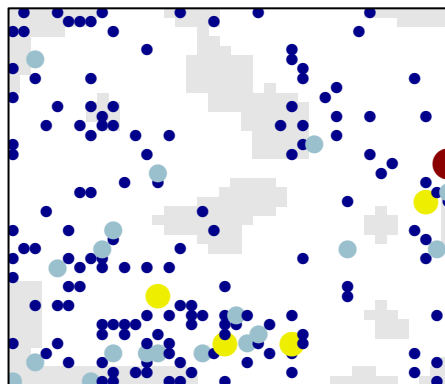
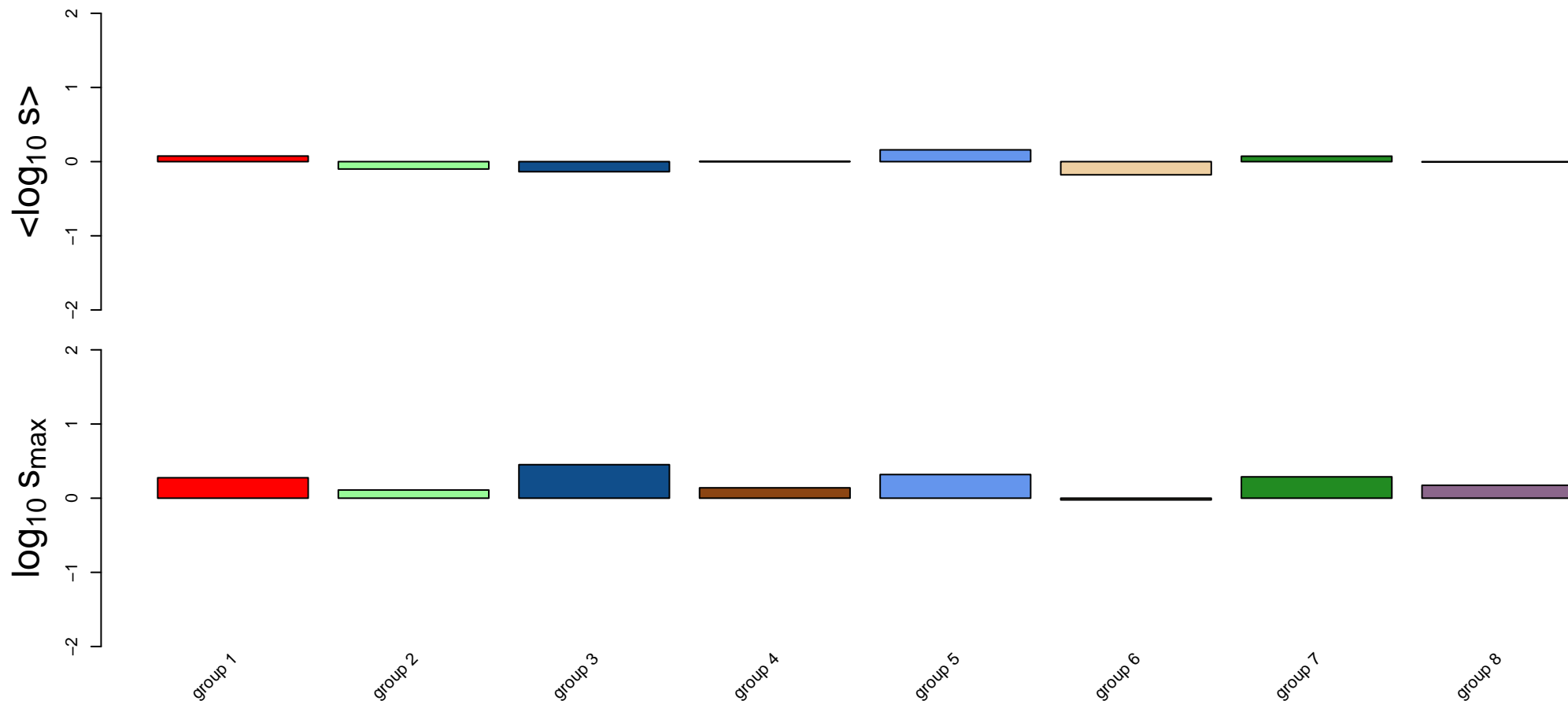
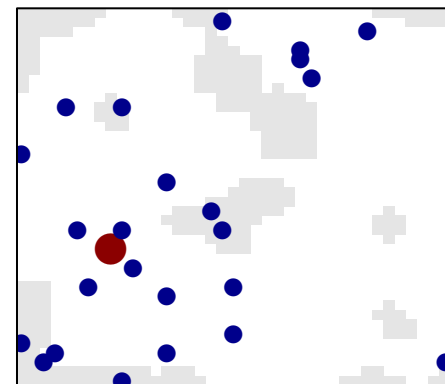


mRNA surveillance pathway

all genes



sink node genes



mRNA_surveillance_pathway
genes with data

Cap binding complex (CBC)

