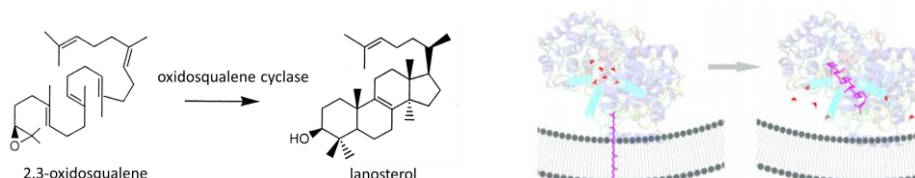


# Master THESIS – Biocatalysis

## Exploring new-to-nature biotransformations by cyclases

### Aim and content of the Master thesis

Terpene cyclases are enzymes that are able to activate C-C double bonds in polyunsaturated molecules to form remarkable polycyclic structures with potent biological activities. As 90% of all natural products contain a cyclic subunit, terpene biosynthesis – in particular terpene cyclases - are receiving a surging interest from the chemical and biotechnological industrial fields. Increasing enzymatic activity and expansion of the reaction scope would unlock the full potential of terpene cyclases in biotechnological applications. Human oxidosqualene cyclase (hOSC) is a very interesting enzyme that generates tetracyclic lanosterol, by protonation of a terminal epoxide in the linear polyisoprene substrate; a key step which is followed by a concerted electrophilic cyclization sequence. hOSC is of basal importance in drug design and medicine.



The goal of this thesis work is to expand the reaction scope of hOSC currently available in nature, to enable the generation of truncated product structures which can be associated with specific inhibitory functions. A second aim is to enhance the enzymatic activity for the biotransformation of oxidosqualene into lanosterol.

In the course of this thesis, the student will have the opportunity to learn multidisciplinary techniques ranging from molecular biology, microbiology and synthetic biology. Biocatalysis will be used for testing the activity of variants of hOSC in order to determine the possible activity on truncated substrates, which were chemically produced in our labs, and analyze biochemically the activity of the best variants.

### Requirements

A highly motivated student interested in biological macromolecules, who would like to broaden his/her knowledge on Biochemistry and Biocatalysis. The ability to work independently is highly recommended.

**Where?**

The position will be held at Science for Life Laboratory, Tomtebodavägen 23b, Solna.

**Details:**

Start: As soon as possible

Duration: 6 months

<https://syrenlab.com/about/>

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