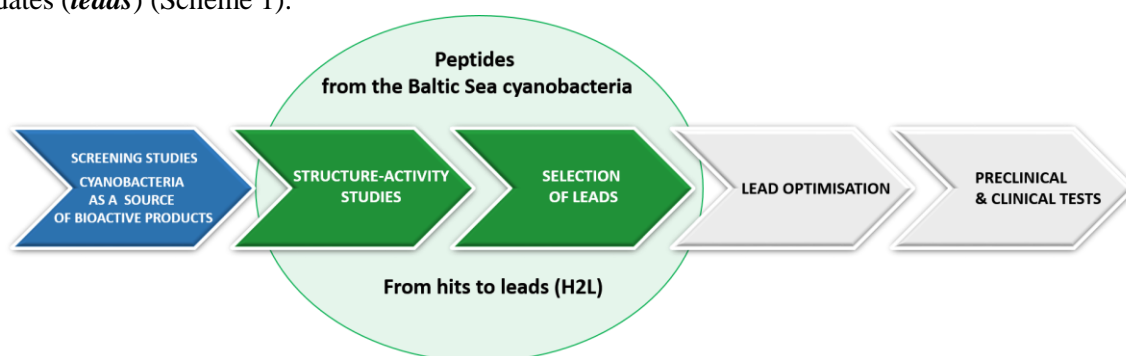


Description for the general public

The therapeutic activities of compounds produced by microorganisms, plants and animals have been explored by man since ancient times centuries. It was estimated that also more than half of the drugs approved in years 1981-2010 derived from natural sources or belong to synthetic analogues of metabolites produced by organisms.

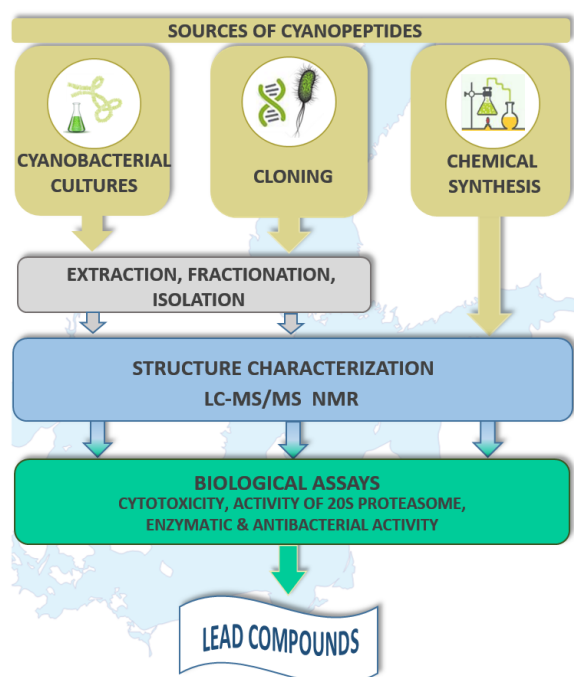
In the case of many health problems, there is still lack of effective, safe and easily available drugs. Therefore, there is an urgent need for further work on new cures that could fulfill these criteria. Marine natural resources constitute an attractive source of such compounds. In the project, we will focus on the Baltic Sea cyanobacteria and their metabolites classified to peptides. In our previous work, we found that these compounds show activities indicating their potential application as anticancer, antibacterial or antithrombotic agents.

However, the process from discovery of bioactive compound to successful introduction of safe and effective drug is long and multistages. Our project corresponds to the research stage (H2L) from the discovery of cyanopeptides with desired activity (*hits*) to selection of compound for further development into drug candidates (*leads*) (Scheme 1).



Scheme 1: Subsequent phases of drug discovery process from natural resources (cyanobacteria)

The selected bioactive peptides will be obtained by isolation from cyanobacterial cells grown in cultures, by chemical synthesis and by genetic methods (Scheme 2). In the next step, activities of natural and synthetic variants of the peptides will be tested in a wide variety of biochemical assays with application of key metabolic enzymes (e.g. involved in blood clotting process). In addition, tests on antibiotic resistant bacteria and on cancer cell lines will be performed. To check the selectivity of the bioactive peptides, the activity against normal (healthy) cells will be tested. As an outcome of the project, for cyanobacterial peptides with most promising features as drug candidates, the most effective method of production will be elaborated and the chemical structure and biological activity will be determined.



Scheme 2: Flow diagram presenting the main task in the project