

2/6/95

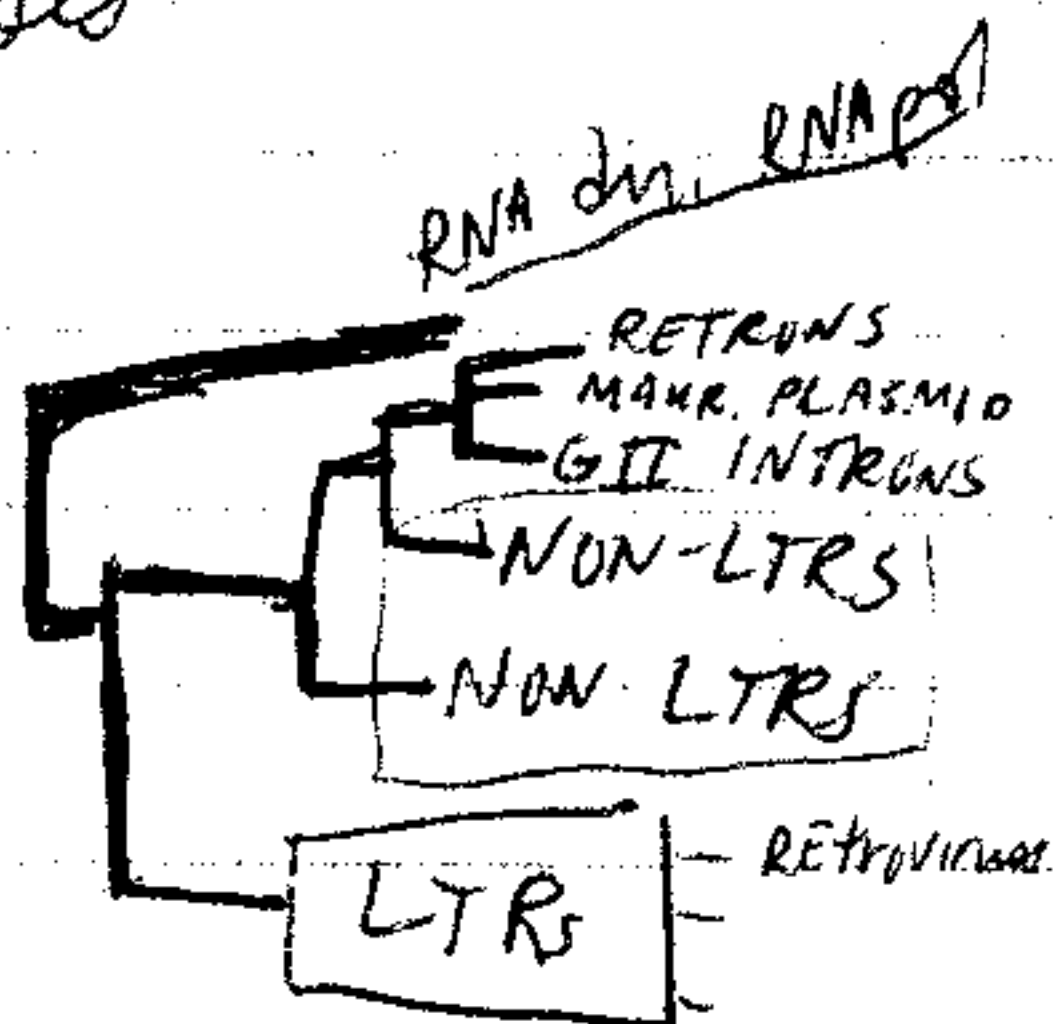
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Mobile Introns & Evolution of Reverse Transcriptase

- group II introns } autocatalysis
- group I introns }

I) Evolution of Rev Transcriptase

- TH Eickbush



II) Group I introns

III) Group II introns

- conserved 2 ary structure
- RNA catalysis
- self-splicing
- form lariat
- similar mechanism as pre-mRNA splicing
- it's proposed that pre-mRNA spliced evolved from Group II's
- require proteins in vivo