NCBP1
NCBP2

Exon-junction complex (EJC)

UPF3B			ACIN1
RBM8A	CASC3	SAP18	RNPS1
MAGOH	EIF4A3	PNN	ALYREF

Transiently interacting factors

NXF1	DDX39B	SRRM1
NXT1	PYM1	

Nucleus

Cytoplasm

pre-mRNA RNA polymerase II

5'-end capping

RNMT
RNGTT

m7G

Splicing

Spliceosome

CBC
m7G

CFIm
CPSF
CFIIIm
CstF

3'-end processing

Cleavage
Poly(A) addition

EJC complex

CBC
m7G

Upf3

Aberrant RNAs

BCL2L3-PABPN1
AAAAAAAA

Polyadenylation by TRAMP complex

Nuclear exosome
RNA degradation

Export

SRm160
Pinin

RNA transport

Nuclear Pore complex (NPC)

pre-mRNA 3'-end processing machinery

Cleavage factor Im (CFIm) complex

NUDT21 CPSF6 PAPOLA

Cleavage factor IIIm (CFIIIm) complex

CLP1 PCF11

Cleavage and polyadenylation specificity factor (CPSF) complex

(*Saccharomyces cerevisiae*)

CPSF1 CPSF2 CPSF3
PIP1L1 CPSF4

MPE1 WDR33
WDR82 REF2
PPP1CA SSU72

Cleavage stimulation factor (CSTF) complex

CSTF1 CSTF2 CSTF3
SYMPK

Ref/Aly

Ribosome binding

CBC
m7G

60S
40S
Ribosome

EJC

Upf3

Stop codon

AAAAAAAA

Recognition of PTC (premature termination codon)

CBC
m7G

PTC

eRF3
eRF1

EJC

Upf1

Upf2

Upf3

Stop codon

AAAAAAAA

Assembly of the surveillance complex

CBC
m7G

Upf1
eRF3
eRF1

EJC

Upf2

Upf3

Stop codon

AAAAAAAA

Decapping
Deadenylation
Cytoplasmic exosome
Ski complex
RNA degradation

Nonsense-mediated decay (NMD)

Translational stalling

Stem-loop

m7G

Stop codon

AAAAAAAA

Hbs1

Dom34

Hbs1

Dom34

Stop codon

AAAAAAAA

PABPC4

HBS1L
PELO

Ski7

No-go decay (NGD)

Recognition of empty A site

m7G

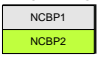
AAAAAAAA

Cytoplasmic exosome

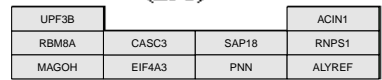
Nonstop decay (NSD)

mRNA_surveillance_pathway
sink nodes

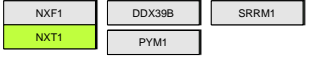
Cap binding complex (CBC)



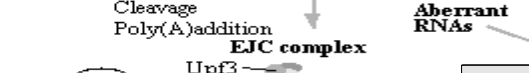
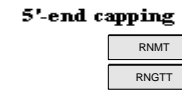
Exon-junction complex (EJC)



Transiently interacting factors

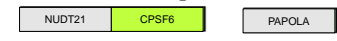


pre-mRNA RNA polymerase II



pre-mRNA 3'-end processing machinery

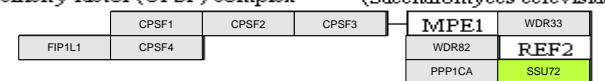
Cleavage factor Im (CFIm) complex



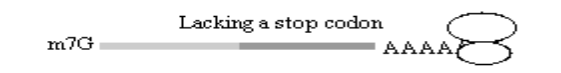
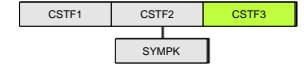
Cleavage factor IIm (CFIIm) complex



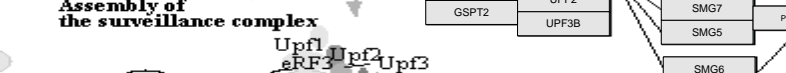
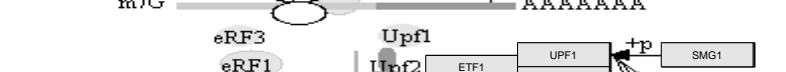
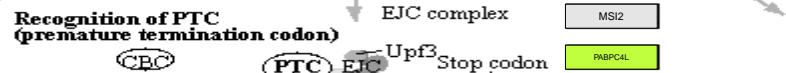
Cleavage and polyadenylation specificity factor (CPSF) complex (Saccharomyces cerevisiae)



