Transfer RNA (tRNA)

There are some 32 different kinds of tRNA in a typical eukaryotic cell.

- Each is the product of a separate gene.
- They are small (~4S), containing 73-93 nucleotides.
- Many of the bases in the chain pair with each other forming sections of double helix.
- The unpaired regions form 3 loops.
- Each kind of tRNA carries (at its 3′ end) one of the 20 amino acids (thus most amino acids have more than one tRNA responsible for them).
- At one loop, 3 unpaired bases form an **anticodon**.
- Base pairing between the anticodon and the complementary codon on a mRNA molecule brings the correct amino acid into the growing polypeptide chain.

Small Nuclear RNA (snRNA)

Approximately a dozen different genes for snRNAs, each present in multiple copies, have been identified. The snRNAs have various roles in the processing of the other classes of RNA. For example, several snRNAs are part of the spliceosomes that participate in converting pre-mRNA into mRNA by excising the introns and splicing the exons.

Small Nucleolar RNA (snoRNA)

As the name suggests, these small (60–300 nucleotides) RNAs are found in the nucleolus where they are responsible for several functions:

- Some participate in making ribosomes by helping to cut up the large RNA precursor of the 28S, 18S, and 5.8S molecules.

- Others chemically modify many of the nucleotides in rRNA, tRNA, and snRNA molecules, e.g., by adding methyl groups to ribose.
- Some have been implicated in the alternative splicing of pre-mRNA to different forms of mature mRNA.
- One snoRNA serves as the template for the synthesis of telomeres.

In vertebrates, the snoRNAs are made from **introns** removed during RNA processing.

Noncoding RNA

Only messenger RNA encodes polypeptides. All the other classes of RNA, including types not mentioned here, are thus called noncoding RNA. Much remains to be learned about the function(s) of some of them. But, taken together, noncoding RNAs probably account for two-thirds of the transcription going on in the nucleus.

HYDROLYSIS OF NUCLEIC ACIDS.

Hydrolysis of Nucleic acids by selective methods can be achieved chemically or enzymatically.

Chemical method of hydrolysis:

ACID HYDROLYSIS:

RNA is relatively resistant to the effects of dilute acid, but gentle treatment of DNA with 1Mm Hcl leads to hydrolysis of purine glycosidic bonds and the loss of purine bases from the DNA without affecting the pyrimidine deoxyribose bonds or the phosphodiester bonds of the backbone. At other chemical conditions, selective removal of pyrimidine bases occurs. In most cases, both Nucleic acids can be hydrolysed to their constituent bases by the treatment with 72% perchloric acid ($HClo_4^-$) for 1hour. The resulting nucleic acid derivative which is devoid of purine bases is called **APURINIC ACID**; while that devoid of pyrimidine bases is called **APYRIMIDINIC ACID.**

ALKALI HYDROLYSIS:

DNA is not susceptible to alkaline hydrolysis. On the other hand, RNA is alkali labile and is readily hydrolyzed by dilute sodium hydroxide.

Enzymatic hydrolysis of Nucleic acids:

Enzymes that hydrolyse nucleic acids are called **NUCLEASES.**

Some nucleases can hydrolyse linkages between 2 adjacent nucleotides at internal positions in the DNA or RNA strand and proceed stepwise from that end. Such nucleases are called **ENDONUCLEASES. Another class of nucleases can hydrolyse only the terminal nucleotide linkage, some at the 5’ and others at the 3’ end; these are called** EXONUCLEASES.

DNases (deoxyribonucleases) acts only on DNA

RNases(ribonucleases) are specific for RNA.