

#### ABSTRACT

The Staghorn Sumac, also identified as *Rhus Typhina*, was tested to see if endophytes contained within the plant had medicinal properties. This plant was taken from the Pickman Park Salt Marsh by Salem State University Central Campus. The results indicated in the study show the Sumac to be associated with the treatments involving relaxants, regulators, pain relievers, cleansing agents, psychoactive, antibiotic, and antiviral treatments.



Image I. Sumac from Pickman Park Salt Marsh

#### INTRO

Rhus Typhina is a native plant to North America, part of the Anacardiaceae family, and has been used for traditional medicinal purposes such as an astringent, blood-purifying agent, treatment of diarrhea, angina, and enuresis by Indigenous peoples for centuries<sup>2</sup>. Fungal endophytes are found within plants. These endophytes can contain medicinal properties. There have been studies which express Sumac to have activity involving, antioxidation, antiproliferative, antibacterial, antifungal, and especially anti-inflammatory properties.<sup>1,2</sup> This research explores fungal endophytes and the medicinal properties that could be contained in the Rhus Typhina found in the local Salt Marsh.



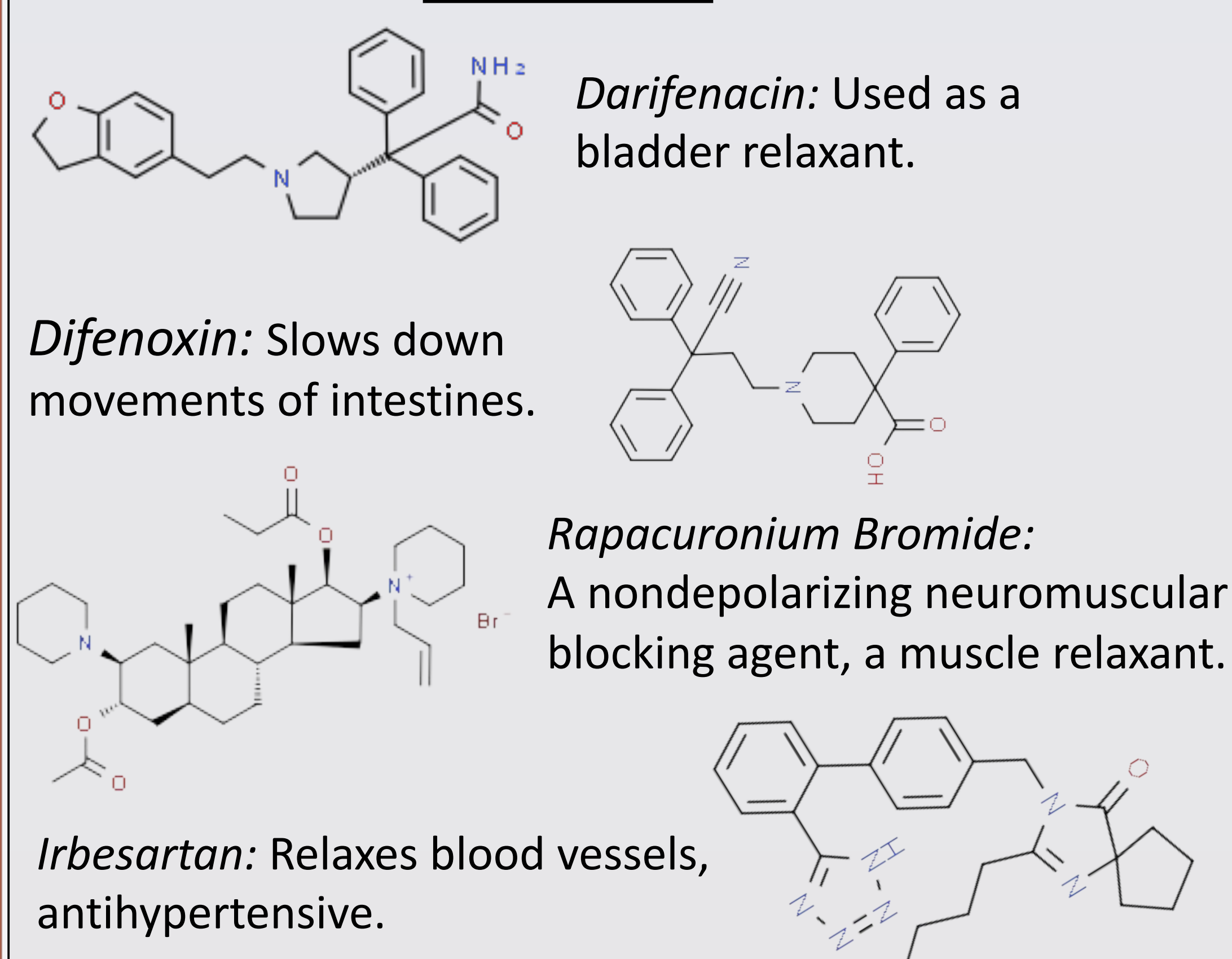
Image II. Endophyte of the Sumac seed plate