Cleavage stimulation factor (CSTF) complex



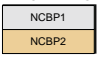
Nonstop decay (NSD)



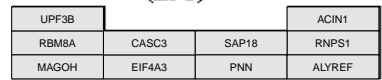
No-go decay (NGD)

mRNA_surveillance_pathway group 1

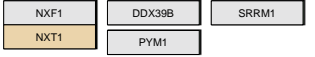
Cap binding complex (CBC)



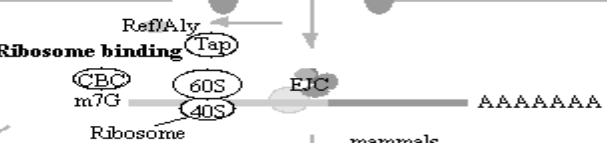
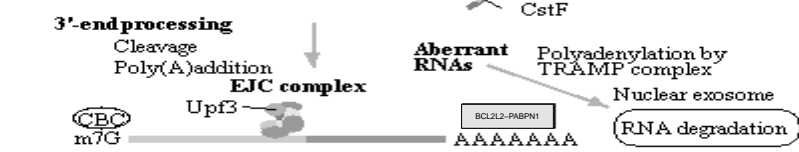
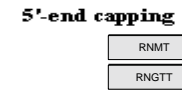
Exon-junction complex (EJC)



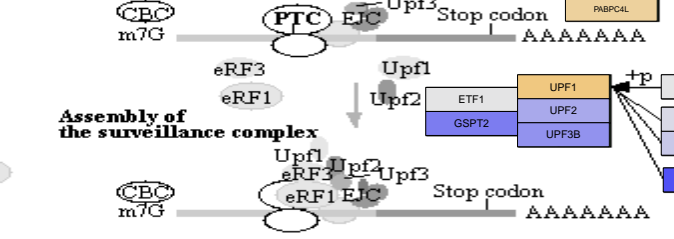
Transiently interacting factors



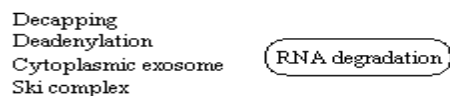
pre-mRNA RNA polymerase II



Recognition of PTC (premature termination codon)

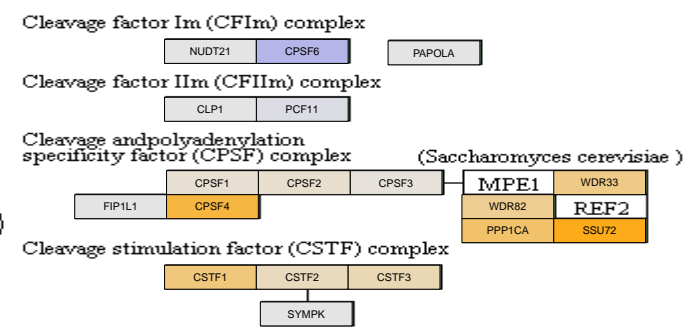


Assembly of the surveillance complex

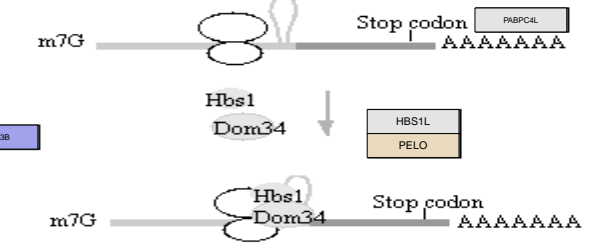


Nonsense-mediated decay (NMD)

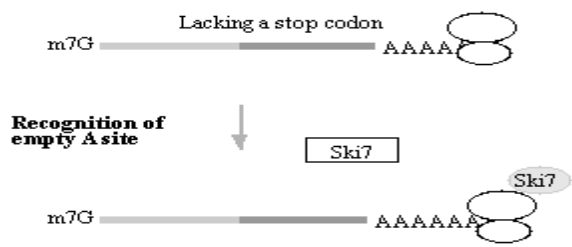
pre-mRNA 3'-end processing machinery



Translational stalling



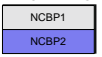
No-go decay (NGD)



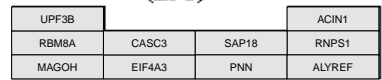
Nonstop decay (NSD)

mRNA_surveillance_pathway group 2

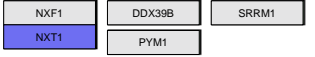
Cap binding complex (CBC)



