miRNA history 1

이 강의의 실천 사항

- 필기! 필기! 필기!

- 강의는 영화가 아니다.

- 감상하지 마라.

- 눈으로 보고, 귀로 듣고, 입으로 읽고, 손으로 써라

microRNA (miRNA)

A short ribonucleic acid molecule

An average of 22

Post-transcriptional regulators
   translational repression
   target degradation

Plant miRNAs versus metazoan miRNAs
   near perfect vs. complementarity low (5' 2-7 bases)
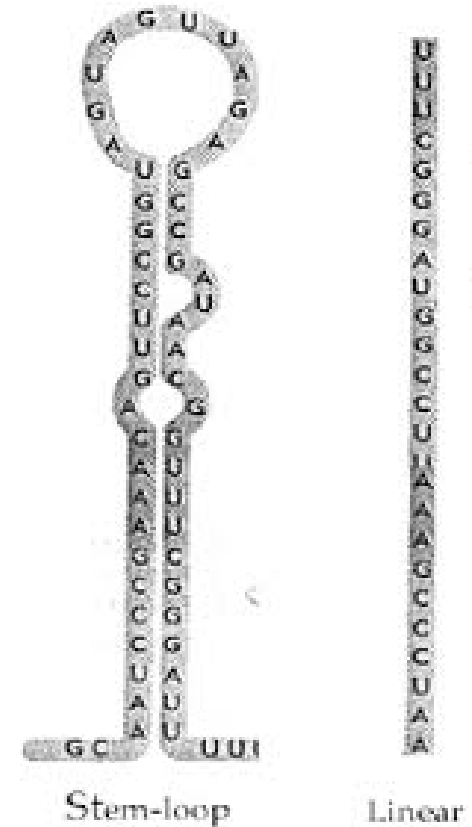   mainly coding region vs. mainly 3' UTR

Image courtesy Juan Gonzalez of UT Dallas

Stem-loop   Linear

http://www.jyi.org/features/ft.php?id=392

History 1 (buried finding)

- Lee RC, Feinbaum RL, Ambros V (December 1993). "The C. elegans heterochronic gene lin-4 encodes small RNAs with antisense complementarity to lin-14". *Cell* **75** (5): 843–54.

- C. elegans
  - Model system
  - Cell lineage
  - Vulva development
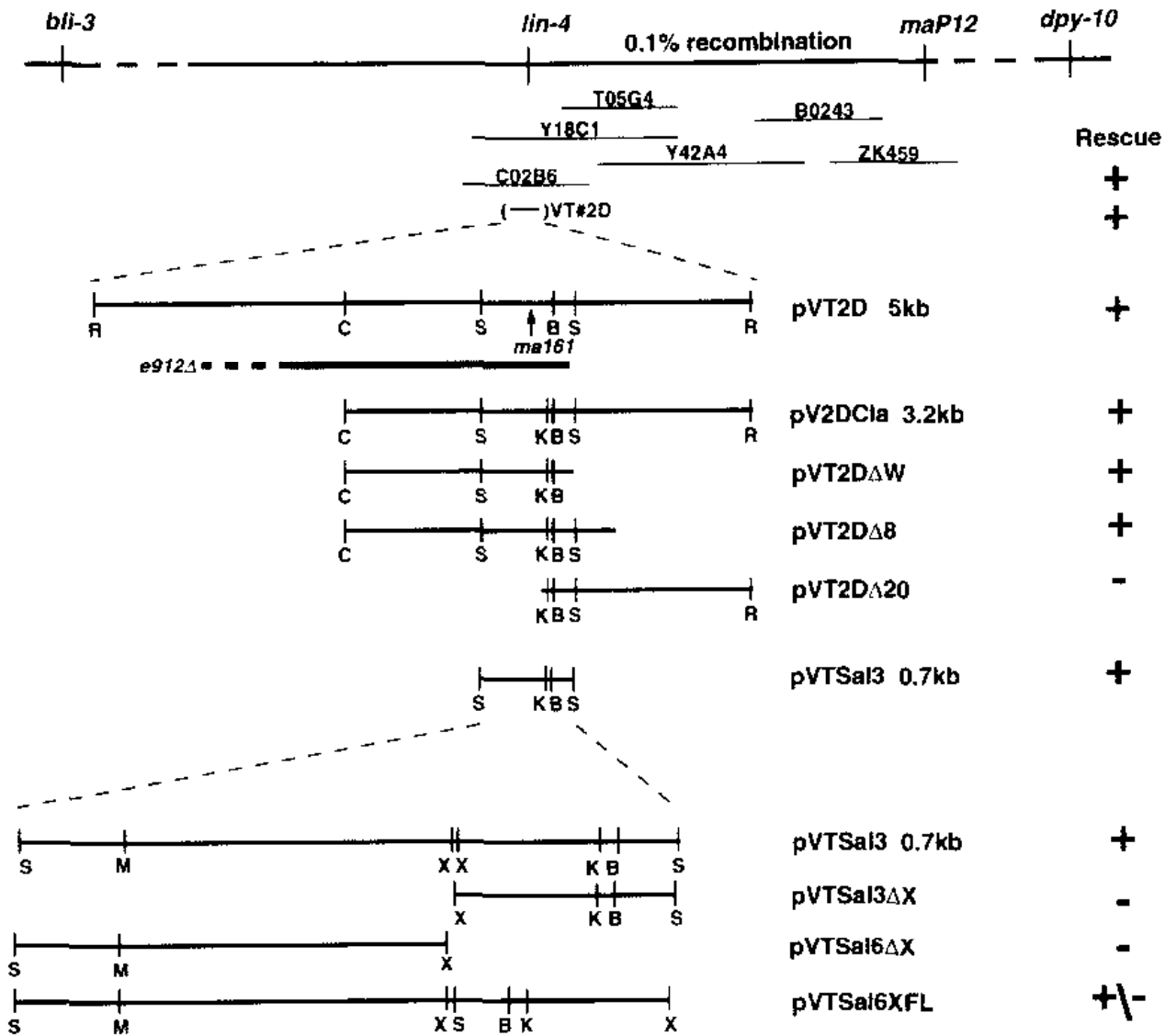
Lee RC, Feinbaum RL, Ambros V (December 1993). "The C. elegans heterochronic gene lin-4 encodes small RNAs with antisense complementarity to lin-14". *Cell* **75** (5): 843–54.
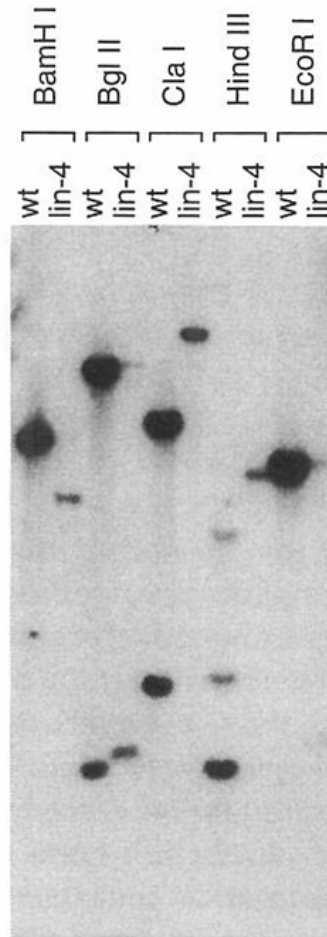
Figure 2. Southern Blot of Genomic DNAs from Wild-Type and *lin-4(e912)* Animals Digested with Various Restriction Endonucleases and Hybridized with pVT2D Probe