#### EXPERIMENTAL

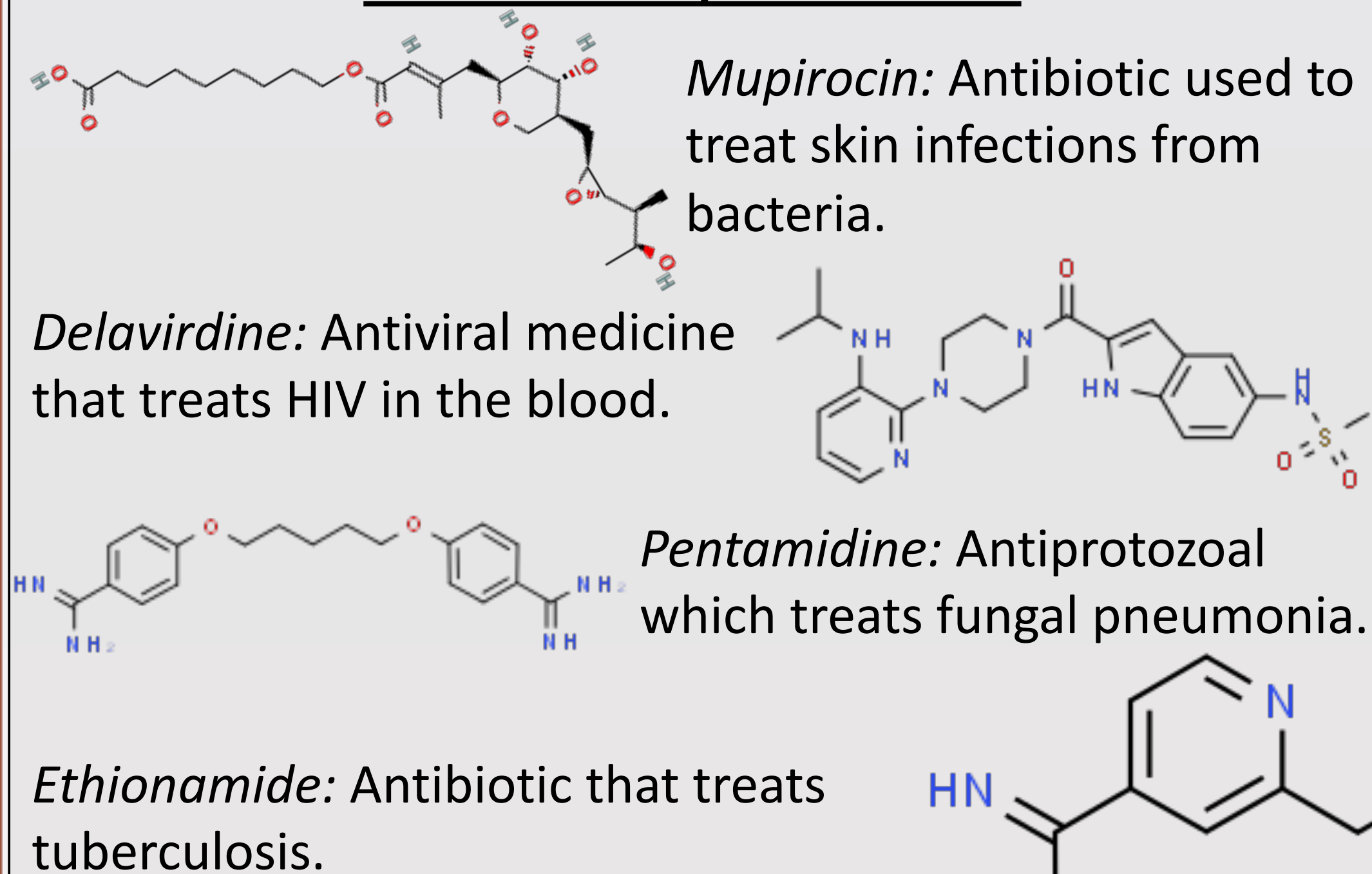
The Sumac acquired by the marsh was washed thoroughly and placed freshly cut on a potato dextrose agar plate. The samples that are used for this study are titled with its description, *Seed White* (1), *Seed Green* (2), *Stem Tan* (3). Each sample had a tiny incision and was put in a loosely capped vial of broth and stored for 4 weeks for growth. Samples were extracted with ethyl acetate. The samples were tested for antibacterial activity by *E. Coli*, *Pseudomonas Aeruginosa*, *Staphylococcus Aureus*, and *Vibrio Parahaemolyticus*. Samples were put in a liquid chromatography with tandem mass spectrometer (LC-MS) machine and tested in triplicate to identify the chemical compounds detected in the sample. These compounds express the medicinal properties found in the sumac.

