

Overview:

- Introduce students to the history of RNA Interference (RNAi) and its applications in common model organisms with a focus on the experimental design
- Students perform RNAi experiments in *Nicotiana benthamiana* (tobacco plants), in *Caenorhabditis elegans* (*C. elegans*) and in mammalian cell culture (human embryonic kidney cell line, HEK293).



Lectures:

1. Introduction to RNAi
2. Post Transcriptional Gene Silencing in Plants
3. *C.elegans*: RNAi History and Experiments
4. *Drosophila*: RNAi Background and Experiments
5. RNAi and Mammalian Systems
6. MicroRNAs, Antisense RNA and Other RNA Silencers
7. Therapeutic Uses of RNA

Labs:

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| 1. Preparation of DNA-Directed Silencing Constructs | 1 week |
| 2. Virus Induced Gene Silencing of Magnesium Chelatase, a Chlorophyll Biosynthesis Enzyme, in Tobacco Plants. Real time RT-PCR Assay. | 5 weeks |
| 3. <i>C.elegans</i> RNAi Experiment to Knockdown Transgenic GFP Expression via Feeding of Silencing Constructs. Qualitative Phenotypic Assessment. | 2 weeks |
| 4. Transient Transfection Delivery of Short Hairpin RNA Expression Plasmids to Mammalian Cell Culture. Semi-quantitative Western Blot. | 3 weeks |