RNA: current thoughts and updates

some of the various kinds of RNA...

The Three basics:

- Messenger RNA
- Transfer RNA
- Ribosomal RNA
Many Kinds of RNA... not complete

- snRNA (small nuclear)
- hnRNA (heterogenous nuclear)
- nc RNA (non-coding)
- μ RNA
- gRNA (guide)
- tm RNA (t and m like)
- siRNA (small interfering)
snRNA

- small nuclear (snRNA):
  - RNA splicing
  - removal of introns
  - maintenance of telomeres, chromosome ends
- Eukaryotic only

hnRNA

- heterogenous nuclear (hnRNA):
  - also called pre-mRNA
  - processing removes introns to yield mature mRNA
- Eukaryotic only
ncRNA

- non-coding RNA:
  - includes tRNA and rRNA
  - does not express other proteins, is part of protein manufacture
  - both (Eukaryotic + Prokaryotic)
µRNA

- microRNA:
  - controls gene activity
  - single stranded
  - small, 21-23 nucleotides
  - provides *down-regulation* of protein synthesis
  - both (Eukaryotic + Prokaryotic)

gRNA

- guide RNA:
  - provides editing
  - helps guide or mark the process
  - both (Eukaryotic + Prokaryotic)
**tmRNA**

- tRNA + mRNA-like RNA:
  - has both tRNA and mRNA like regions
  - rescue of stalled ribosome, functions include:
    - search for stalled ribosome
    - mark incomplete protein for removal and destruction
  - interesting D-loop structure
  - Only bacteria (so far)

**siRNA**

- small interfering RNA:
  - also called *short interfering* or *silencing*…
  - small, double stranded
  - part of a regulation pathway (RNAi):
    - RNA interferes or regulates synthesis of proteins
    - especially useful in research
  - may be important in viral response
  - Eukaryotic only
**Type of RNA** | **Functions**  
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Messenger RNA (mRNA) | Carries information specifying amino acid sequences of proteins from DNA to ribosomes.  
Transfer RNA (tRNA) | Serves as an adapter molecule in protein synthesis, translates mRNA codons into amino acids.  
Ribosomal RNA (rRNA) | Plays catalytic (ribozyme) roles and structural roles in ribosomes.  
Primary transcript | Serves as a precursor to mRNA, tRNA, or rRNA, before being processed by splicing or cleavage. Some intron RNA acts as a ribozyme, catalyzing its own splicing.  
Small nuclear RNA (snRNA) | Plays structural and catalytic roles in spliceosomes, the complexes of protein and RNA that splice pre-mRNA.  
SRP RNA | Is a component of the signal-recognition particle (SRP), the protein-RNA complex that recognizes the signal peptides of polypeptides targeted to the ER.  
Small nucleolar RNA ( snoRNA) | Aids in processing of pre-rRNA transcripts for ribosome subunit formation in the nucleolus.  
Small interfering RNA (siRNA) and microRNA (miRNA) | Are involved in regulation of gene expression.