encourage any science/biology major student to sign up for a research immersive learning class because it will help prepare them for plans after their undergraduate degrees such as graduate school, phd program. Also it will also look good on your resume and most importantly makes you a better scientist.