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New techniques and approaches to address the drugability of RNA

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Abstract

The development of new tools in chemical biology can lead to significant advances in biology. Nowhere is this more prominent than in the chemistry of oligoribonucleotides. Examples of such tools include very long structured RNAs, modified RNAs for screening, RNAs site-specifically labeled with functional groups, siRNAs, miRNA mimics and anti-microRNA oligonucleotides as genetic tools. Techniques for the modification and functionalization of RNA can be of paramount importance in the emerging field of RNA- related biomedical research. A variety of labels and functional groups have been developed in order to study a wide array of RNA properties and functions, including RNA-RNA and RNA-protein interactions suspected of playing roles in pathological mechanisms. In a program designed to advance the drugability of RNA we have developed new chemical approaches to identify the cellular partners of coding and non-coding RNAs, as well as new in vitro assays to characterize ligand-RNA interaction. We are using these tools and assays to design new classes of ligands that modulate the functions of selected RNAs in pathological mechanisms. Examples will be presented.

Biography

Jonathan Hall is Professor for Pharmaceutical Chemistry at the ETH Zurich since 2007, and is currently Chair of the Institute. He is a chemist with a broad experience in the chemistry and biology of nucleic acids. He worked for fifteen years at Novartis Pharmaceuticals where he led a nucleic acids group. His interests lie with the discovery of RNA targets in disease pathways and the development of new chemistry to inhibit RNA function, in particular the inhibition of non-coding RNA biogenesis.