Similar amounts of wild-type and *lin-4(e912)* DNA were loaded. For each enzyme, the hybridization in *e912* DNA is to a band of weaker intensity and of altered size (smaller for each enzyme except ClaI) than that in wild-type DNA, consistent with a deletion in *e912* DNA of sequences corresponding to the pVT2D probe.
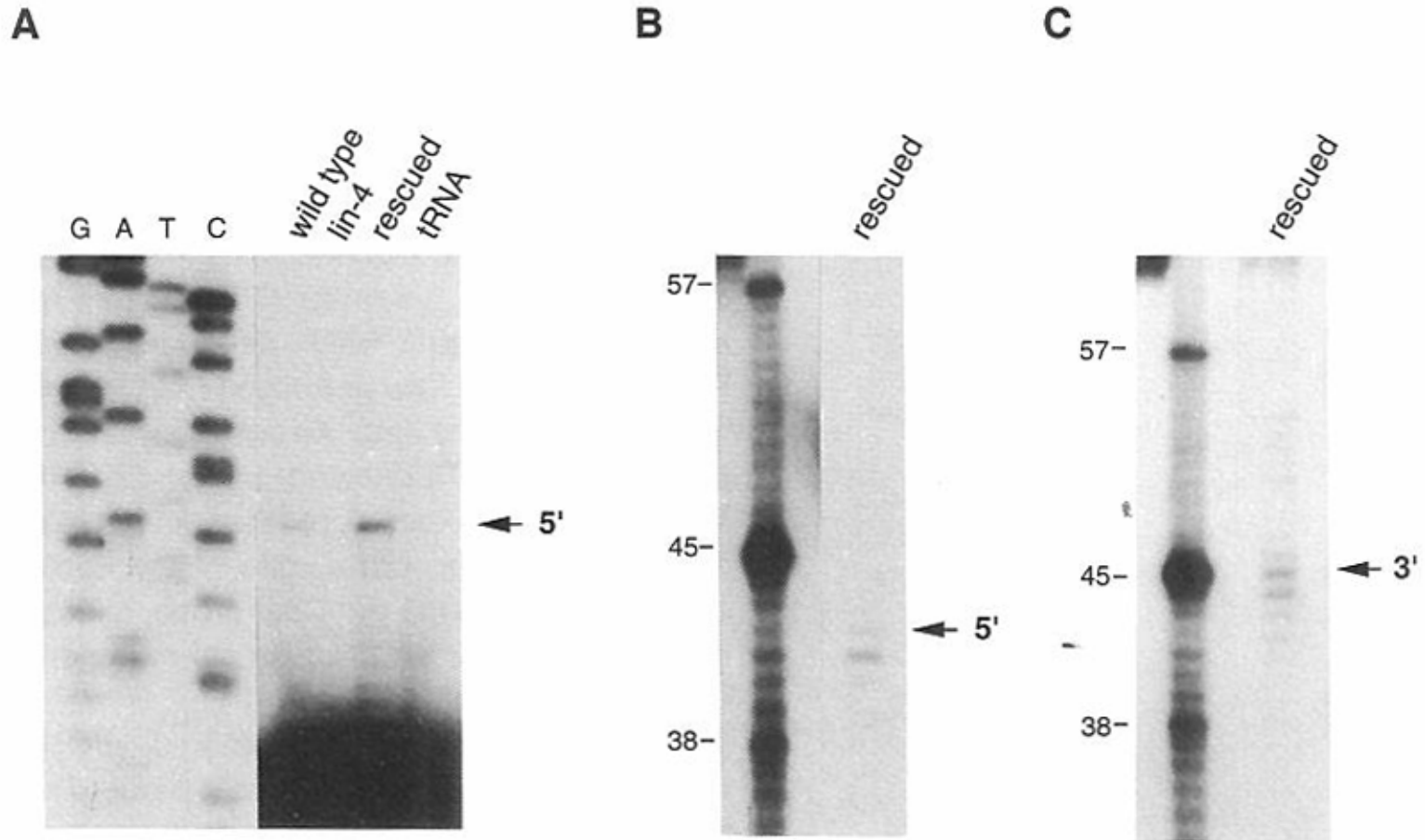
Lee RC, Feinbaum RL, Ambros V (December 1993). "The C. elegans heterochronic gene lin-4 encodes small RNAs with antisense complementarity to lin-14". *Cell* **75** (5): 843–54.