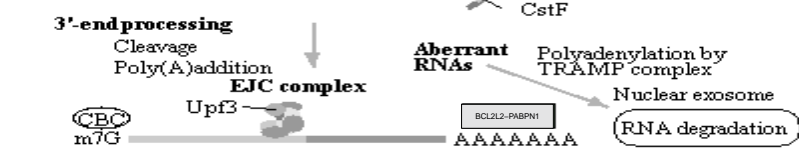
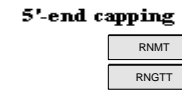
Exon-junction complex (EJC)



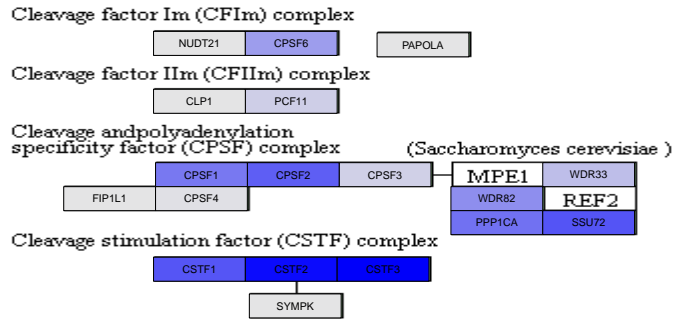
Transiently interacting factors



pre-mRNA RNA polymerase II

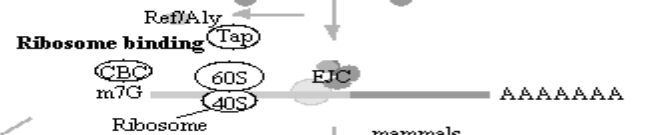


pre-mRNA 3'-end processing machinery

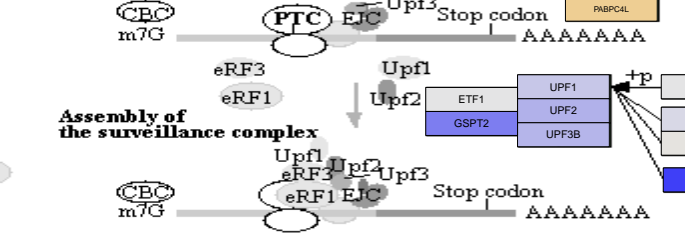


Nucleus

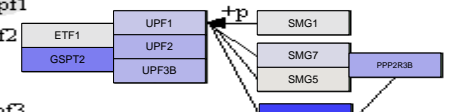
Cytoplasm



Recognition of PTC (premature termination codon)

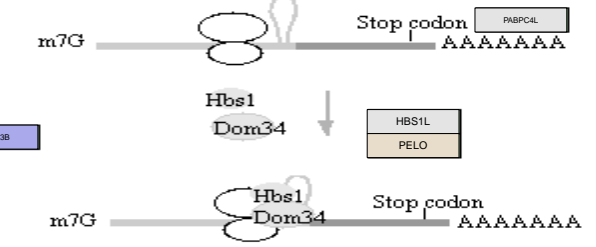


Assembly of the surveillance complex

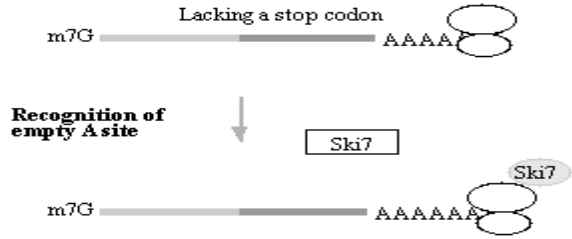


Nonsense-mediated decay (NMD)

Translational stalling



No-go decay (NGD)

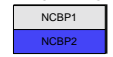


Nonstop decay (NSD)

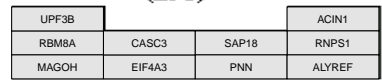
Cytoplasmic exosome

mRNA_surveillance_pathway group 3

Cap binding complex (CBC)



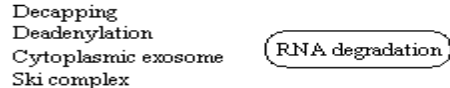
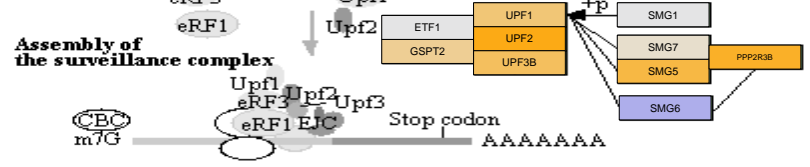
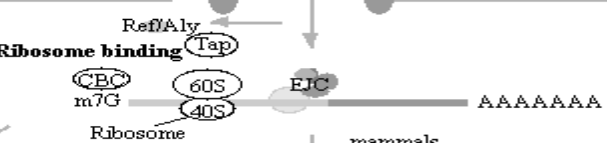
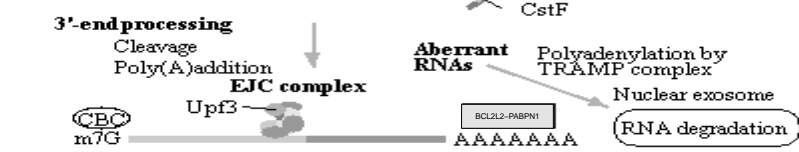
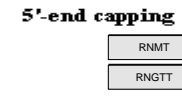
Exon-junction complex (EJC)



