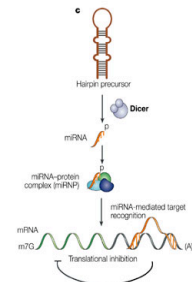


# miRNA

## Reading:

<http://www.ambion.com/techlib/hottopics/rnai/>  
Lecture notes

Components of the RNAi machinery are used for other processes.



The first miRNA was discovered in *C. elegans*.

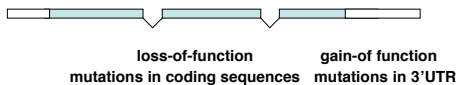
*lin-14(lf)* mutations caused precocious development.

*lin-14(gf)* and *lin-4* mutations caused retarded development.

wild type: embryo → L1 → L2 → L3 → L4 → adult  
precocious: embryo → L2 → L3 → L4 → adult  
retarded: embryo → L1 → L1 → L2 → L3.....

*lin-14(lf)*; *lin-4(lf)* mutants are precocious.

### *lin-14* gene (simplified)



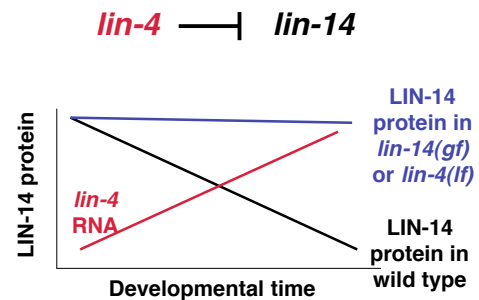
*lin-4* encodes no protein. Only an RNA.

LIN-14 RNA always present, but protein decreases through larval development.

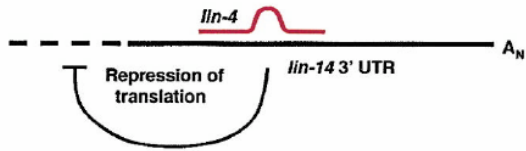
*lin-4* required for LIN-14 decrease.

*lin-4* RNA increases through larval development.

*lin-4* RNA potentially could base pair with *lin-14* 3' UTR.



### Model



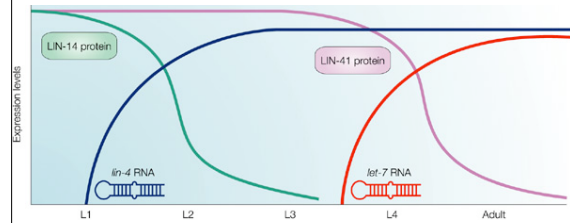
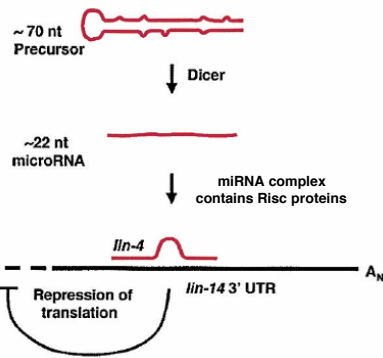
### Used *lac-z::lin-14* 3' UTR reporter transgene to test model



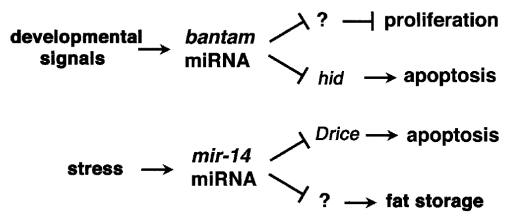
LacZ decreases through larval development.

*lin-4* required for LacZ decrease.

Reduction of Dicer and Risc components results in *lin-4* phenotype; also required for LacZ decrease.



### Two *Drosophila* miRNAs regulate cell proliferation, apoptosis and fat storage.



~300 estimated miRNAs in *C. elegans*

~530 estimated miRNAs in humans