RAMA UNIVERSITY

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FACULTY OF ENGINEERING &TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

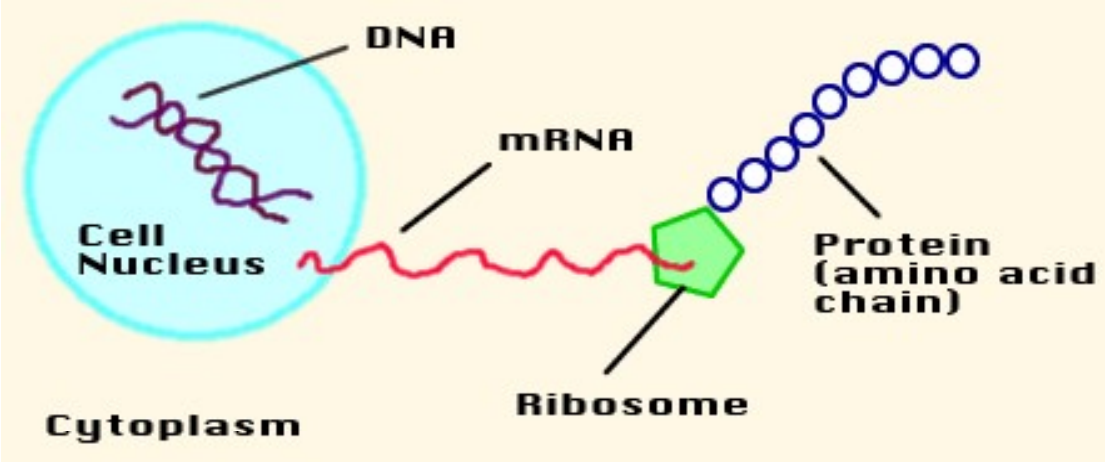
Types of RNA

In all prokaryotic and eukaryotic organisms, three main classes of RNA molecules exist-

1)Messenger RNA(m RNA)
2)Transfer RNA (t RNA)
3)Ribosomal RNA (r RNA) The other are –

- small nuclear RNA (SnRNA),
- micro RNA(mi RNA) and
- small interfering RNA(Si RNA) and
- heterogeneous nuclear RNA (hnRNA).

Messenger RNA (m-RNA)



- Comprises only 5% of the RNA in the cell
- Most heterogeneous in size and base sequence
- All members of the class function as messengers carrying the information in a gene to the protein synthesizing machinery