Identification of Two Small *lin-4* Transcripts
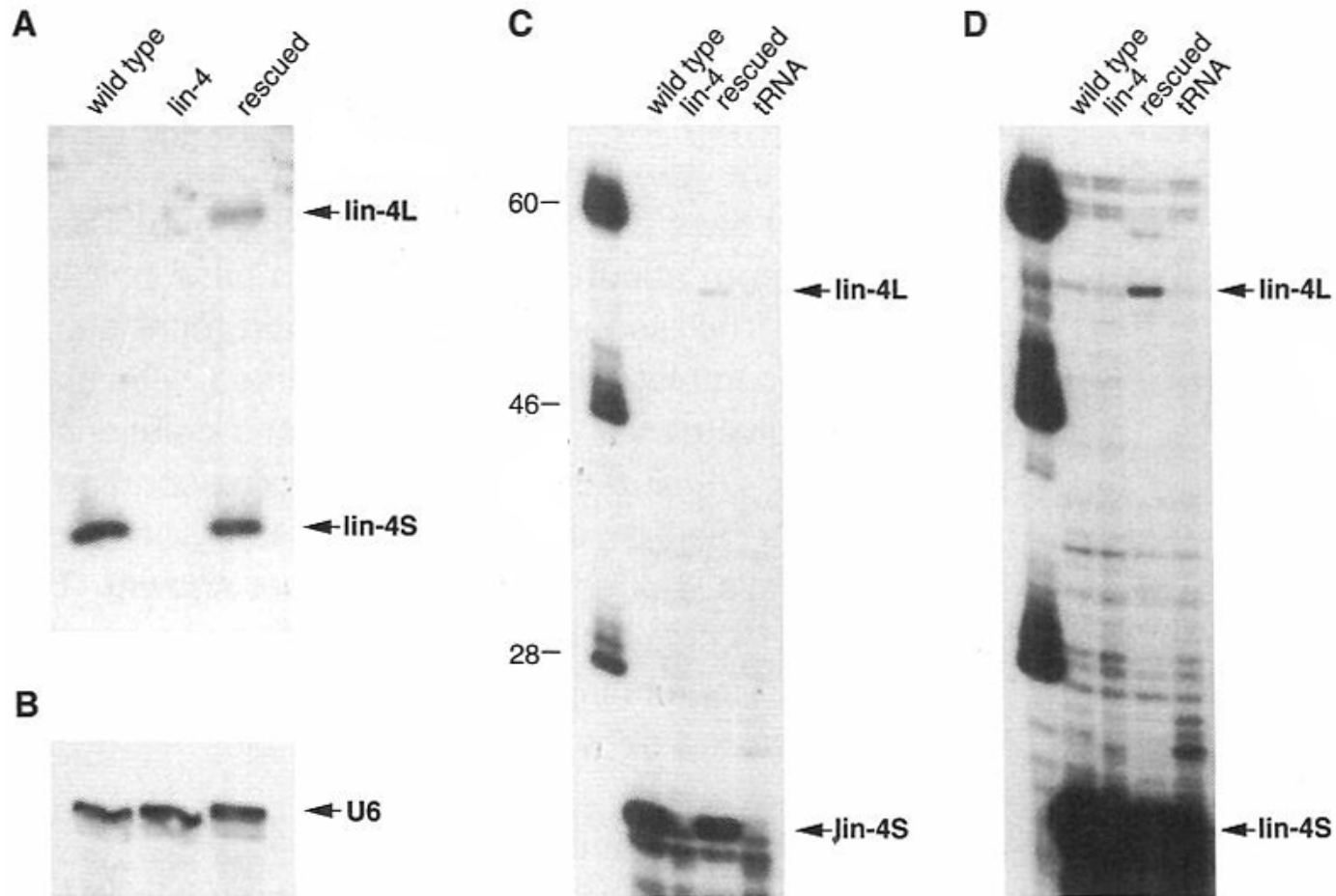
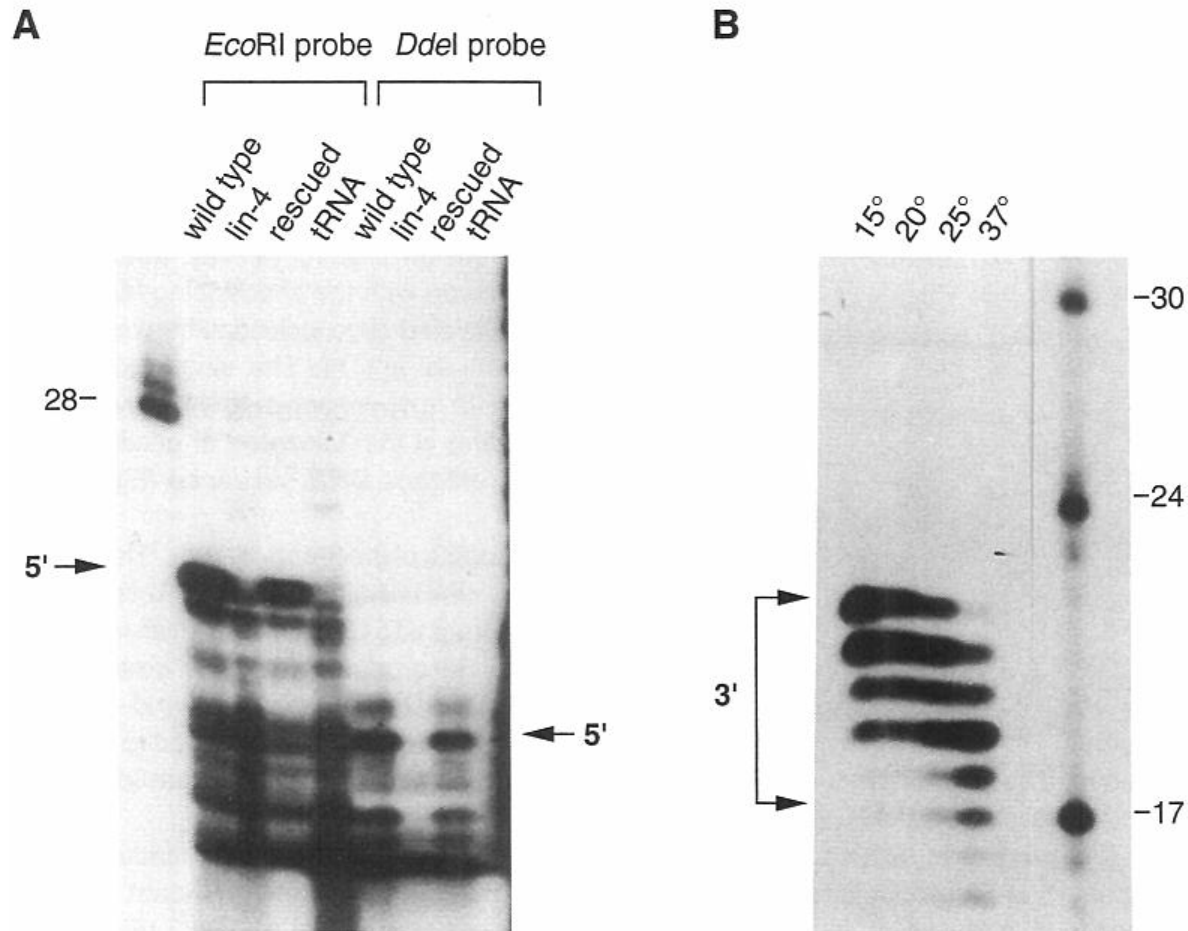

