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Effects of Arsenic on *Janthinobacterium* sp. Isolate #19

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BACKGROUND

- *Janthinobacterium* is an aerobic, gram-negative, bacteria that is isolated from the microbiota of forest soils, Antarctic glaciers, lakes, and rivers (Oh et al. 2019)
- Highly resistant to arsenic and other heavy metals
- Known to have antibacterial, antiviral, and antifungal properties
- Some bacteria (ex. *Chromobacterium violaceum*) have shown to transport violacein via OMVs
- Violacein is responsible for the violet color in *Janthinobacterium*
- Outer membrane vesicles (OMVs) come from gram-negative bacteria that promotes pathogenesis, bacterial survival during stressed conditions, and microbial regulation

HYPOTHESIS

- Adding the stressor arsenate (AsV) to *Janthinobacterium* sp. #19 will increase the amount of OMVs produced

Why is this relevant?

- *Janthinobacterium* samples were pulled from Lake Killarney which has a high concentration of arsenic present
- Arsenic is a known stressor
- Addition of AsV would allow us to observe whether OMV production and regulation is impacted

METHODS

- *Janthinobacterium* sp. isolate #19 was plated on LB agar with AsV (50 ug/ml) and without AsV (control)
- Plates were left for 48 hours to observe growth

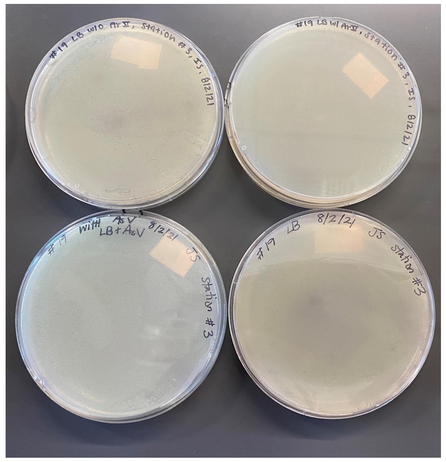

Figure 1. Comparison of bacterial growth between *Janthinobacterium* plates with AsV (bottom left and top right) and without AsV (top left and bottom right) after 48 hours.

- Bacteria is weighed then centrifuged to pellet out the cell of the bacteria
- Supernatant was assessed for OMVs using a fluorescence-based assay called a synaptogreen assay
- Presence of lipid membrane would tell us that OMVs are present

RESULTS & CONCLUSION

- The addition of AsV to the *Janthinobacterium* sp. #19 isolate resulted in a decrease in OMV production when compared to the control (Figure 2)
- Presence of phosphate could be the result of decreased OMV production as the phosphate transport system can allow arsenic through and allow for less uptake
- Possible errors could have been a result of the viability of bacteria collected from the periphyton samples
- Overall, hypothesis is disproven

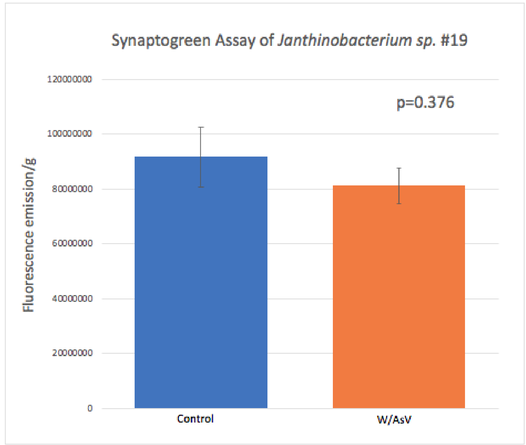

Figure 2. Comparison of OMV production measured by Synaptogreen Assay of supernatant from *Janthinobacterium* sp. #19 treated with AsV (50ug/ml) and control with no AsV. Overlap of Error bars for *Janthinobacterium* sp. #19 control SEM ± 10793792.5 and *Janthinobacterium* sp. #19 with AsV treatment SEM ± 6556244.8 indicates the decrease of OMV production in treated conditions is not statistically significant which is also indicated by the high p-value of 0.376.

FUTURE STEPS

- Look at the effect of different concentrations of arsenate (AsV) on *Janthinobacterium* isolate #19
- Consider the use of a minimal medium that contains less phosphate to eliminate possibility of competition between arsenic and phosphate
- Consider the effects of AsIII as a stressor on *Janthinobacterium* isolate #19

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