#### LCMS DATA RESULTS

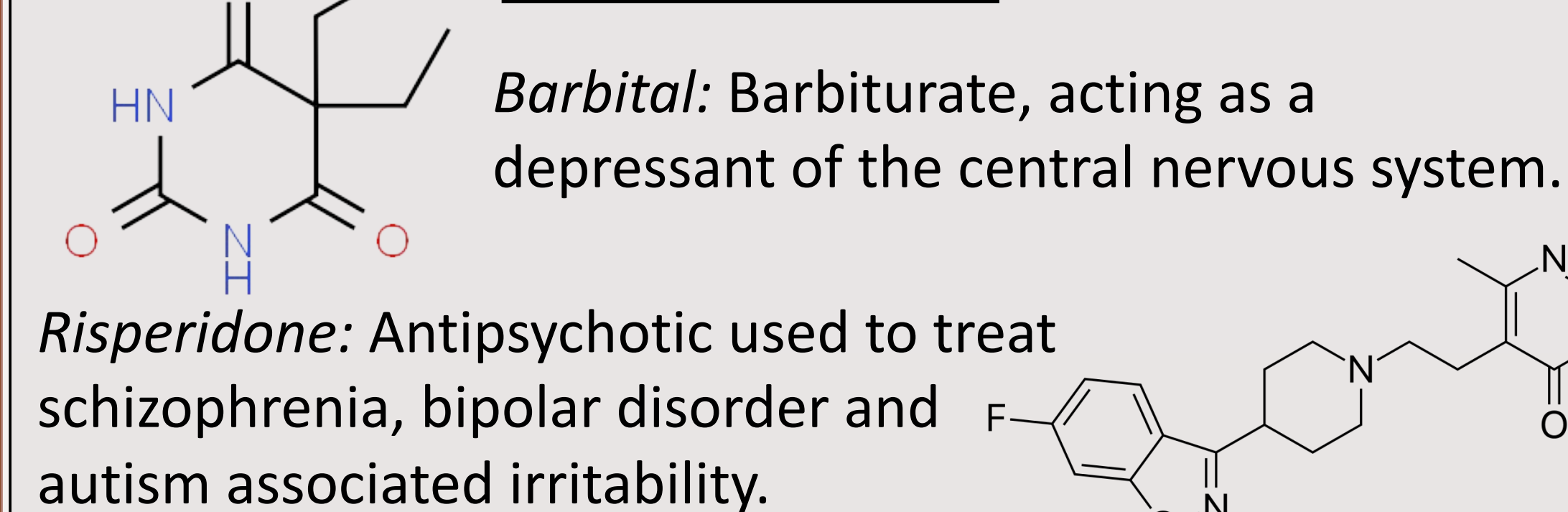
##### Relaxants



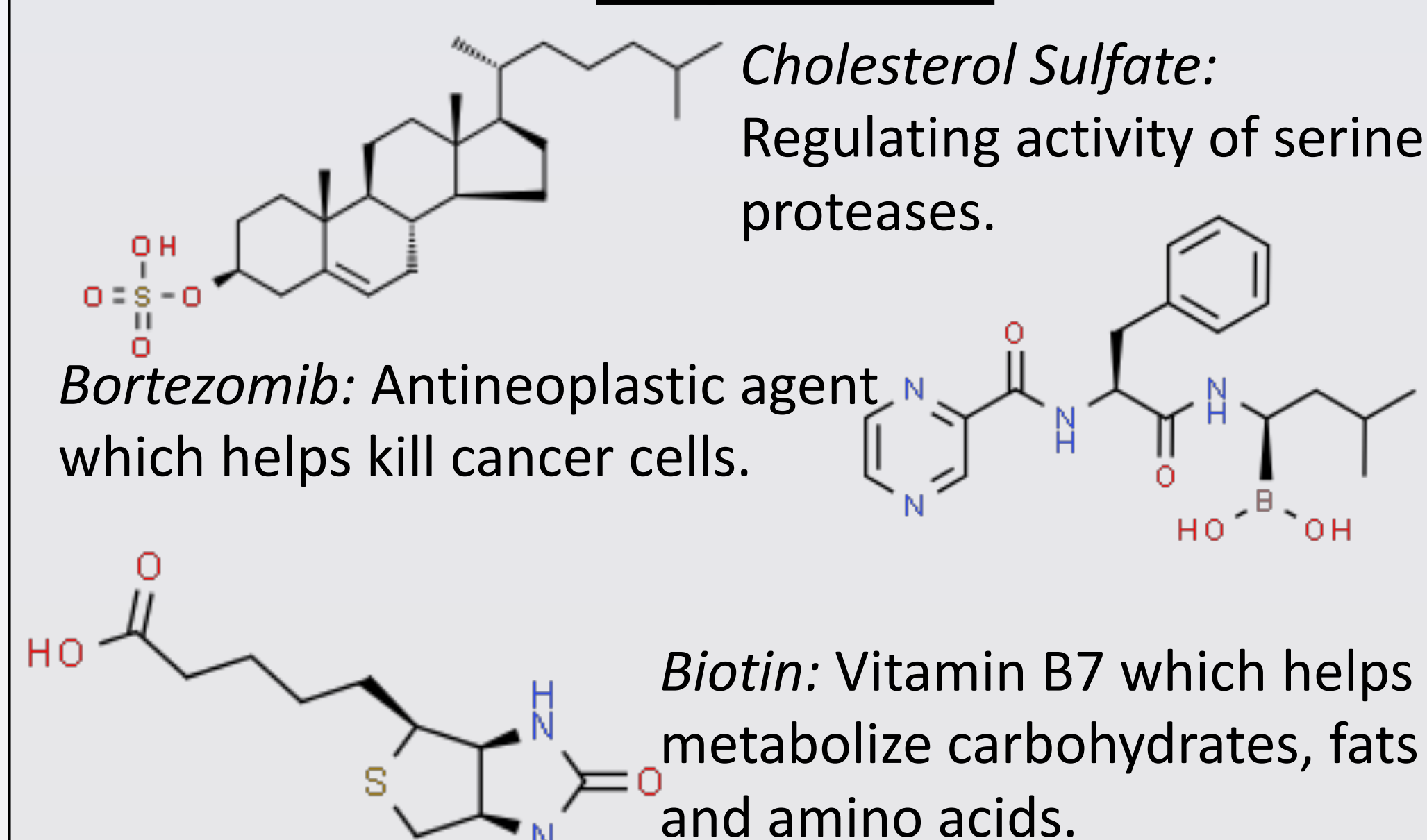
##### Antibiotic/Antiviral



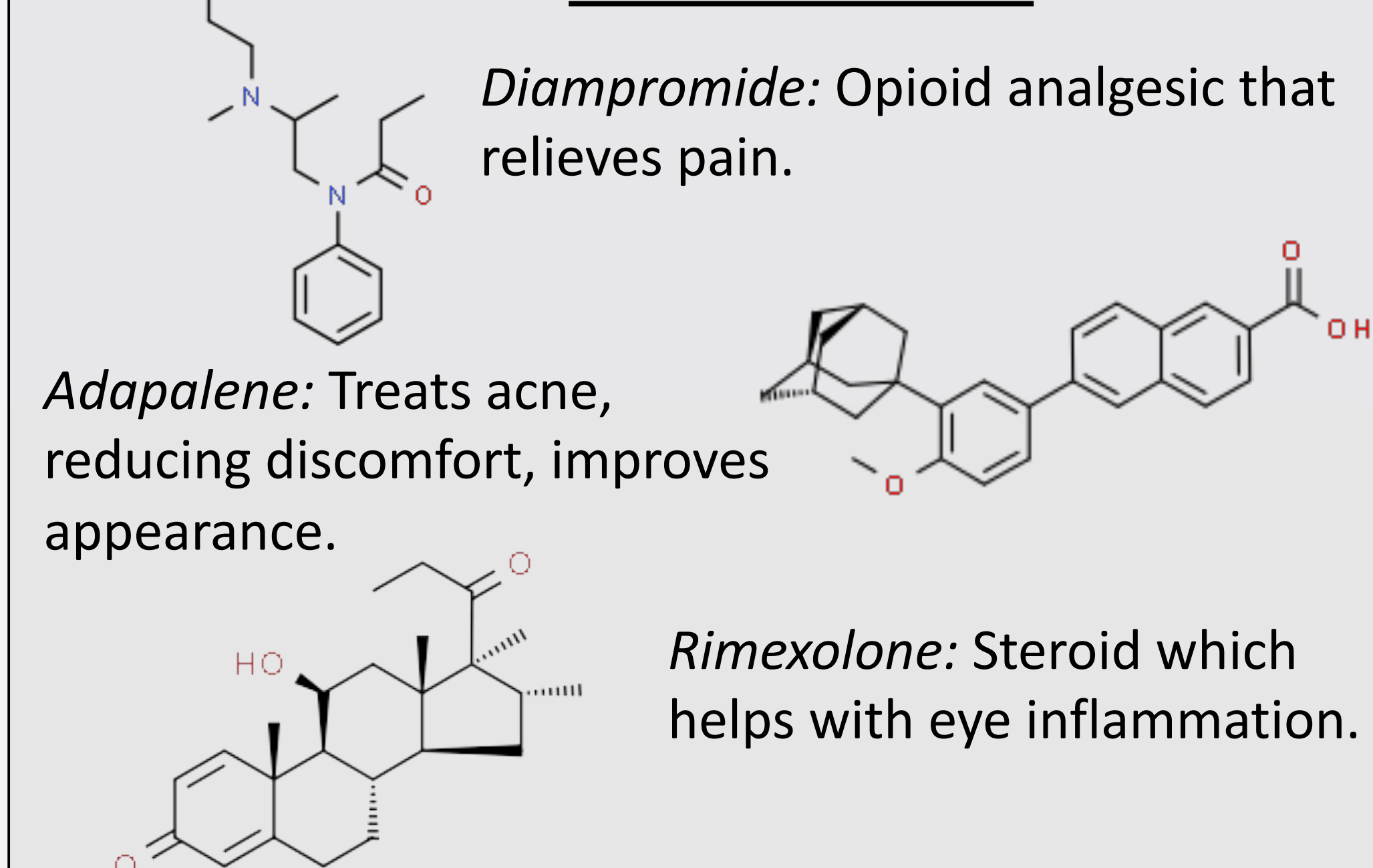
##### Psychoactive



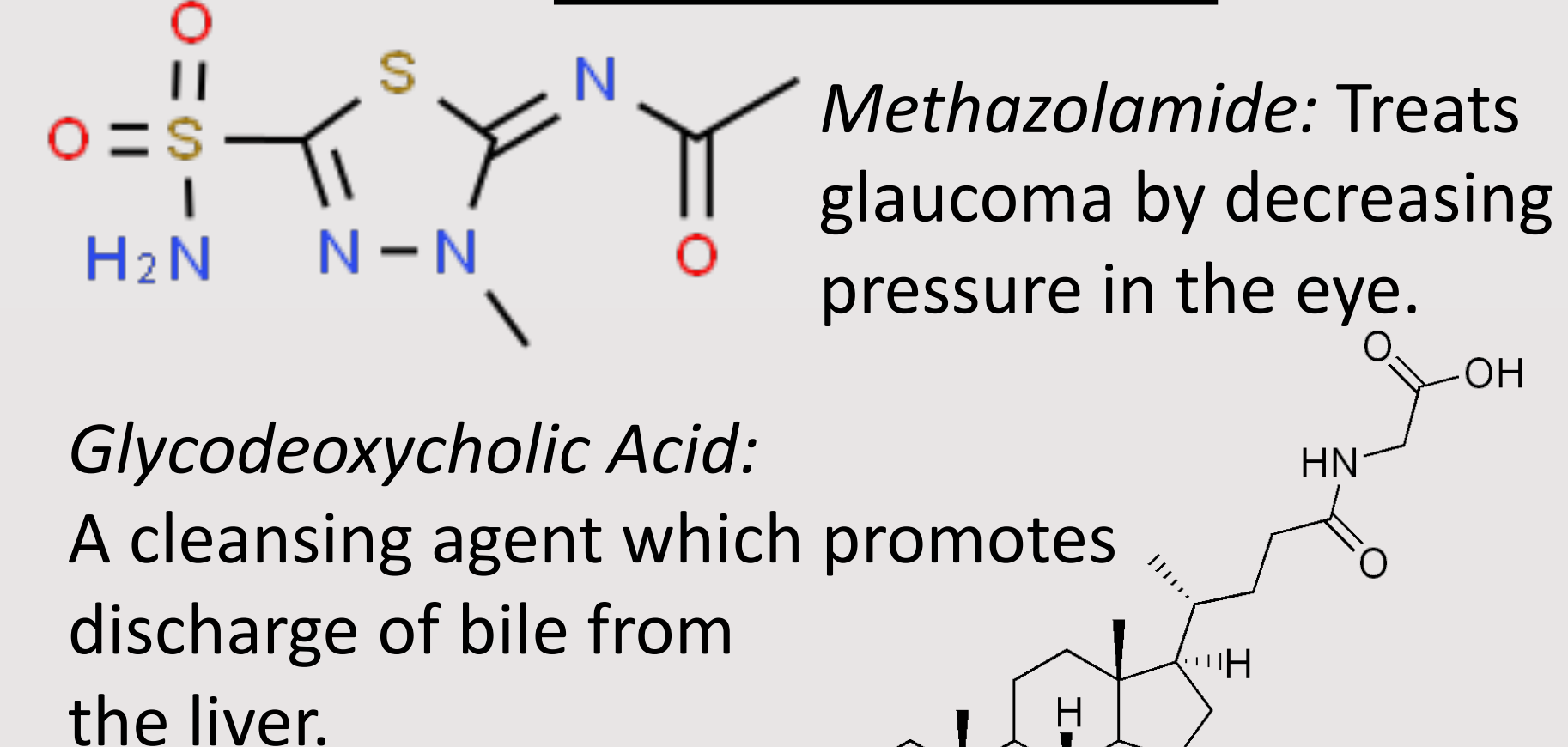
##### Regulators



##### Pain Reliever



##### Miscellaneous



Structures courtesy of <http://www.chemspider.com/>