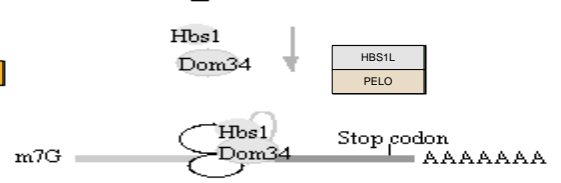
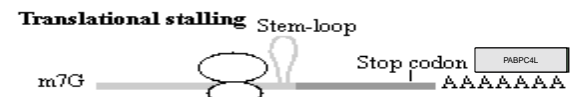
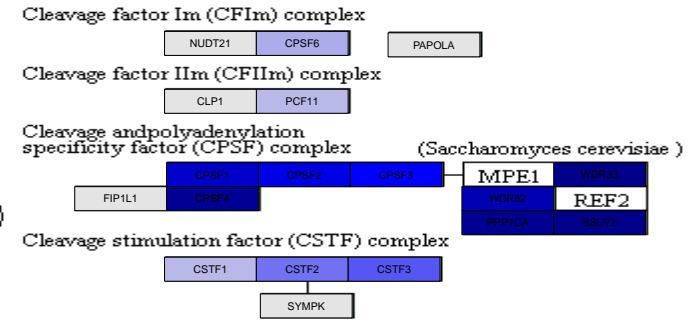
Transiently interacting factors



pre-mRNA RNA polymerase II



pre-mRNA 3'-end processing machinery



Nonstop decay (NSD)

Nonsense-mediated decay (NMD)

No-go decay (NGD)

mRNA_surveillance_pathway group 4

Cap binding complex (CBC)

NCBP1
NCBP2

Exon-junction complex (EJC)

UPF3B			ACIN1
RBM8A	CASC3	SAP18	RNPS1
MAGOH	EIF4A3	PNN	ALYREF

Transiently interacting factors

NXF1	DDX39B	SRRM1
NXT1	PYM1	

pre-mRNA RNA polymerase II

5'-end capping
RNMT
RNGTT

m7G

Splicing

Spliceosome

CBC m7G

CFIm CPSF
CFIIIm CstF

3'-end processing

Cleavage
Poly(A) addition

EJC complex

CBC m7G

Upf3

Aberrant RNAs

Polyadenylation by TRAMP complex

BCL2L3-PABPN1

Nuclear exosome
RNA degradation

Export

SRm160
Pinin

RNA transport

Nuclear Pore complex (NPC)

pre-mRNA 3'-end processing machinery

Cleavage factor Im (CFIm) complex

NUDT21	CPSF6	PAPOLA
--------	-------	--------

Cleavage factor IIIm (CFIIIm) complex

CLP1	PCF11
------	-------

Cleavage and polyadenylation specificity factor (CPSF) complex

(*Saccharomyces cerevisiae*)

CPSF1	CPSF2	CPSF3	MPE1	WDR33
PIP1L1	CPSF4		WDR82	REF2
			PPP1CA	SSU72

Cleavage stimulation factor (CSTF) complex

CSTF1	CSTF2	CSTF3
SYMPK		

Nucleus

Cytoplasm

Ref/Aly

Ribosome binding

CBC m7G

60S
40S

Ribosome

EJC

AAAAAAA

Recognition of PTC (premature termination codon)

CBC m7G

PTC

EJC

Upf3

Stop codon

AAAAAAA

Assembly of the surveillance complex

CBC m7G

eRF3
eRF1

Upf1
Upf2
Upf3

eRF1
EJC

Stop codon

AAAAAAA

Decapping
Deadenylation
Cytoplasmic exosome
Ski complex

Nonsense-mediated decay (NMD)

RNA degradation

Translational stalling

Stem-loop

m7G

Stop codon

AAAAAAA

Hbs1

Dom34

Hbs1

Dom34

Stop codon

AAAAAAA

Cytoplasmic exosome
Ski7

No-go decay (NGD)

