

SOS in Biochemistry, Jiwaji University, Gwalior

M.Sc. II Semester (2019-20)

Paper BCH 201: Fundamentals of Molecular Biology (Unit IV & V)

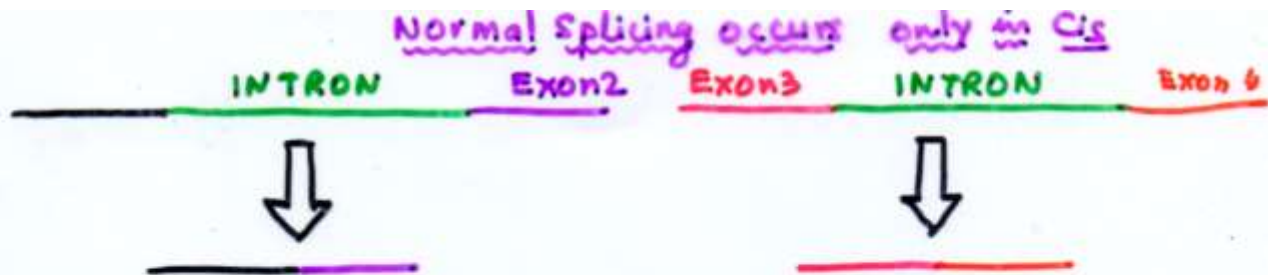
***trans*-Splicing**

(Intermolecular splicing reaction)

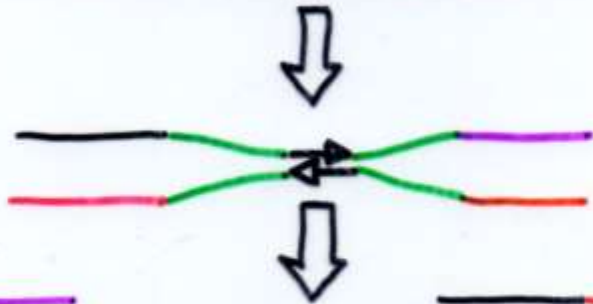
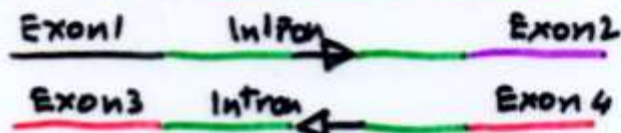
***cis*-splicing (intramolecular splicing reaction) is common.**

***trans*-splicing reaction (intermolecular splicing) is rare (e.g., in *Trypanosome*, *C. elegans* etc.)**

Fig. 1



splicing can occur in trans if complementary sequences are introduced in introns

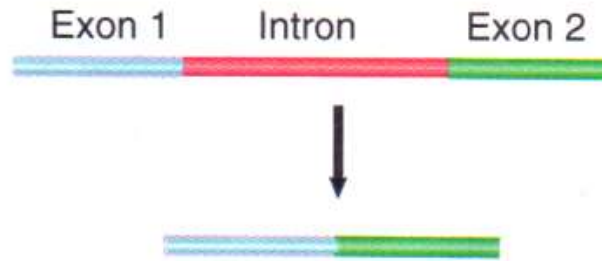


cis-spliced product

trans-spliced product

Cis & Trans
splicing

Normal splicing occurs only in *cis*



Splicing can occur in *trans* if introns contain complementary sequences

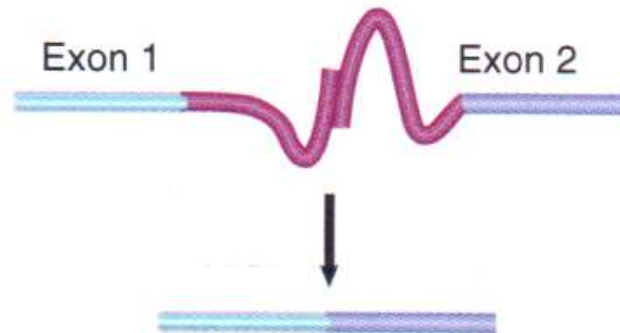
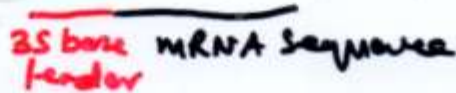
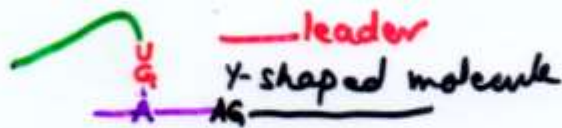


FIGURE 21.26 Splicing usually occurs only in *cis* between exons carried on the same physical RNA molecule, but *trans*-splicing can occur when special constructs are made that support base pairing between introns.

SL RNA provides an exon that is connected to the first exon of an mRNA by trans splicing. The reaction involves the same interactions as nuclear cis splicing but generates a Y shaped RNA instead of a lariat because the intron is in two separate parts.