#### BIOACTIVITY INHIBITION

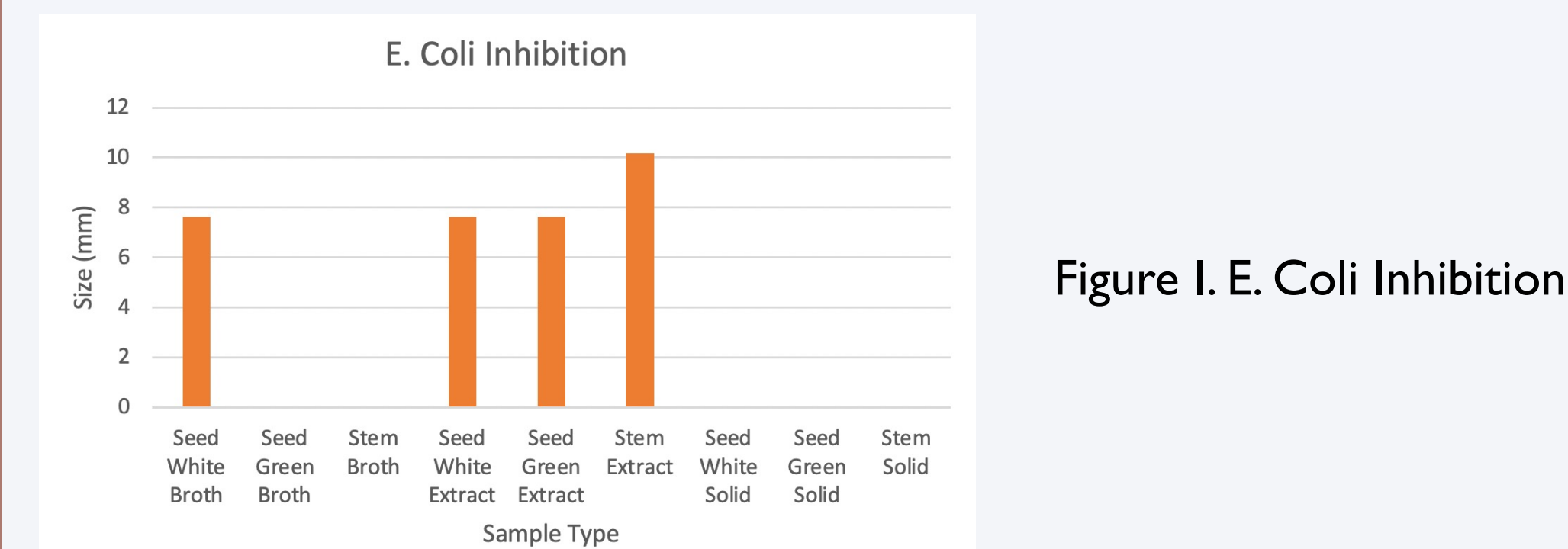


Figure I. E. Coli Inhibition

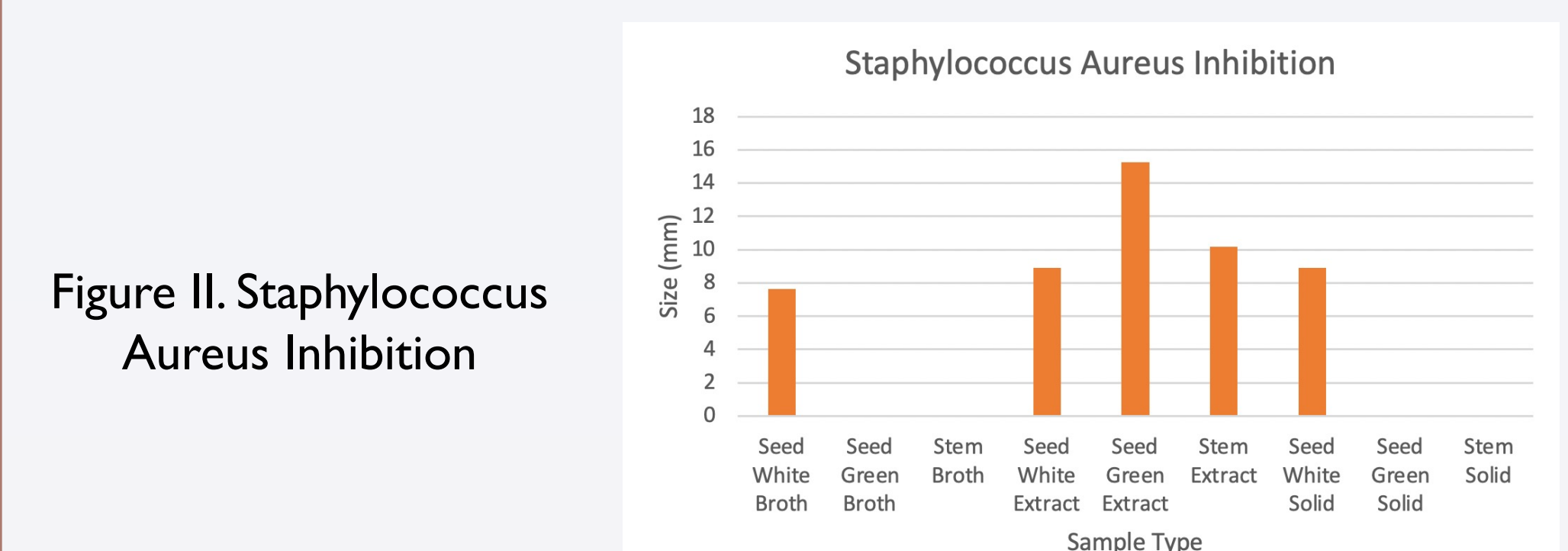


Figure II. Staphylococcus Aureus Inhibition

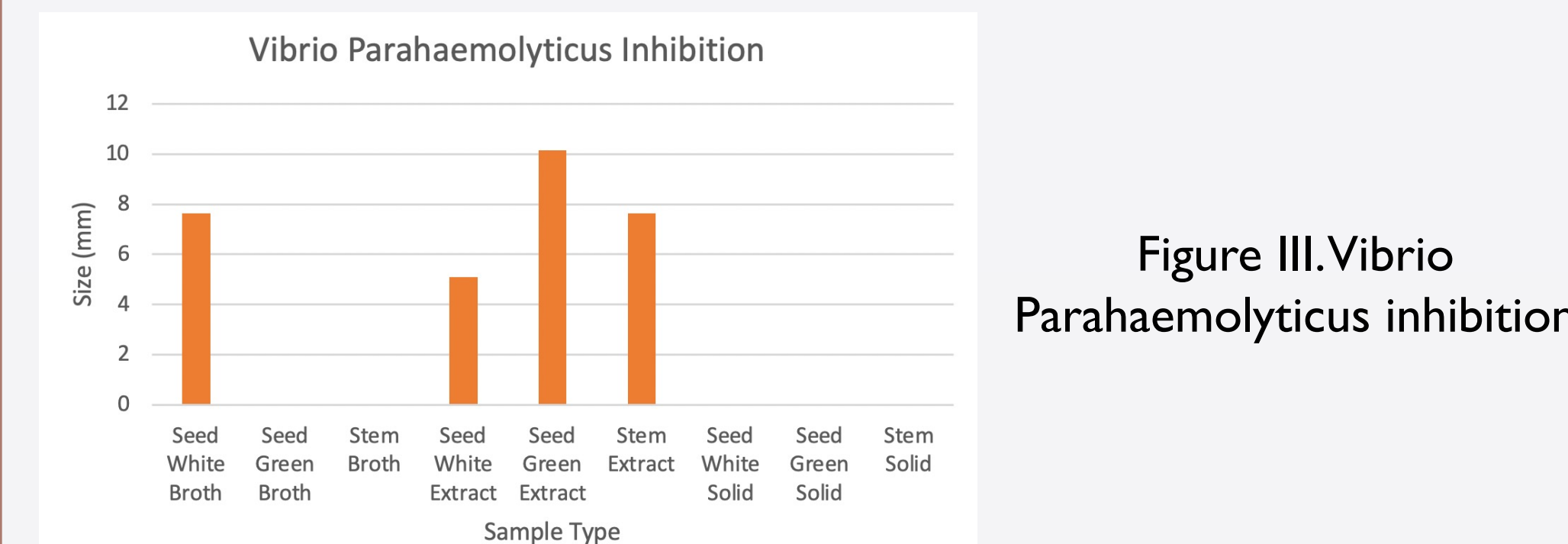


Figure III. Vibrio Parahaemolyticus inhibition