Recognition of empty A site

m7G

Lacking a stop codon

AAAAA

Ski7

m7G

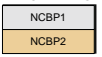
AAAAAA

Cytoplasmic exosome

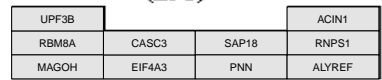
Nonstop decay (NSD)

mRNA_surveillance_pathway group 5

Cap binding complex (CBC)



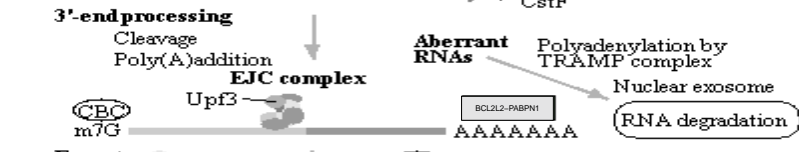
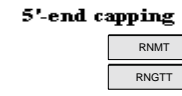
Exon-junction complex (EJC)



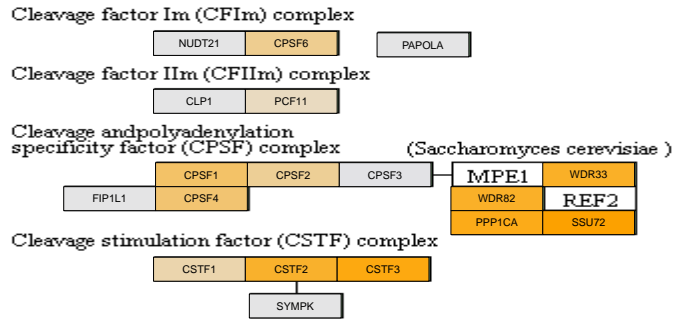
Transiently interacting factors



pre-mRNA RNA polymerase II

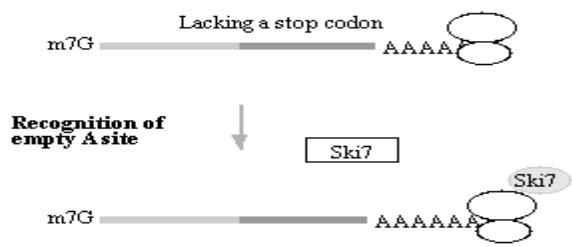
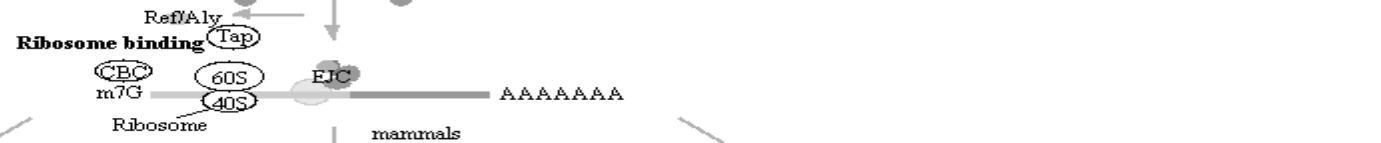


pre-mRNA 3'-end processing machinery

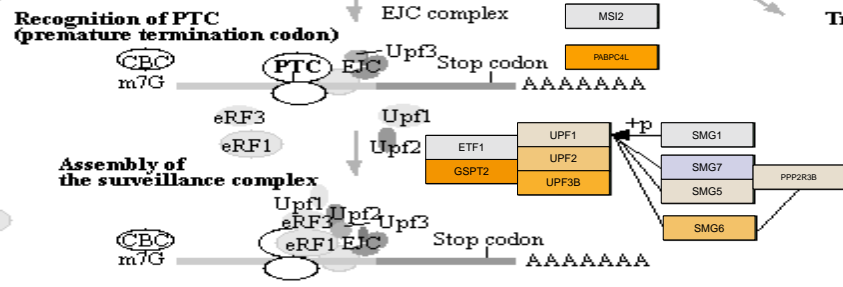


Nucleus

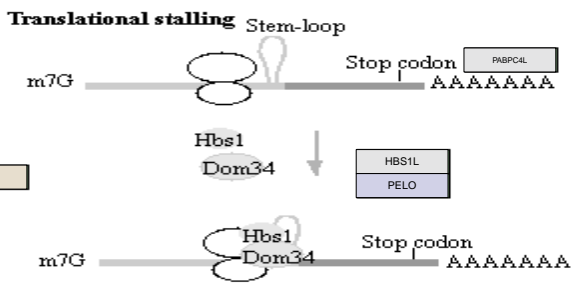
Cytoplasm



Nonstop decay (NSD)



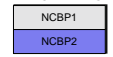
Nonsense-mediated decay (NMD)



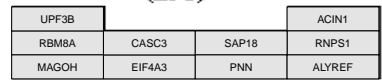
No-go decay (NGD)

mRNA_surveillance_pathway group 6

Cap binding complex (CBC)



