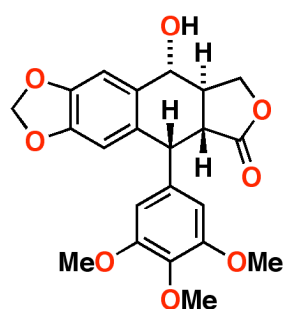


Associate Professor Mick Sherburn: sherburn@rsc.anu.edu.au

My group's research focus is synthetic organic chemistry. We develop new methods to achieve efficient chemical synthesis. We do this by designing new domino sequences, cycloaddition reactions, radical reactions, and metal-catalysed bond forming reactions. We also devise new methods for stereoselective synthesis. We apply these new methods in the total synthesis of bioactive natural products of medicinal importance, in hydrocarbon structures of fundamental importance, and in self-assembly and host-guest chemistry.

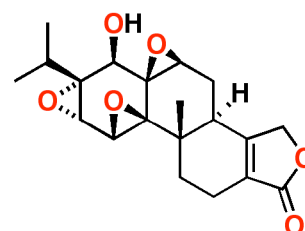
Total synthesis of medicinally-important natural products

Lignans like podophyllotoxin have cancer-fighting properties and are used in chemotherapy. The natural



podophyllotoxin
an anticancer agent

product triptolide shows great potential in medicine due to its myriad biological activities. We have developed the shortest enantioselective syntheses of these important compounds using domino reactions, which are very efficient chemical processes in which several bonds are formed in one operation. Our

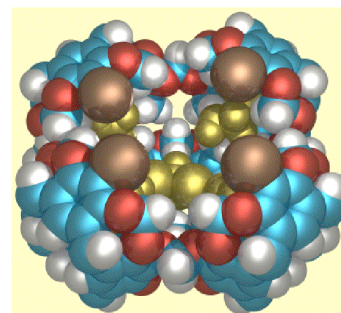


triptolide
anticancer,
antiinflammatory,
immunosuppressive
activities

syntheses also allow new analogues of these natural products to be prepared and tested for their potential medicinal value. Several bioactive natural product syntheses and analogue syntheses are underway in the group. Summer research projects are available in this area.

Superbowls: supramolecular chemistry, drug delivery and catalysis

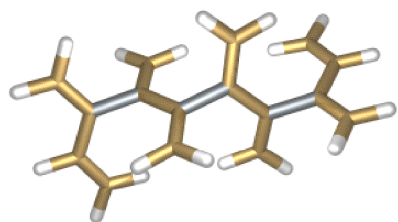
We recently designed and synthesized the largest fully encapsulating and non-collapsible host molecules, which we call superbowls. These structures are used for molecular recognition, complexation and catalysis. Summer research projects available in this area will focus on superbowl container molecules with useful properties: the selective binding and release of medicinal agents, and investigations into the use of superbowls as synthetic enzyme mimics.



superbowl
a large host molecule

Fundamental structures and domino reactions

Often scientists are inspired by Nature's chemical structures. Sometimes, structures not produced naturally initiate the development of exciting new methods, concepts and principles. Our interest in this area is focused on the dendralenes, one of the four fundamental classes of conjugated hydrocarbon structures. We reported the first chemical synthesis of this hydrocarbon family, previously believed to be too unstable to prepare. We have shown that these structures undergo remarkable and unprecedented reactions and reaction sequences to form complex natural product-like structures. Several summer research projects are available in this area.



[8]dendralene
a fundamental structure