

STudent REseArch Mobility Programme (STREAM) Research Project proposal



Host University: Leiden University

Main Research Field (drop-down list): 15. Natural Sciences

Specified field, subject:

Chemistry, Biology, Medicine, Life science, Drug delivery, Chemical Biology

Research project title:

In vivo cell fusion using a synthetic model system

Possible starting month(s):

Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
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Exact starting and end dates will be discussed between the supervisor and the student

Possible duration in months:

Minimum: 3 months

Maximum 2 semesters

Suitable for students in: Bachelor level Master level

Prerequisites:

- Minimum GPA 3.2 out of 4
- BSc degree in Chemical Biology, Chemistry, Biology or in a closely related field.

Description:

Fusion of lipid bilayers, or membranes, is a ubiquitous process. It occurs in the cells of our body during cargo exchange by membrane vesicles and during viral infection. However this fascinating process is unexpectedly complex and we aim at elucidating the details of this process using synthetic biomimetics, which has all the characteristics of natural membrane fusion; targeted docking resulting in efficient lipid and content mixing. Our synthetic fusion system is composed of a complementary pair of lipidated peptides able to form a heterodimeric coiled coil motif at the membrane interface. Recently we achieved fusion between liposomes and live cells for the delivery of drugs. Currently we are redesigning our fusion system such that it will be able to fuse live cells with each other as a tool to create hybrid cells. For this we design stapled peptides and peptide oligomers using synthetic approaches. Membrane fusion will be studied using biophysical and biochemical techniques with a special focus on peptide-peptide and peptide-lipid interactions. Furthermore, in-vitro membrane fusion between liposomes and live cells will be studied using optimized biomimetic model systems.



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Faculty and/or Department:

[Faculty of Science](#) / [Leiden Institute of Chemistry](#)

Deadline for nomination to reach Leiden University:

- 1 April (for Fall semester intake) / 1 October (for Spring semester intake).
- Please note: Due to the COVID-19 situation and measures taken, the project might be cancelled if empirical research in the institute is impeded by COVID-19.

Notification of admission given by the end of:

Approximately 6 weeks after receipt of the application.

Contact person:

Ms. Usha Mohunlol, Coordinator STREAM Programme

Contact email: u.c.mohunlol@sea.leidenuniv.nl