IV) Mobility

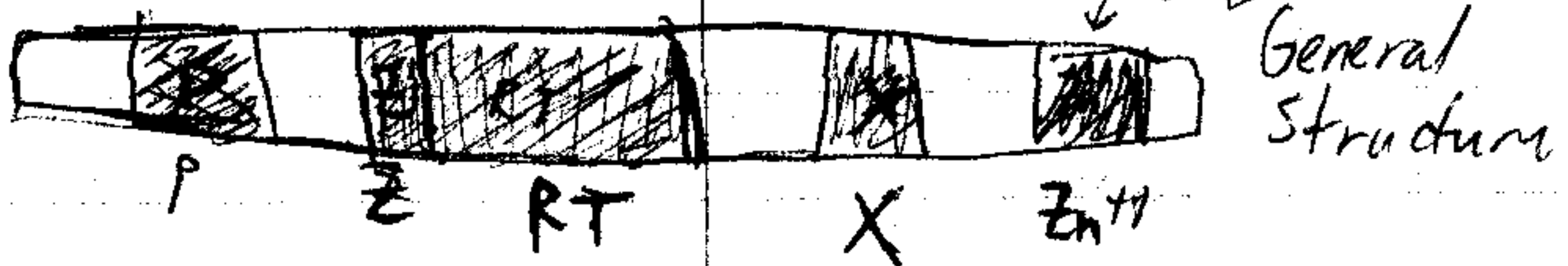
- group I's mobility incr. by self-encoded homing endonucleases (site specific)
- group II's encode rev. transcriptase like proteins
- both can transpose & both can exist on own

Group II introns

Cox 1 ... contains group I & II introns

I¹ } first two group II introns
I² }

- both encode ORFs - maturases ~~of reverse transcriptase~~
~~activity~~
- both are similar to rev. transcriptase
- both can ~~be~~ as rev. transcriptase



③ homing

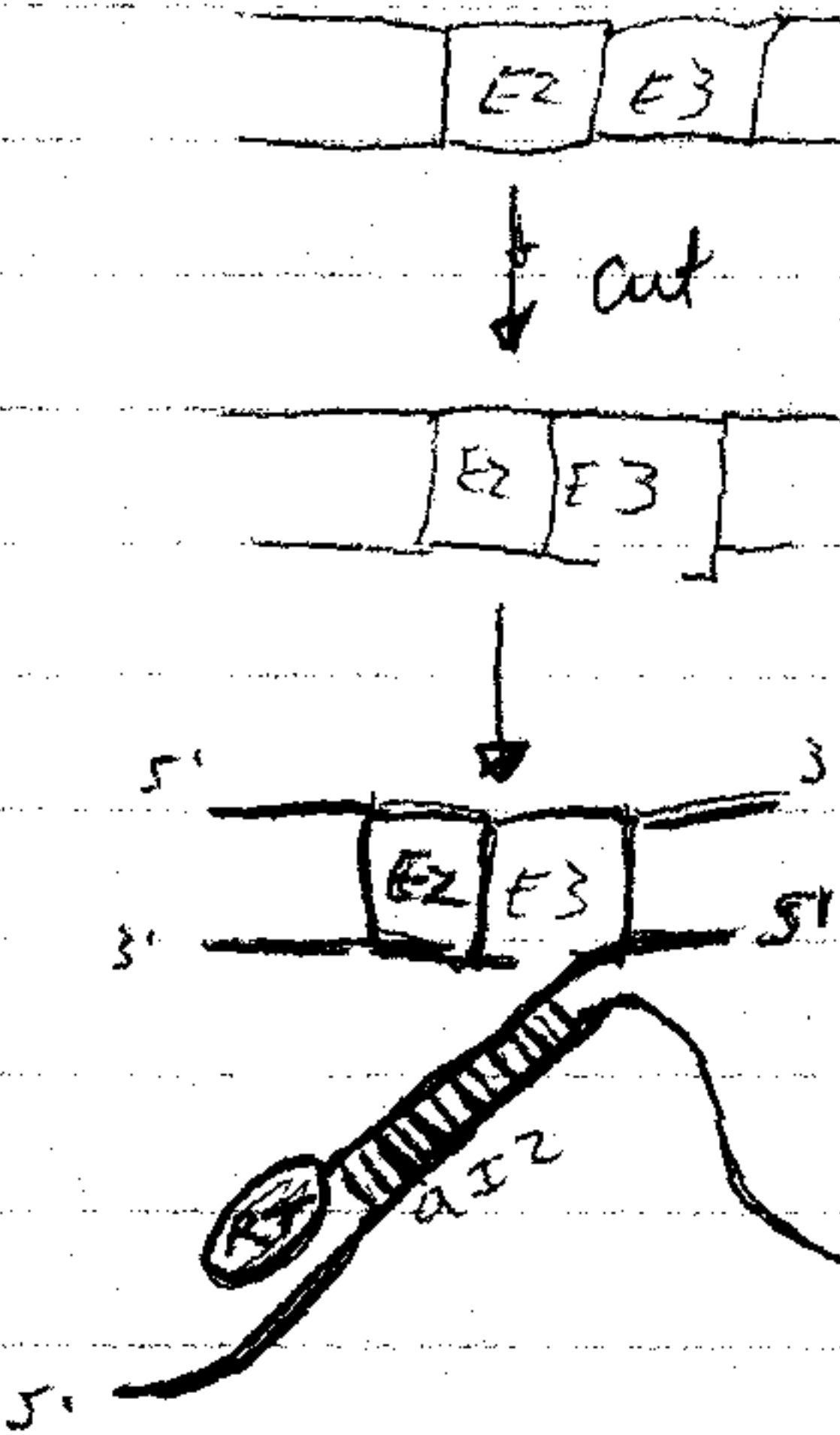
- transfer of intron & gene conversion of flanking sequences

