
Regular Wednesday IMG seminar



Diego André Florian Joseph

Laboratory of Epigenetic Regulations

“The fall of the helicase of Dicer”

Dicer is an RNase III endoribonuclease that processes pre-miRNAs and dsRNAs into small RNAs of ~21–28 nt, serving the miRNA and RNAi pathways. In mammals, Dicer’s ability to process long dsRNA is constrained by its helicase domain. Consequently, the miRNA pathway predominates, and RNAi is considered vestigial. This constraint comes from a crucial interaction between the HEL1 subdomain of Dicer and its catalytic domain, which maintains Dicer in a “closed” conformation, making it highly selective. In the absence of HEL1, Dicer adopts an “open” conformation that reduces substrate selectivity and activates RNAi. Until now, this was the only interaction known to confer substrate selectivity and restrict RNAi activity. Here, we show that Dicer contains an additional region within its helicase that contributes to substrate selectivity. Analysis of Dicer’s AlphaFold structure revealed four major intrinsically disordered regions (IDRs) adopting loop-like conformations. IDR1 is enriched in negatively charged residues and is predicted to interact with the positively charged RNA substrate channel of Dicer. Removal of IDR1 recapitulates the phenotype observed in the absence of HEL1, suggesting that HEL1 subdomain is not the only region in Dicer responsible for substrate selectivity.

The seminar will be held

on Wednesday 11 March 2026 at 15:00

in the Milan Hašek Auditorium at IMG

(Institute of Molecular Genetics of the Czech Academy of Sciences, Vídeňská 1083, Prague 4)