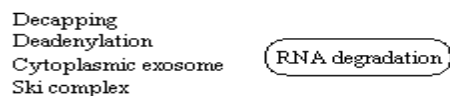
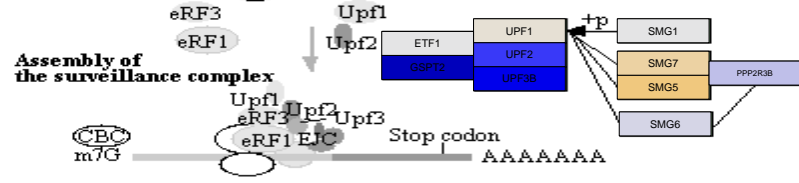
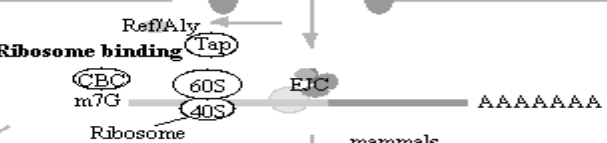
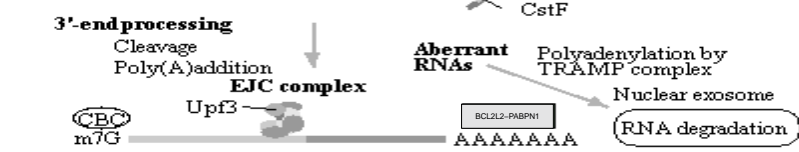
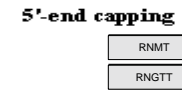
Exon-junction complex (EJC)



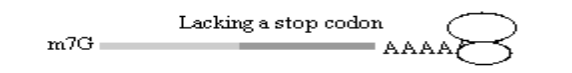
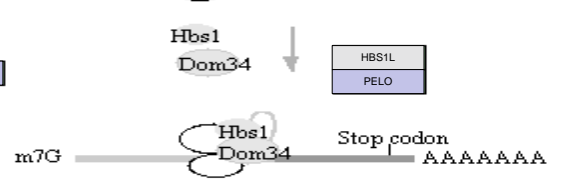
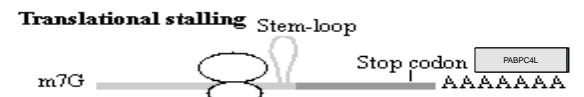
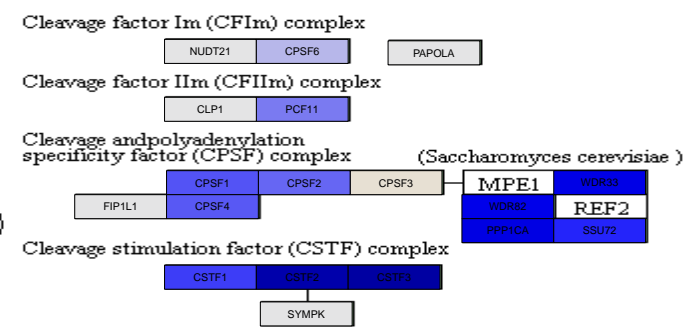
Transiently interacting factors



pre-mRNA RNA polymerase II



pre-mRNA 3'-end processing machinery



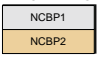
Nonstop decay (NSD)

Nonsense-mediated decay (NMD)

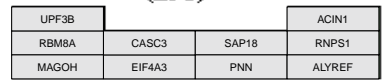
No-go decay (NGD)

mRNA_surveillance_pathway group 7

Cap binding complex (CBC)



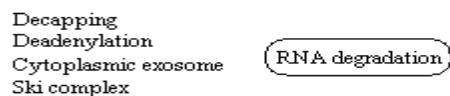
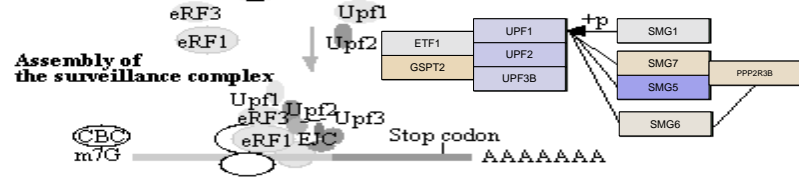
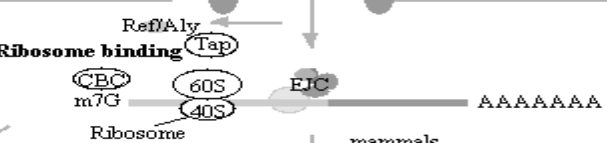
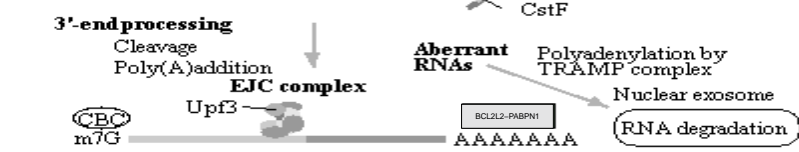
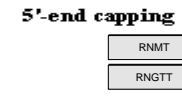
Exon-junction complex (EJC)



