

## Eucaryotic mRNA Processing

- (1) 5' Capping
- (2) 3' Cleavage/Polyadenylation
- (3) HnRNP proteins
- (4) RNA splicing

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## Overview: mRNA Processing

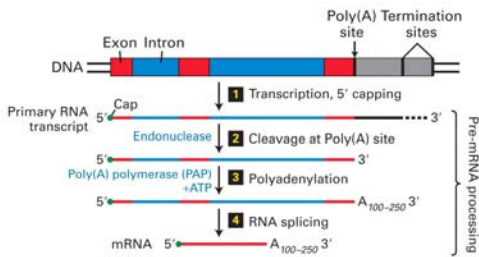


Fig. 12-2

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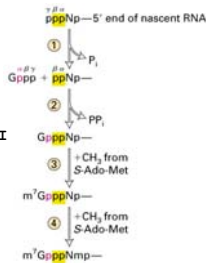
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## Capping the 5' End

- Reactions 1 & 2 catalyzed by capping enzyme that associates with CTD of RNA Pol II
- Capping specific for RNA Pol II
- Methyltransferases catalyze reactions 3 & 4




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## hnRNP Proteins

- Pre-mRNA associated with hnRNPs as they are transported to cytoplasm
- hnRNPs stands for: *heterogeneous ribonucleoprotein particles*
- RNA in the hnRNPs is a collection of mRNA and other small RNAs
- Different types of hnRNPs bind to different regions of new RNA.  
Ex: hnRNP A1, C, and D bind to pyrimidine-rich sequences
- Several RNA-binding motifs have been identified in hnRNPs  
Ex: RNP motif

How do you think they discovered hnRNPs?

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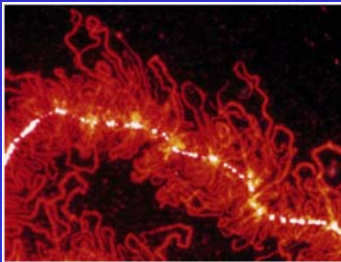
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## hnRNP Protein Visualization

White  
DAPI

Red  
hnRNP  
antibody



Nascent transcripts in oocyte of a newt

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## RNA Recognition Motif (RRM)

aka. RNP motif, RNA-binding domain (RBD)

(a) RNA recognition motif (RRM)



(b) Sex-lethal RRM domains

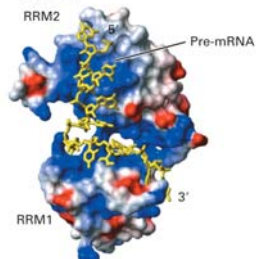


Fig. 12-3

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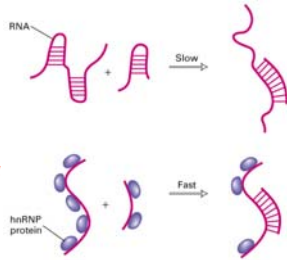
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## Accelerated Hybridization of RNA with hnRNP

Makes pre-mRNA more accessible to binding of other molecules & for processing.

Why do *single-stranded mRNA sequences* form secondary structures?



hnRNP may prevent secondary structure formation

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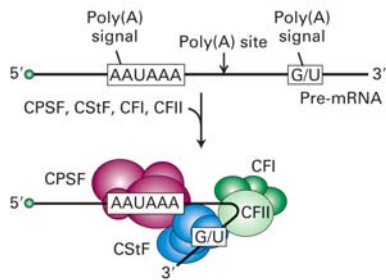
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## Model of Cleavage and Polyadenylation



The AAUAAA site is key! How was it found?  
How was its function unraveled?

Fig. 12-4

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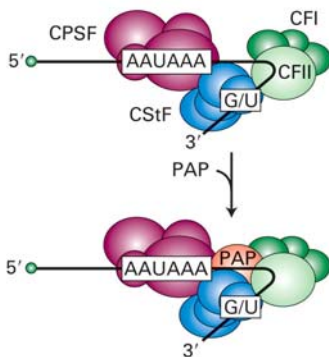
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If you knew about the AAUAAA site, how might you find proteins that bound this site?