Lee RC, Feinbaum RL, Ambros V (December 1993). "The C. elegans heterochronic gene lin-4 encodes small RNAs with antisense complementarity to lin-14". *Cell* **75** (5): 843–54.
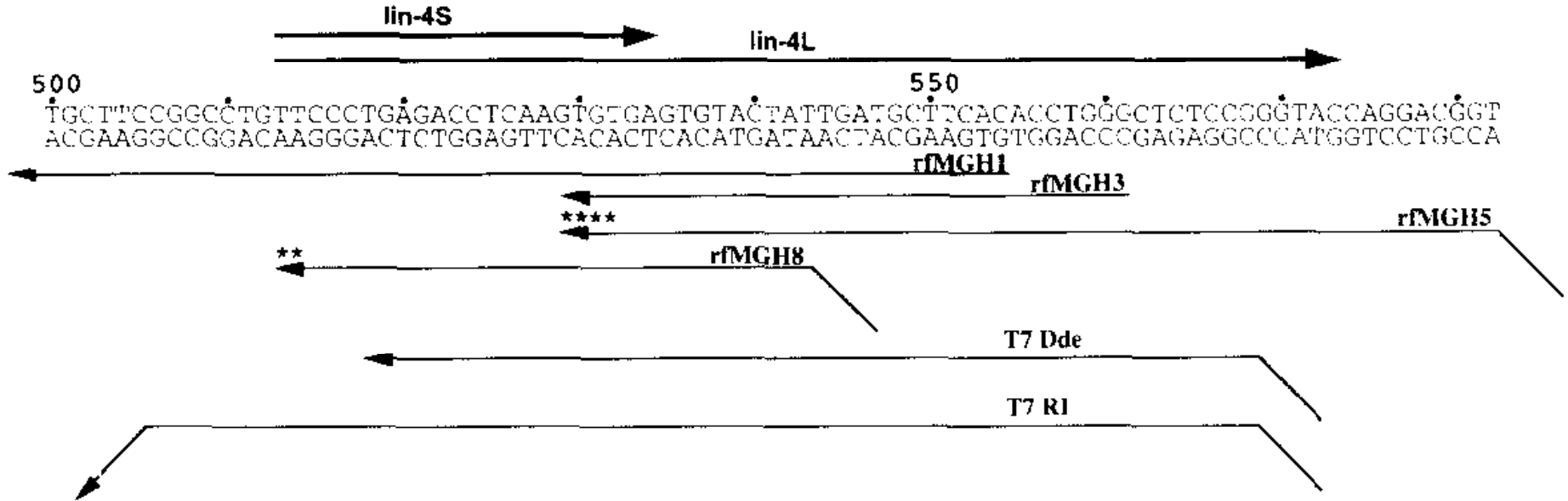
Mapping 5'and 3'Ends of *lin-4L*

Lee RC, Feinbaum RL, Ambros V (December 1993). "The C. elegans heterochronic gene lin-4 encodes small RNAs with antisense complementarity to lin-14". *Cell* **75** (5): 843–54.

