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AVHANDLINGENS TITTEL: *Diels-Alder Reactions in Synthesis and Method Development: Development of a Synthetic Pathway to Decalin Terpenoids and Evaluation of Phosphordiamides as Diels-Alder Catalysts*

Målet med prosjektet har vært å lage nye stoffer med anti-kreft virkning, og utvikling av nye metoder for å få reaksjoner til å gå raskere.

Chemists are a bit like artists. An artist carefully changes their materials by small increments transform a block of marble into the Venus de Milo. The chemist, likewise, takes their starting molecule, their block of marble, and makes a number of smaller synthetic steps, transformations, on it to obtain their final product, a useful molecule. Often the new molecule that one desires to make comes from nature, rather than is invented whole cloth, but is hard to obtain it in large quantities and a synthetic pathway, all the steps the necessary synthetic steps, must be developed. Asmarines are a group of molecules that have been located in sponges in the Red sea and several of its members have shown anti-cancer properties in the laboratory. In order to perform more in-depth studies it is however necessary that the molecule can be produced in the laboratory. This has as of yet not been possible. In my research, I've managed to develop the start of a synthetic pathway to these asmarines.

One of the most important steps in this synthetic pathway is a reaction in which two molecules, defined by containing one and two molecular bonds respectively, are combined to form a six-membered ring of carbon atoms. This is referred to as a Diels-Alder reaction. In parallel with the development of the synthetic pathway a new concept of catalysts, a molecule that changes how fast a reaction goes, for this types of reactions were also developed. This development was mainly done with computer models. This new type of catalyst would be based on phosphorus and it would keep the reacting complex together the same way that two water molecules are kept together. The computer models indicates that this concept has got good chances of success.