Extraction and Functionalization of Neurolenins from *Neurolaena lobata*

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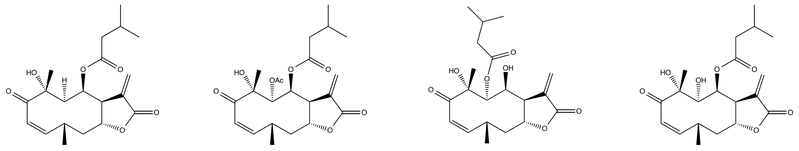
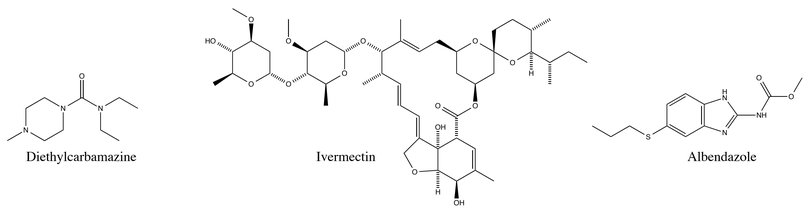
Project Goals



The goal of this project is to extract and purify neurolenins from the shrub weed *Neurolaena lobata*, elucidate their structures via 2D NMR techniques, and selectively alter functional groups in attempts to increase biological activity against neglected tropical disease lymphatic filariasis.

Background and Applications

Lymphatic filariasis (LF) is a tropical disease that is spread by parasitic roundworms *W. bancrofti, B. malayi,* and *B. timori.*[1,2] Current treatments for LF temporarily sterilize female adult worms and kill microfilariae.[3] The main drugs used against LF are diethylcarbamazine, ivermectin, and albendazole and are given through mass drug administration.[4]



There is a need for medications with novel mechanisms that kill the adult worms in addition to microfilariae. Previously neurolenin B, C, and D have shown anti-inflammatory activity as well as activity against parasite *T. cruzi*.[5,6] Neurolenins from Belize have also shown activity against *B. pahangi* (a close relative of filarial nematode *B. malayi)* in all stages of its lifecycle.[4] It is believed that the *α,β*-unsaturated carbonyls contribute to the activity of neurolenins.[7]

References

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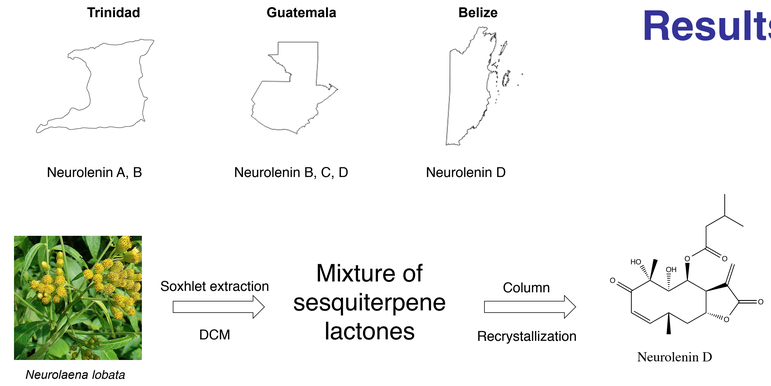
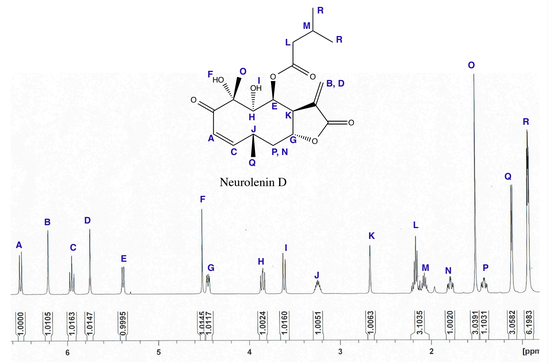
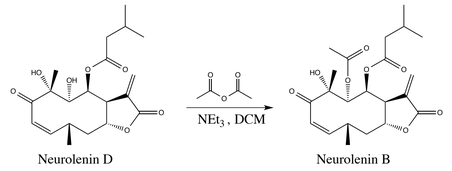
Results

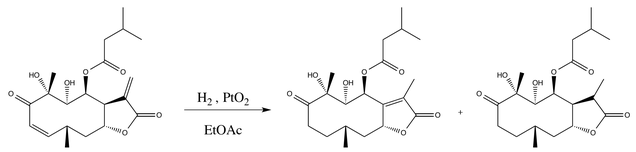




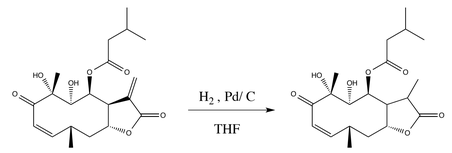
Neurolenin D was extracted and purified from *Neurolaena lobata,* which was obtained from Belize.[8] *N. lobata* from different countries throughout South and Central America contain differing amounts of neurolenin molecules.[5] Neurolenin D was characterized via HRMS as well as various NMR techniques including: ^{1}H, ^{13}C, COSY, HSQC, and DEPT. Neurolenin D was acetylated and subsequently yielded neurolenin B.



Future Work



The selective hydrogenation of of the *α,β*-unsaturated ketone as well as the hydrogenation of both *α,β*-unsaturated carbonyls will determine their contribution to neurolenin D's biological activity.[9]

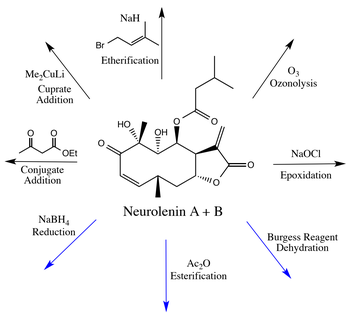


The selective hydrogenation of the *α,β*-unsaturated ester will confirm its contribution in neurolenin D's activity.[10]

Previous Work

Kristine cultured *B. pahangi* and after five days treated them with varying concentrations of extracted neurolenins. She found concentrations as low as 0.6 µg/ mL of neurolenin in DMSO were active against *B. pahangi* in all stages of its lifecycle 80 hours post treatment.[4]

The organic chemistry 2 class extracted neurolenin from *N. lobata* and attempted to selectively alter certain functional groups. Promising results were found for three of the reactions through TLC.



Funding

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