

MASTER THESIS PROJECT

Stealth labeling – visualizing RNA and DNA *in vitro* and *in vivo*

Background

What if it was possible to observe RNA-based therapeutics and vaccines as they do their job to enter and reprogram human cells, through a microscope in real-time. Thanks to a new method, developed by us it is now possible! We have developed a method that makes RNA visible, using new minimalistic probes – fluorescent RNA base analogues.¹⁻³ This new method makes RNA visible in the cell and can contribute to solve the largest remaining challenge for taking also other RNA-based therapeutics to the clinic – their low functional cellular uptake. Similarly, the method facilitates research regarding new RNA-vaccines so that the world can be better prepared the next time it is hit by a pandemic. Our development here is in close collaboration with the Bio department at Chalmers and AstraZeneca with the large academia/industry consortium [FoRmulaEx](#) (SSF-IRC).

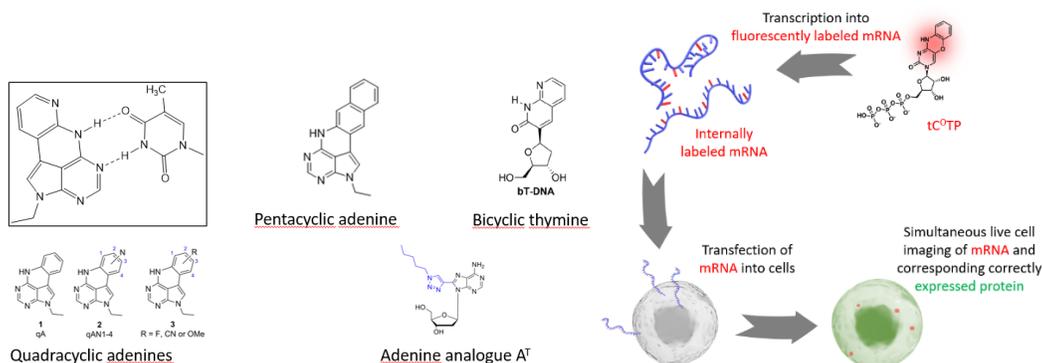


Figure 1. To the left: Examples of fluorescent DNA and RNA base analogues developed by us. To the right: Stealth labeling approach for fluorescence labeling of mRNAs and how we use it in studies regarding cell uptake of RNA-based medicines.

Project:

Possible projects will focus on the development of novel strategies to label and monitor RNA that is important both in a biological and pharmaceutical (RNA-based therapeutics and vaccines) context. Investigations can span from photophysical characterization of novel fluorescent base analogues and enzymatic incorporation of such molecules into RNA (transcription) to their use in the study of cellular uptake of RNA-based therapeutics and vaccines to gain an increased understanding of why this process still is very inefficient and how to make it more efficient.

Applicant

We are looking for highly motivated students with interest both in physical chemistry, biology and/or applications in pharmaceutical industry. You should have a bachelor's degree in Chemical engineering, Biological engineering, Chemical engineering with physics or equivalent and be fluent in English. Depending on exact character of the work it will could be either a 30 or 60 hp thesis project.

Contact:

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