Mapping 5' and 3' Ends of *lin-4S*

Lee RC, Feinbaum RL, Ambros V (December 1993). "The C. elegans heterochronic gene lin-4 encodes small RNAs with antisense complementarity to lin-14". *Cell* **75** (5): 843–54.
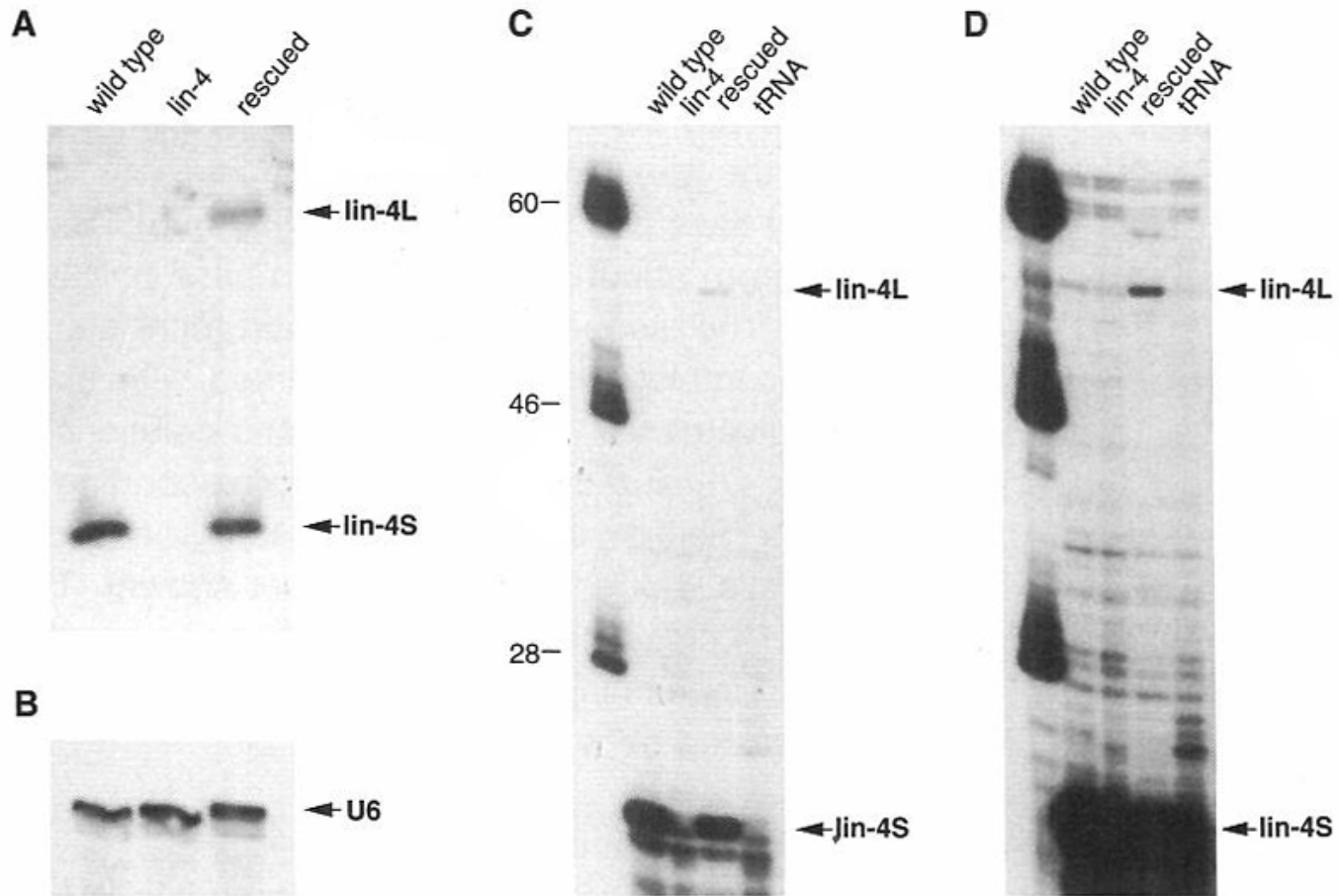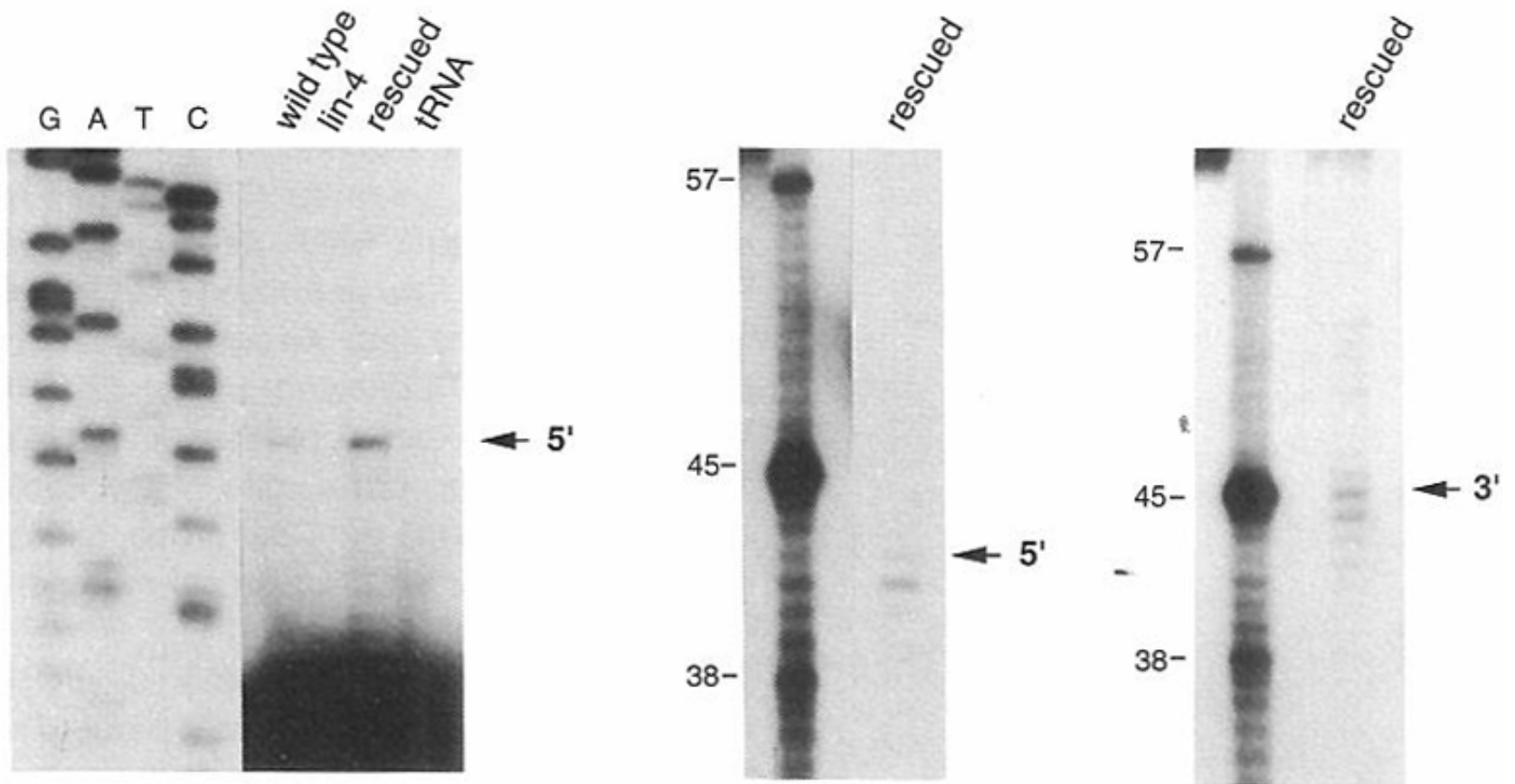
lin-4S and *lin-4L*

Lee RC, Feinbaum RL, Ambros V (December 1993). "The C. elegans heterochronic gene lin-4 encodes small RNAs with antisense complementarity to lin-14". *Cell* **75** (5): 843–54.

Lee RC, Feinbaum RL, Ambros V (December 1993). "The C. elegans heterochronic gene lin-4 encodes small RNAs with antisense complementarity to lin-14". *Cell* **75** (5): 843–54.

Lee RC, Feinbaum RL, Ambros V (December 1993). "The C. elegans heterochronic gene lin-4 encodes small RNAs with antisense complementarity to lin-14". *Cell* **75** (5): 843–54.

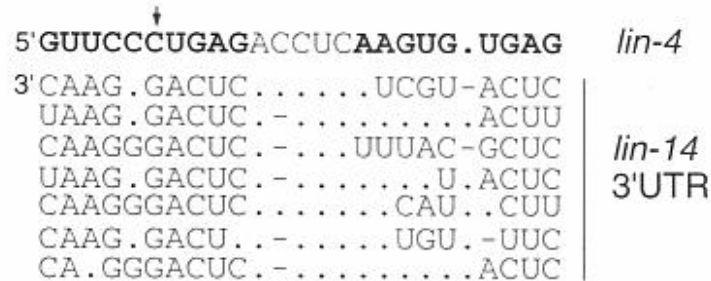# *lin-4* Transcripts and Complementarity between *lin-4* and *lin-14*