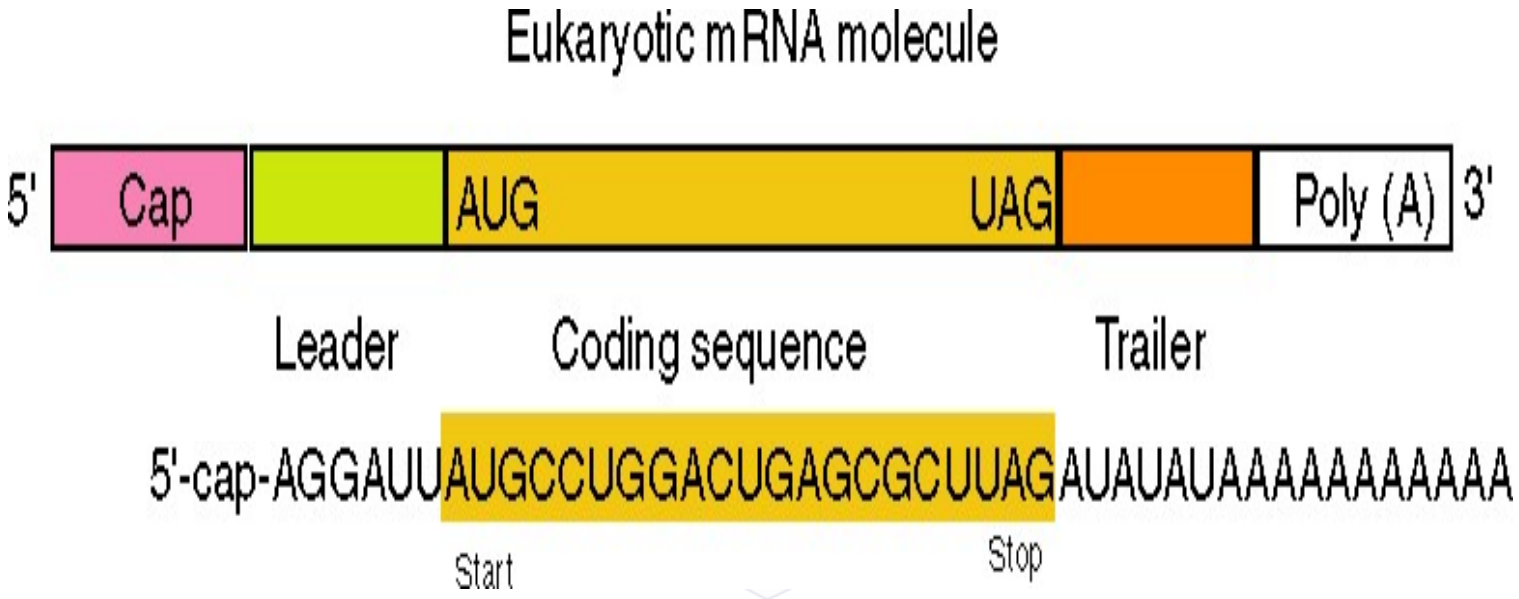
Structural Characteristics of m-RNA

- The 5’ terminal end is capped by 7-methyl guanosine triphosphate cap.
- The cap is involved in the recognition of mRNA by the translating machinery
- It stabilizes m RNA by protecting it from 5’ exonuclease

Structural Characteristics of m-RNA(contd.)

- The 3'end of most m-RNAs have a polymer of Adenylate residues(20-250)
- The tail prevents the attack by 3' exonucleases
- Histones and interferons do not contain poly A tails
- On both 5' and 3' end there are non coding sequences which are not translated (NCS)
- The intervening region between non coding sequences present between 5' and 3' end is called coding region. This region encodes for the synthesis of a protein.

Structural Characteristics of m-RNA



5’ cap and 3’ tail impart stability to m RNA by protecting from specific exo nucleases.

Structural Characteristics of m-RNA(Contd.)

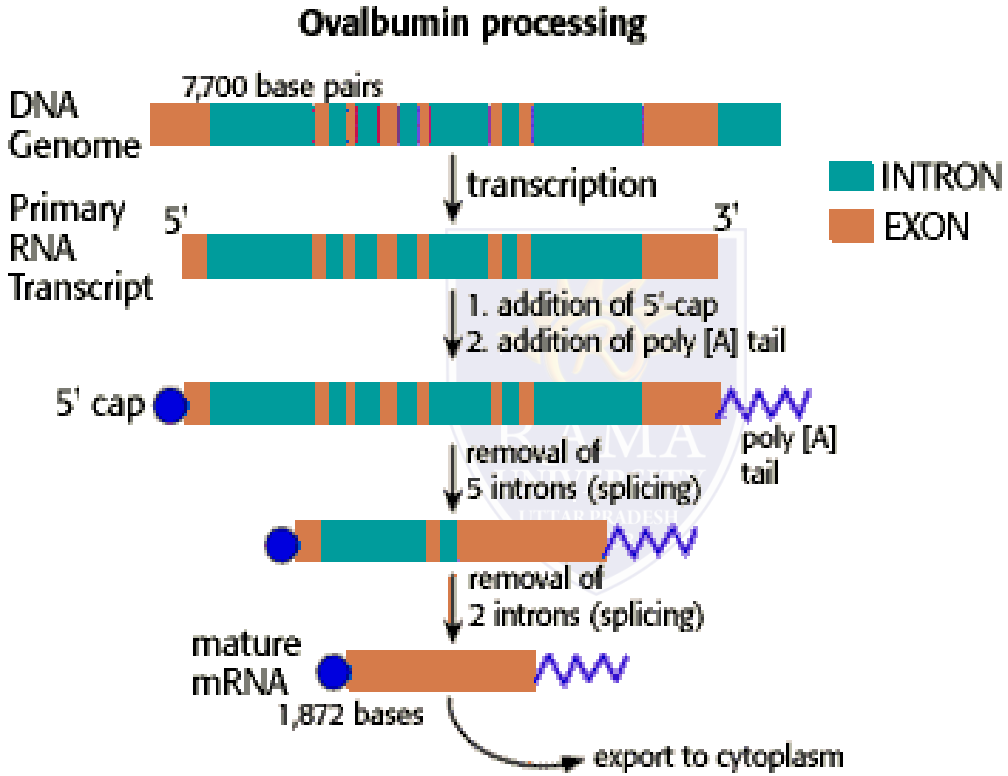
- The m- RNA molecules are formed with the help of DNA template during the process of transcription.
- The sequence of nucleotides in m RNA is complementary to the sequence of nucleotides on template DNA.
- The sequence carried on m -RNA is read in the form of codons.
- A codon is made up of 3 nucleotides
- The m-RNA is formed after processing of heterogeneous nuclear RNA

Heterogeneous nuclear RNA (hnRNA)

- In mammalian nuclei , hnRNA is the immediate product of gene transcription
- The nuclear product is heterogeneous in size (Variable) and is very large.
- Molecular weight may be more than $10^{7,}$ while the molecular weight of m RNA is less than 2x 10^{6}
- 75 % of hnRNA is degraded in the nucleus, only 25% is processed to mature

m RNA

Heterogeneous nuclear RNA (hnRNA)



- Mature m –RNA is formed from primary transcript by capping, tailing, splicing and base modification.