

Enhancement of siRNA design via inclusion of hybridization thermodynamics of off targets

Nourah Salem

University of Science and Technology, Egypt

Through this work, a computational study using the thermodynamic parameter (free energy) is applied on designed siRNA sequences. The study investigates the siRNA self-folding, target mRNA self-folding, siRNA-target gene hybridization and siRNA-off target hybridization free energy. Through a comparison between our calculations with previously

experimentally determined off-target genes' level of expression. We concluded a correlation between off-targets hybridization energetics and level of gene expression. This indicates that considering the off-target effect is as important as considering the on-targets in the process of siRNA designing. This work represents an elementary step for a greater project, which is building a software capable of designing siRNA sequences with new considerations that we worked on testing here. Yet, this first step is fundamental, because it broadens minds to a new approach for more efficient siRNA designing. In this work, we reviewed papers covered some approaches in

siRNA computational designing and a paper which has already built its siRNAs, tested them and discovered the off-targets associated with each siRNA, and as we had the off-targets already discovered experimentally. We collected all off-target sequences and started with our own approach. Therefore, we would present how exactly, we approached our project including the troubleshoots and the proper temporal sequence of in using each method, followed by all results and their reasonable interpretations, ending with our conclusions in this step of the project and giving a glimpse about the future implementations.

S-nourahhamed@zewailcity.edu.eg