Lee RC, Feinbaum RL, Ambros V (December 1993). "The C. elegans heterochronic gene lin-4 encodes small RNAs with antisense complementarity to lin-14". *Cell* **75** (5): 843–54.
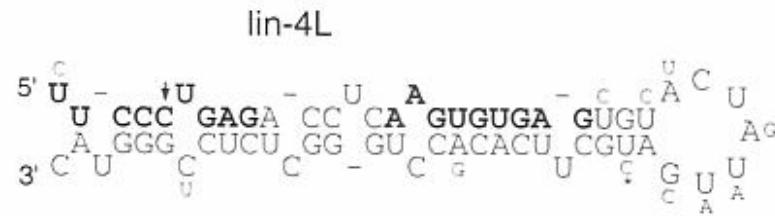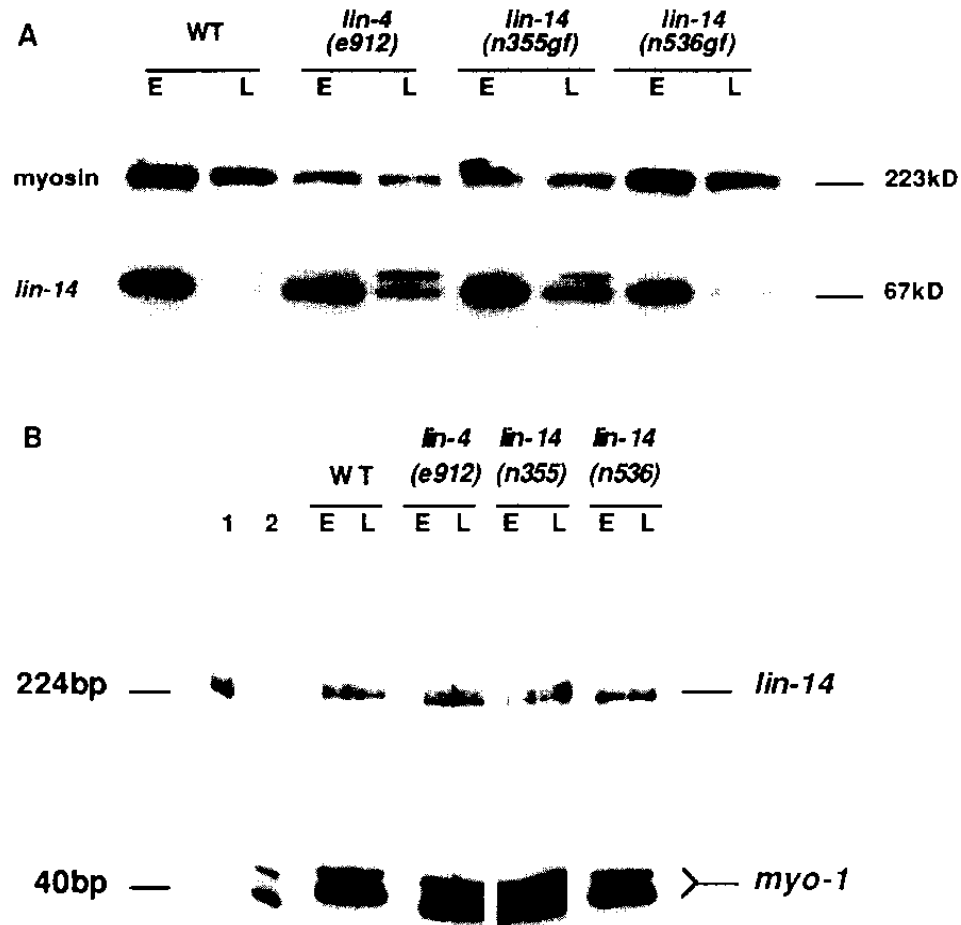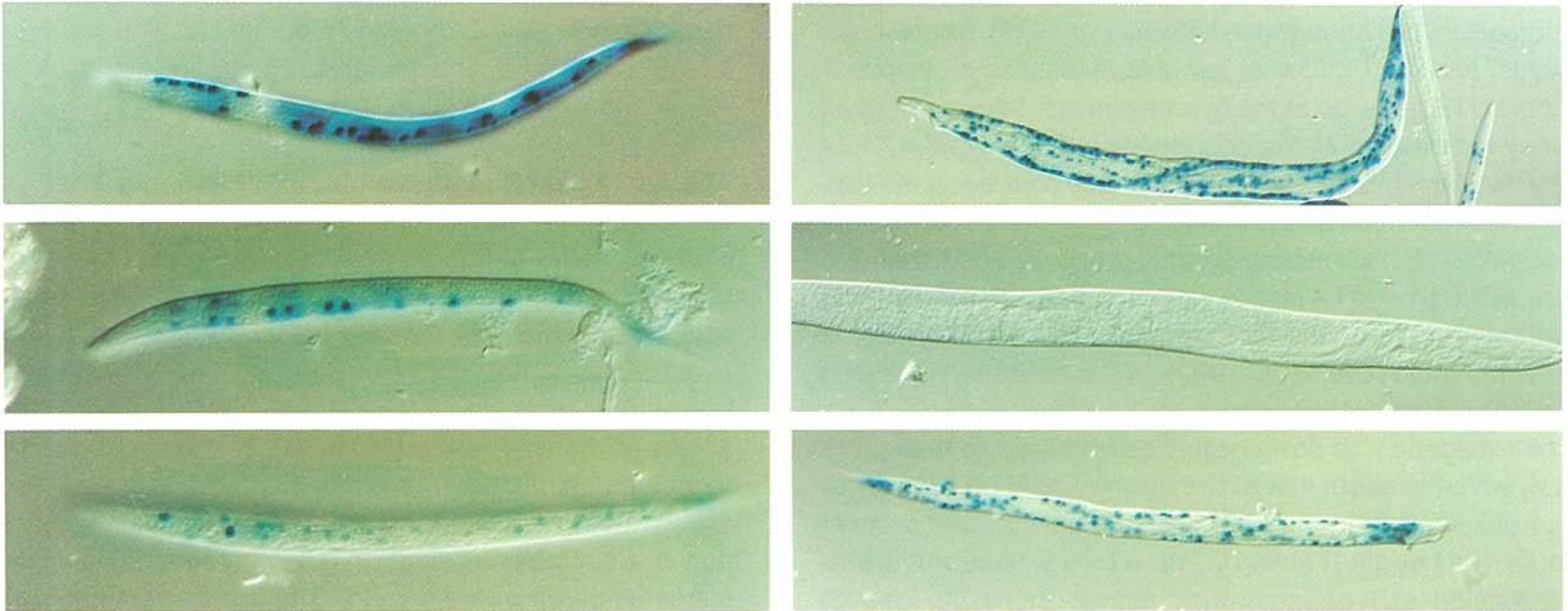
History 1 (even buried deeper)

- Bruce Wightman*, Ilho Ha*, Gary Ruvkun (December 1993). "Posttranscriptional regulation of the heterochronic gene *lin-14* by *lin-4* mediates temporal pattern formation in C. elegans". *Cell* **75** (5): 855–62.