Tandem repeats
of leader unit-

Individual
transcription unit-



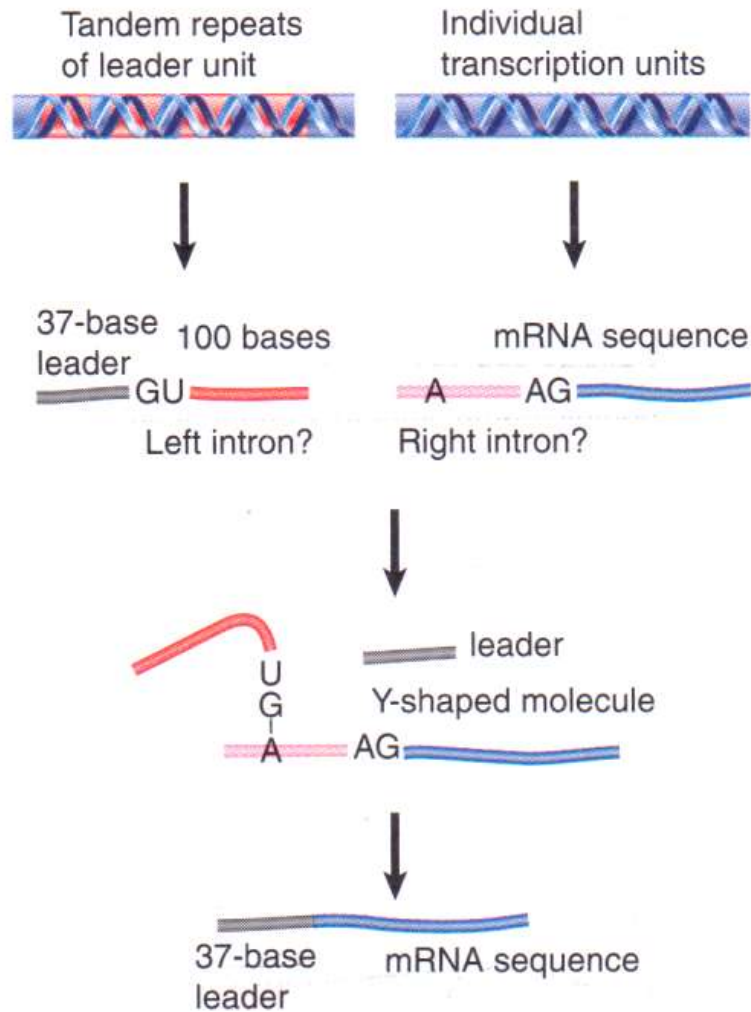


FIGURE 21.27 The SL RNA provides an exon that is connected to the first exon of an mRNA by *trans*-splicing. The reaction involves the same interactions as nuclear *cis*-splicing, but generates a Y-shaped RNA instead of a lariat.