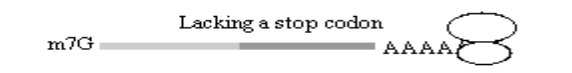
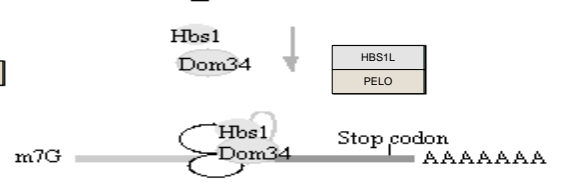
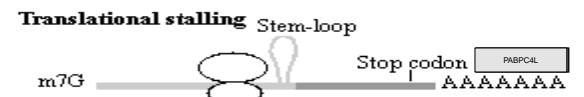
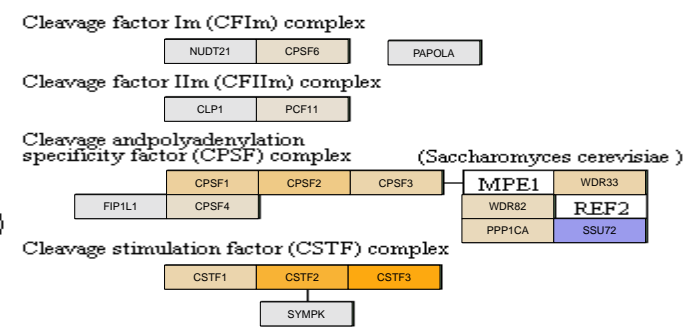
Transiently interacting factors



pre-mRNA RNA polymerase II



pre-mRNA 3'-end processing machinery



Nonstop decay (NSD)

Nonsense-mediated decay (NMD)

No-go decay (NGD)

mRNA_surveillance_pathway group 8

Cap binding complex (CBC)

NCBP1
NCBP2

Exon-junction complex (EJC)

UPF3B			ACIN1
RBM8A	CASC3	SAP18	RNPS1
MAGO8	EIF4A3	PNN	ALYREF

Transiently interacting factors

NXF1	DDX39B	SRRM1
NXT1	PYM1	

pre-mRNA RNA polymerase II

5'-end capping
RNMT
RNGTT

m7G

Splicing

Spliceosome

CBC
m7G

CFIm
CPSF
CFIIIm
CstF

3'-end processing

Cleavage
Poly(A) addition

EJC complex

CBC
m7G

Aberrant RNAs

Polyadenylation by TRAMP complex

Nuclear exosome
RNA degradation

Export

SRm160
Pinin

Tap

RNA transport

Nuclear Pore complex (NPC)

pre-mRNA 3'-end processing machinery

Cleavage factor Im (CFIm) complex

NUDT21	CPSF6	PAPOLA
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Cleavage factor IIIm (CFIIIm) complex

CLP1	PCF11
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Cleavage and polyadenylation specificity factor (CPSF) complex

(*Saccharomyces cerevisiae*)

CPSF1	CPSF2	CPSF3	MPE1	WDR33
PIP1L1	CPSF4		WDR82	REF2
			PPP1CA	SSU72

Cleavage stimulation factor (CSTF) complex

CSTF1	CSTF2	CSTF3
SYMPK		

Nucleus

Cytoplasm

Ref/Aly

Ribosome binding

CBC
m7G

60S
40S

Ribosome

EJC

AAAAAAA

Recognition of PTC (premature termination codon)

CBC
m7G

PTC

EJC

Upf3

Stop codon

AAAAAAA

Assembly of the surveillance complex

CBC
m7G

Upf1

Upf2

Upf3

Stop codon

AAAAAAA

Decapping
Deadenylation
Cytoplasmic exosome
Ski complex

Nonsense-mediated decay (NMD)

RNA degradation

Translational stalling

Stem-loop

m7G

Stop codon

AAAAAAA

Hbs1

Dom34

HBS1L
PELO

m7G

Stop codon

AAAAAAA

Hbs1

Dom34

Ski7

No-go decay (NGD)

Cytoplasmic exosome

Recognition of empty A site

m7G

AAAAA

Ski7

m7G

AAAAAA

Cytoplasmic exosome

Nonstop decay (NSD)