Discovery of small molecules targeting oncogenic non-coding RNAs

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RNA is one of the most intriguing and promising biological targets for the discovery of innovative drugs in a large number of pathologies and various biologically relevant RNAs that could serve as drug targets have already been identified (1). Among the most important ones, it is worth to mention prokaryotic ribosomal RNA which is the target of a number of currently employed antibiotics, viral RNAs such as TAR, RRE and DIS RNA of HIV-1 or oncogenic microRNAs that are tightly involved in the development and progression of various cancers. However, difficulties in the rational design of strong and specific small-molecule ligands renders this kind of molecules relatively rare. In this presentation, we will show our recent results about the structure-based design of new RNA ligands targeting oncogenic RNAs that led us to the identification of new compounds bearing a promising biological activity but also to a better understanding of the formed interactions toward the design of optimized compounds (2). In parallel to the design of bioactive compounds, we also perform the screening of chemical libraries thus increasing the available chemical tools for the development of efficient and specific RNA binders for a wide number of therapeutic applications (3). We will finally show the validation of a new antibacterial target and the design of original compounds bearing potential antimicrobial activity against resistant bacterial strains.

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