Toward automatic design of co-transcriptional RNA switches

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Functional RNA molecules generally need to fold into a precise structure to achieve their function. However, the folding of RNA is intrinsically a hierarchical and dynamical process that occurs co-transcriptionally.

We are addressing the question of how the sequences of RNA molecules encode their folding, including the co-transcriptional folding path which guides the RNA folding process. To this aim, we use a learn-by-designing approach applied to a model system: transcription-regulating RNA switches, which regulate transcription by a terminator/anti-terminator switch mechanism.

We are developing automatic design algorithms and experimental approaches in order to systematically explore and evaluate general principles of RNA switches design and of sequence-encoding of co-transcriptional RNA folding.

We will present recent experimental results on the regulatory function of computationally designed RNA switches.