- 인제대 뇌과학 연구소장

Bruce Wightman*, Ilho Ha*, Gary Ruvkun (December 1993). "Posttranscriptional regulation of the heterochronic gene *lin-14* by *lin-4* mediates temporal pattern formation in C. elegans". *Cell* **75** (5): 855–62.
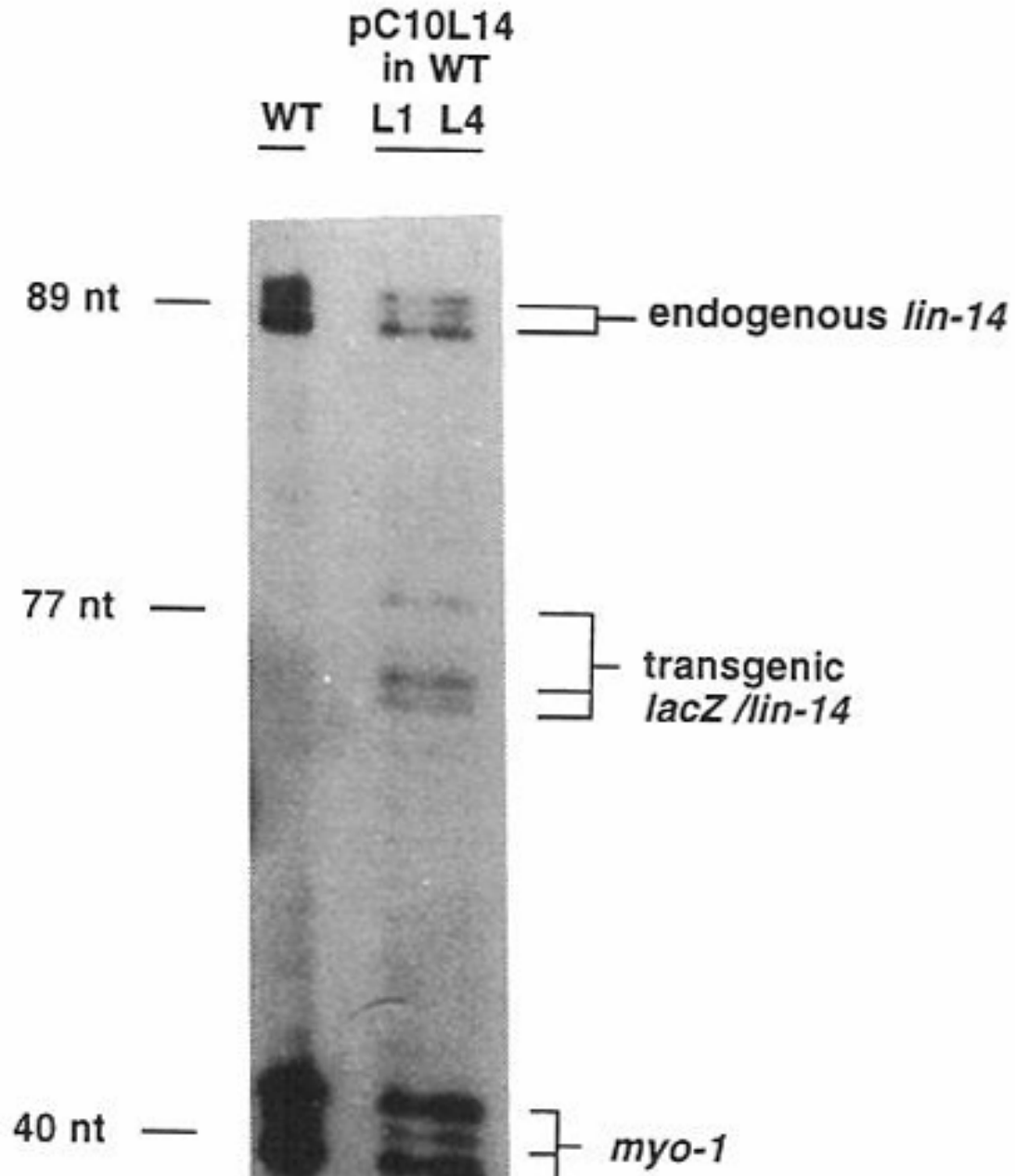
Bruce Wightman*, Ilho Ha*, Gary Ruvkun (December 1993). "Posttranscriptional regulation of the heterochronic gene *lin-14* by *lin-4* mediates temporal pattern formation in C. elegans". *Cell* **75** (5): 855–62.
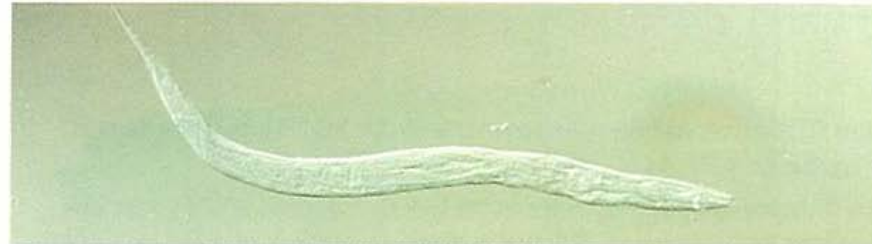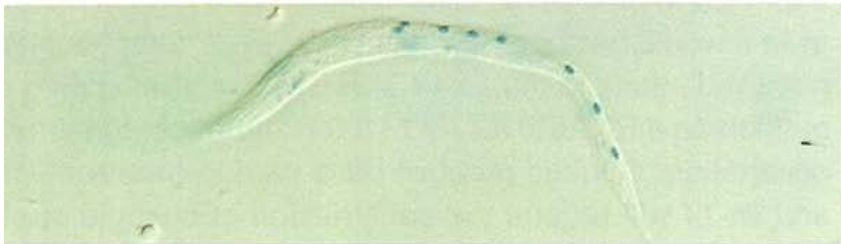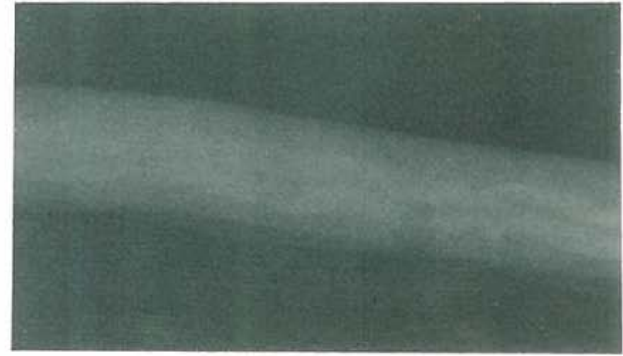
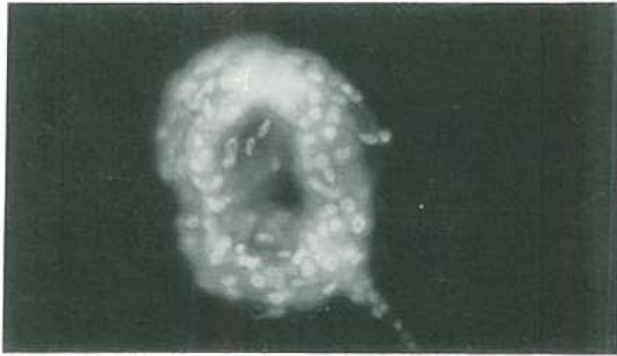Table 1. β-Galactosidase Activity of the Fusion Constructs in Staged Preparations from Transgenic Animals.

