Universität Basel

Research Project

Chemical Tailoring of RNAs and Vesicles to Create New Drugs

Third-party funded project

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Organisation / Research unit
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Department
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RNA therapeutics suffer from stability, immunogenicity, and delivery problems. We will take inspiration from two recent discoveries in biology to help us build better RNA therapeutics: 1. Methylated RNAs are substrates for direct reversal repair enzymes and their methylation state controls their function; 2. Exosomes are natural delivery systems for RNAs of all sizes. The fact that Nature uses alkyl groups to control the function of RNAs suggests that chemists could too. I will study which alkyl groups on RNA get repaired, and which do not, facilitating the design of RNAs with alkyl groups that can be permanent or temporary. This information will help us graft drug-like properties into RNA by judicious installation of specific alkyl groups. For RNA therapies to be successful they need to stay out of the liver and reach their targets. In another major objective we will use a reaction developed in my group to functionalize the surface of exosome nanoparticles isolated from cells and use these as vehicles to deliver our synthetic RNAs.

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