③ rev. transcriptase

- specific for intron RNAs
- makes cDNA of both (intron) & (intron + ^{local} exons)

A Lamboury contd

Mechanism - Proposed

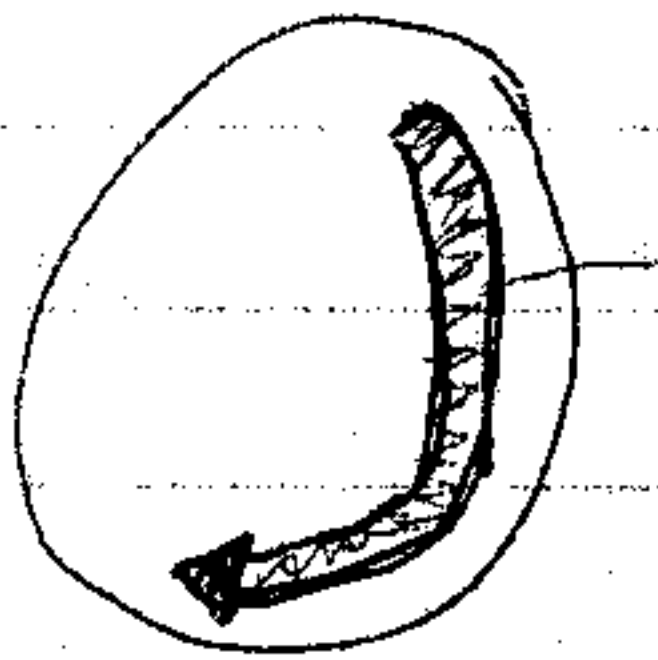


- v. similar to non-LTR trans

- which is consistent w/ phylogenetic relationships

3' unspliced RNA

Mitochondrial Plasmids



3.6-3.7 Kb

N. crassa

Mauriceville

+

Varbud

-81 KD protein

- has rev. trase activity
- more reduced prot. than other trases
(e.g. no RNase H)
- has codon usage like intron encoded prots.

Tx

- tx'd by host N. crassa mt. RNA pol
- 3' end has tRNA like structure
- proposed RNA 2ary structure
 - confirmed by chem. structure mapping
- like tRNA-like structures in plant viruses RNA polymerase



Appears that cDNA synthesis initiates w/o a primer.