#### CONCLUSIONS

This research identifies useful medicinal compounds that were produced by the endophytes in the Sumac. This study found the presence of relaxants, regulators, antibiotics, psychoactive and pain-relieving properties, as well as activity of bacterial inhibition of the seed and stem in *E. Coli*, *Staphylococcus Aureus*, and *Vibrio Parahaemolyticus*. Compounds such as Darifenacin and Difenoxin support the use of Sumac to treat enuresis and diarrhea, respectively. Mupirocin and Ethionamide are antibiotics, which may explain the presence of bacterial inhibition, as analyzed in the bioactivity section. Additional compounds indicated antiviral, antifungal, and several pain relievers and psychoactive activities. These compounds indicate a potential for future research to determine if Rhus Typhina can be used as a treatment in those areas.

#### REFERENCES

- Wang, S., & Zhu, F. (2017). Chemical composition and biological activity of staghorn sumac (*Rhus typhina*). *Food Chemistry*, 237, 431-443.
- Trusov, N. A., Solomonova, E. V., Nozdrina, T. D., Sorokopudov, V. N., & Bamatov, I. M. (2021). Prospects of use of *Rhus typhina* L. (Anacardiaceae r.br.) in food and medical industry. *IOP Conference Series: Earth and Environmental Science*, 848(1), 012044.
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