Fig. 12-4

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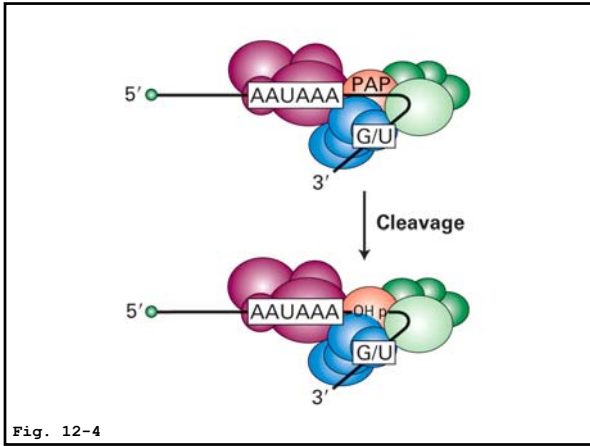
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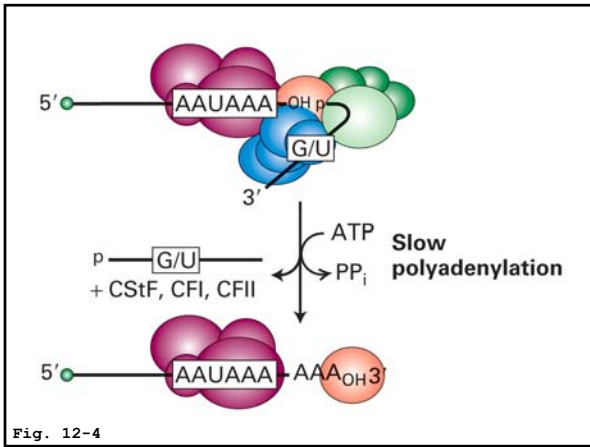
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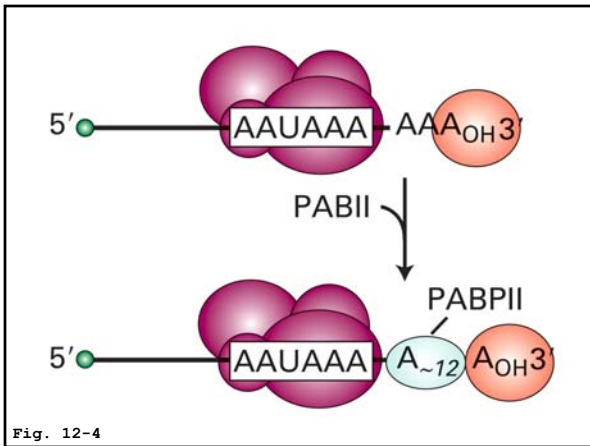
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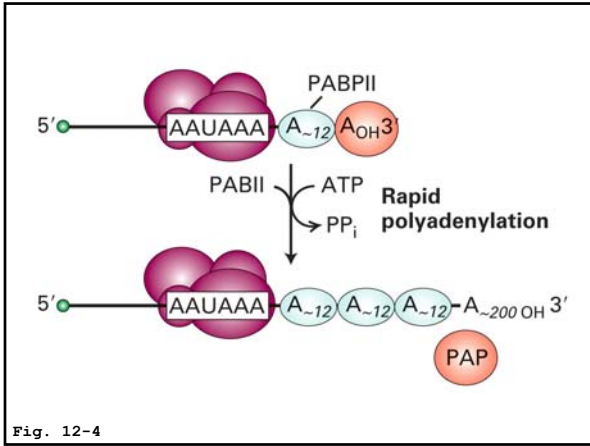
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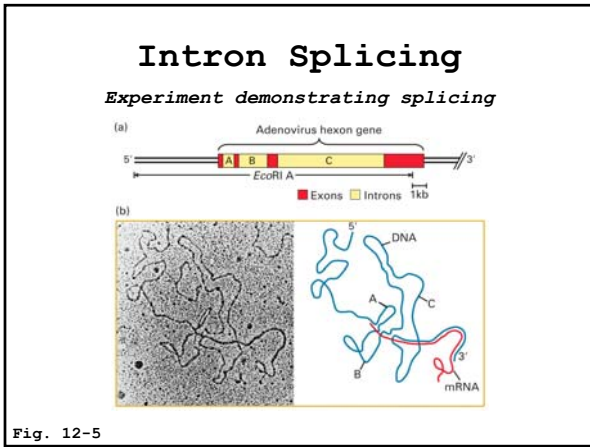
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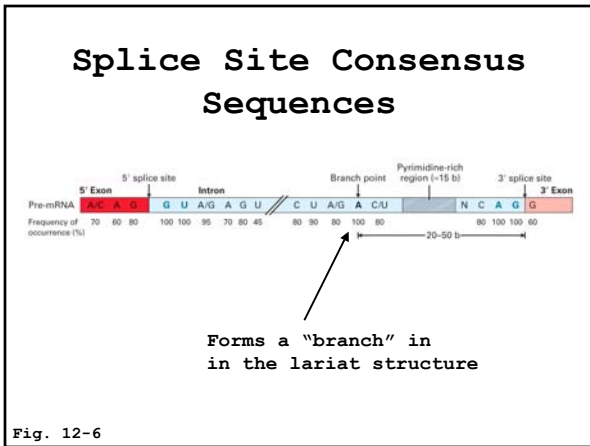
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