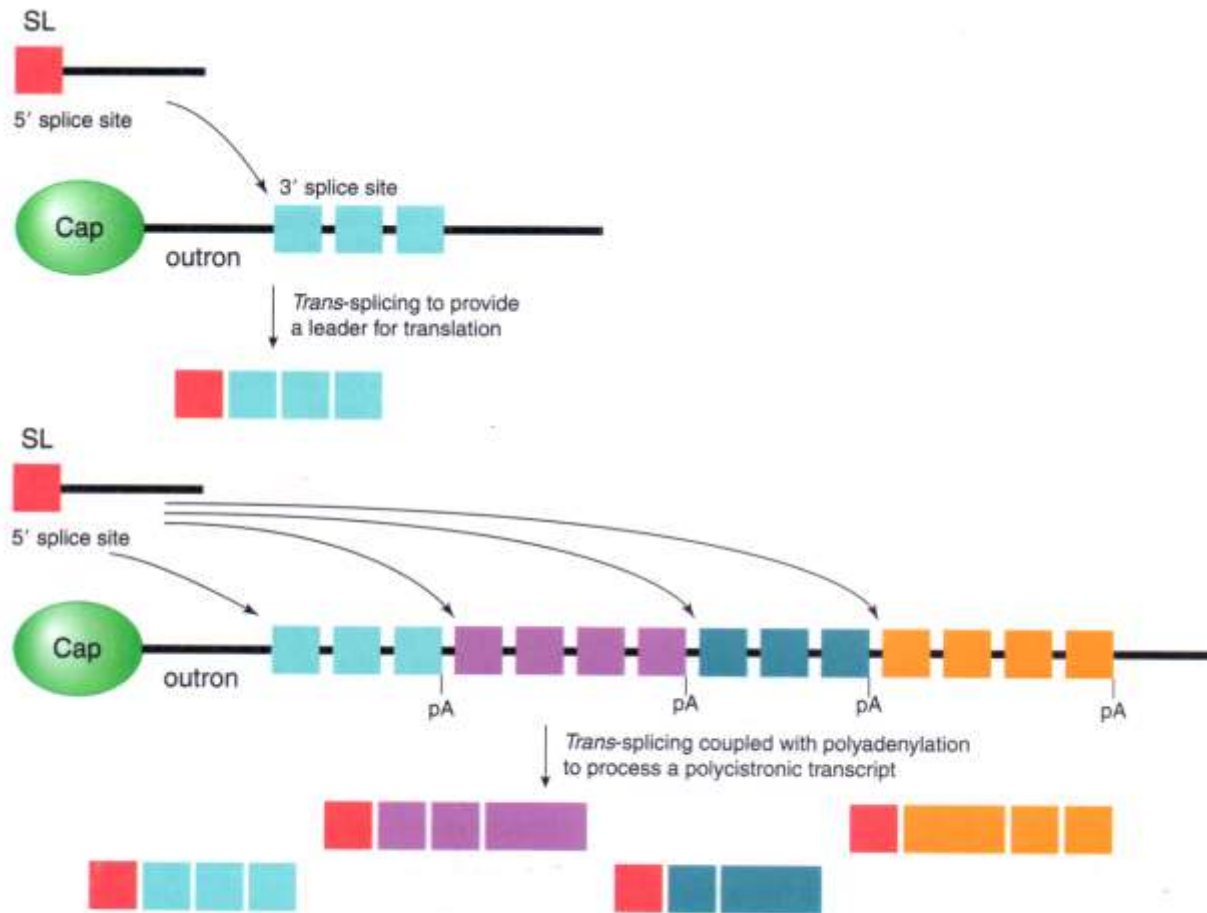
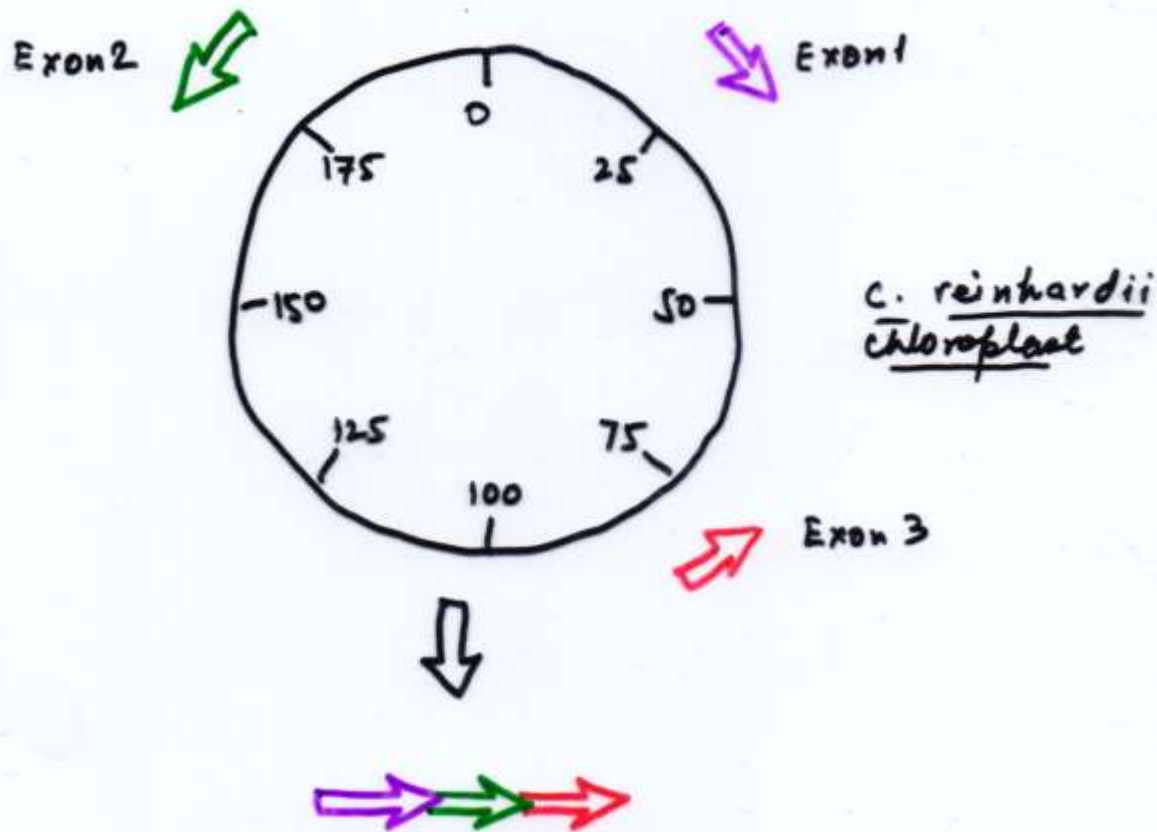


FIGURE 21.28 The SL RNA adds a leader to facilitate translation. Coupled with the cleavage and polyadenylation reactions, the addition of the SL RNA is also used to convert polycistronic transcripts to monocistronic units.



The exons of chloroplast psa gene are dispersed, arranged in opposite orientation & transcribed into 3 individual RNAs.

The m RNA is formed by two trans-splicing events, each of which requires the products of specific nuclear genes.

Biological Significance
of
***trans*-splicing Reaction**

Biological Significance

Primary mechanism to process precursor RNA into mature, translatable mRNAs in trypanosomes and nematodes.