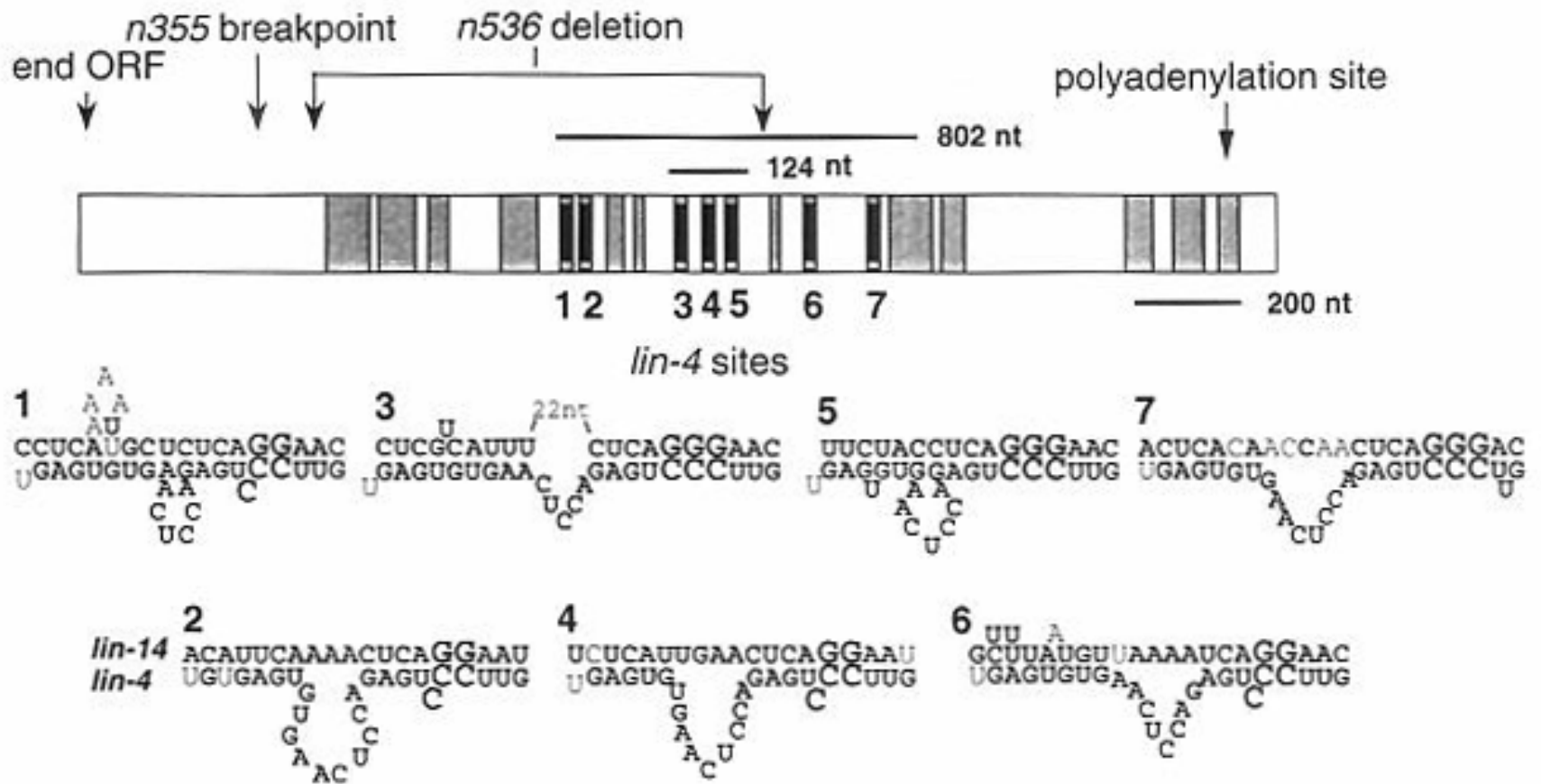| β'UTR	Genotype	β-Galactosidase Activity		
		L1	L4	L1/L4 ratio
lin-14	WT(int)	1.6 ± 0.9	0.02 ± 0.02	99 ± 33 (n = 4)
	lin-4(int)	1.0 ± 0.9	0.4 ± 0.4	4 ± 3 (n = 9)
	WT(Ex)	4.1 ± 2.0	0.02 ± 0.005	182 ± 60 (n = 3)
	WT(Ex)high	164 ± 49	1.6 ± 0.4	104 ± 15 (n = 3)
unc-54	WT(int)	9.0 ± 4.4	1.4 ± 0.7	7 ± 4 (n = 4)
	lin-4(int)	0.4 ± 0.3	0.2 ± 0.02	2 ± 1 (n = 2)
lin-14/802 nt	WT(Ex)high	108 ± 25	1.6 ± 0.8	72 ± 16 (n = 3)
lin-14/124 nt	WT(Ex)high	116 ± 7	1.7 ± 0.3	72 ± 16 (n = 2)

Each construct utilizes a col-10 promoter fused to lacZ with different 3'UTRs. The activity of these constructs was determined in either wild-type or lin-4 mutant backgrounds, as indicated. The transgene arrays were analyzed as either extrachromosomal array (Ex) or randomly integrated into a chromosome (int). Those transgenes assayed as high copy arrays are indicated by high and have higher β-galactosidase activity. The units shown are change of OD_{574} from CPRG hydrolysis per minute per milligram of protein and are mean values and standard deviations. The ratio of L1 to L4 β-galactosidase activity was calculated for each experiment, and the mean and standard deviations are shown.

Bruce Wightman*, Ilho Ha*, Gary Ruvkun (December 1993). "Posttranscriptional regulation of the heterochronic gene *lin-14* by *lin-4* mediates temporal pattern formation in C. elegans". *Cell* **75** (5): 855–62.

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