

05 Unlocking the potential of natural products for transformative health and societal gain

Helen Sheridan

Some of the world's most effective medicines are derived from compounds found in plants and fungi, including aspirin, quinine, codeine, and penicillin. We share the earth with nearly 400,000 plant species, of which only about 10 percent have a documented use (for food, medicine, building materials, poison, animal feed etc). As a Natural Product (NP) chemist and 'Medicine Hunter', working with a range of plant species, my research in the Trinity School of Pharmacy and Pharmaceutical Sciences focuses on discovering new NP therapies targeted at unmet clinical need, in addition to addressing key global challenges using innovative NP approaches.

Ethnomedicine to human clinical trials

During my research in ethnomedicine, I successfully identified a novel class of therapeutic molecules. From an initial hypothesis, this work progressed a dimeric indane drug candidate called PH46A, for the treatment of Inflammatory Bowel Disease – from NP discovery, through medicinal chemistry and pre-clinical development, to human clinical trials. This work resulted in numerous publications, and seven patents in the US, EU, and Asia. During this period, I co-founded the campus company, Trino Therapeutics, which gave employment to multiple researchers and created lasting international partnerships. The initial research was funded in the late 1980s by a grant of just £500 from the Royal

Irish Academy. It took approximately 20 years and €13 million (from Enterprise Ireland, venture capital, and a Wellcome Trust Strategic Translation Award) to drive the project from hypothesis to the clinic.

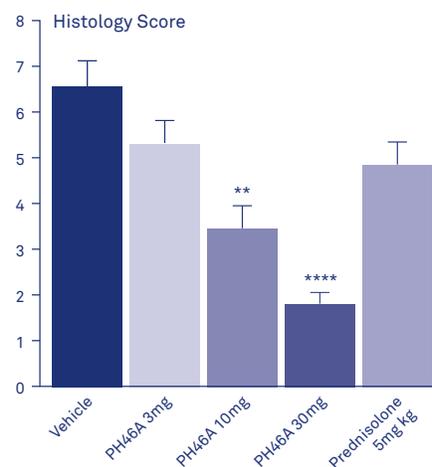
Unlocking nature's pharmacy from bogland species (UNPBS)

– I recently secured €6 million in philanthropic funding through the Irish Immigrant Investor Programme (IIP), overseen by the Department of Justice, to turn the lens of 'Medicine Hunting' on the flora of the Irish boglands. In this project, my group applies historical ethnomedical use, contemporary science, and advanced metabolomics to direct and inform the search for species with therapeutic and commercial potential. This project has extensive civic engagement, outreach, and educational elements. My team works closely with state agencies (e.g. Teagasc), not-for profits (e.g. Irish Peatland Conservation Council, IPPC), SMEs and other stakeholders, focusing on biodiversity and ethnomedicine, to deliver both research and educational outcomes. A recent EU ruling will eliminate the industrial scale exploitation of Irish Peatland by 2030. Comprehensive understanding of the scientific potential of bogland biodiversity could lead to innovative approaches, offering alternative, cross sectoral, opportunities for Irish communities, who have historically relied on the harvesting of turf for fuel for employment and commerce.

The NatPro Centre for Natural Products Research

– The UNPBS project has been pivotal in my recent establishment of NatPro, the Trinity Centre for Natural Products Research. The aim of the Centre is to 'Inspire and Catalyse Transformative Change' in Ireland using NPs to deliver innovation across sectors, from pharmaceuticals to food and cosmetics.

I have a deep understanding of the challenges that line the road from therapeutic drug discovery for a natural product to human clinical trials. Through this invaluable lens of experience-led decision making, my group hunts for novel molecules to identify transformative opportunities, with the potential to eliminate some of the challenges related to health maintenance, treatment, and disease prevention.



Helen Sheridan received her BSc and PhD from University College Dublin. She held research Fellowships in both the CNRS at Gif-Sur-Yvette and Oxford University. Helen is Associate Professor in the School of Pharmacy and Pharmaceutical Sciences, Co-Founder of Trino Therapeutics, and Founder and Director of NatPro, the TCD Centre for Natural Products Research. Helen's innovative research unlocks the potential of Natural Products, from discovery to application. She is a Fellow of both TCD and the Royal Society of Chemistry. Contact: hsheridn@tcd.ie

LEFT – Sheridan & Frankish Trino Therapeutics.
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