

RNAs

23/01/2024

Thymine - $\text{CH}_3 + \text{Uracil}$

Why does RNA have Uracil & DNA does not?
Cytosine \rightleftharpoons Uracil

↳ can undergo spontaneous deamination to uracil. \rightarrow changes in structure.

Hence, genetic code changes.

\Rightarrow Repair system cannot differentiate between altered C and preexisting U.

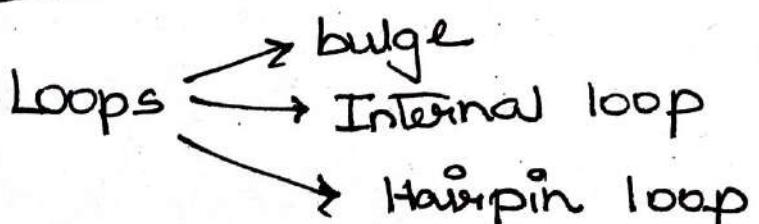
Double helical RNA!

loop-y structures

Wobble base pairs

G:U base pair. \rightarrow weak bonding, because of (str. sim.)!

↳ can be found only when most of the bps are joined \rightarrow not found in pure G-U strand.



① mRNA

- regulation of nuclear export
- protection against Degradation by exonucleases
- promotion of Translation.

② Modifications

- 5' end (before transcription) → capping with 7'methyl guanosine
(because it emerges first) (nucleus) ↳ cotranscriptionally
- 3' end → tailing with polyadenylate residues
(nucleus)
- Splicing → removal of introns & joining of exons
(nucleus)

Otherwise RNAase shortens it, and it also helps shuffling proteins to bind to RNA cap/tail 5' cap binds ribosome → helps in translation.

Riboswitch

bind small molecule ligand → and regulate expression of downstream gene.
→ cis → part of the same molecule (mRNA)

helps in translational shutdown (quick fix, immediate effect on existing mRNA)

microRNA acts on RNA & prevents translation
and

lnc RNA regulates gene expression as well
as translation, can also mediate
mRNA stability.

RNAase-P → RNA ~~as~~ acting as ribonuclease

RNAase-P → (conserved secondary base-pairing sequence)
(anti-sense strand removed)

enzymes cleaving pre-mRNA → (cutter)

enzymes cleaving mRNA → (cutter)

enzymes cleaving mRNA → (cutter)

cellular RNAi pathways (see A19) (silencing)

conjugation of siRNA at mRNA with dsRNA end

cleavage of target mRNA by cleavage

of siRNA by Dicer (nuclease)

at cleavage sites → double-stranded RNA

double-stranded RNA is then binds

to components of ribosomes to prevent

protein synthesis (translation)