

# Translation - mRNA → Protein

10/31/12

Genetic code:

4 nucleotides  $\rightarrow 4^3 = 64$   
20 amino acids



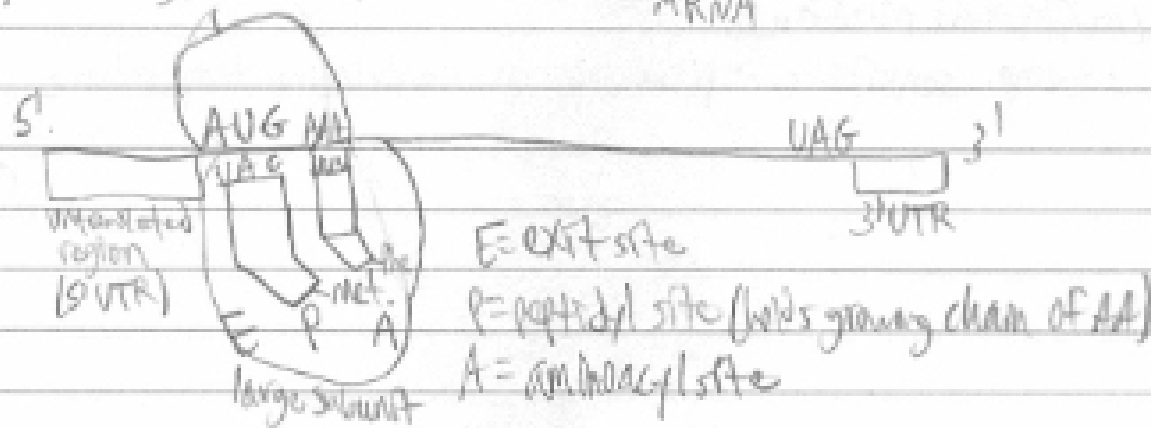
Genetic code is read 3 letters at a time and is not overlapping.

- not overlapping is evolutionarily favored
- redundant - multiple codons per amino acid
- not ambiguous
- \* Universal amongst all of life.

Functional - tRNA + rRNA work to translate mRNA

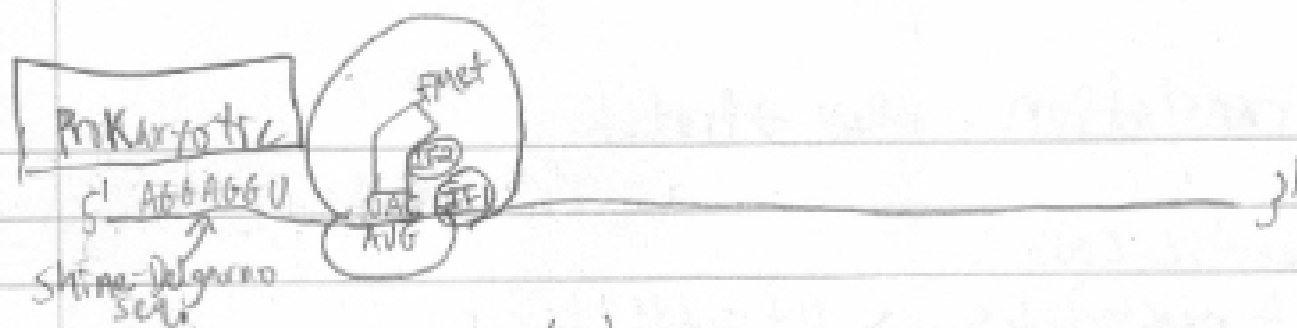
- 1<sup>o</sup> Structure of protein - polypeptide chain
- 2<sup>o</sup> -  $\alpha$  helix +  $\beta$ -sheets
- 3<sup>o</sup> - amino acid side chains involved in folding
- quaternary - multiple polypeptides together

5' of RNA corresponds to N-terminus of protein (3' = C-terminus)



Initiation - finding of start codon

Elongation -  
termination



IF3 - help keep (50S) (30S) large & small subunits apart

IF1 + IF2 - make sure only the initiator tRNA binds at the P-site



### Elongation

EF-Tu - binds to the next charged tRNA and brings it to A-site

EF-G - moves ribosome 3bp to move peptide chained tRNA to P-site

### Termination

RF1 (release factor) - recognizes UAA + UAG stop codons

RF2 -> UAA and UGA

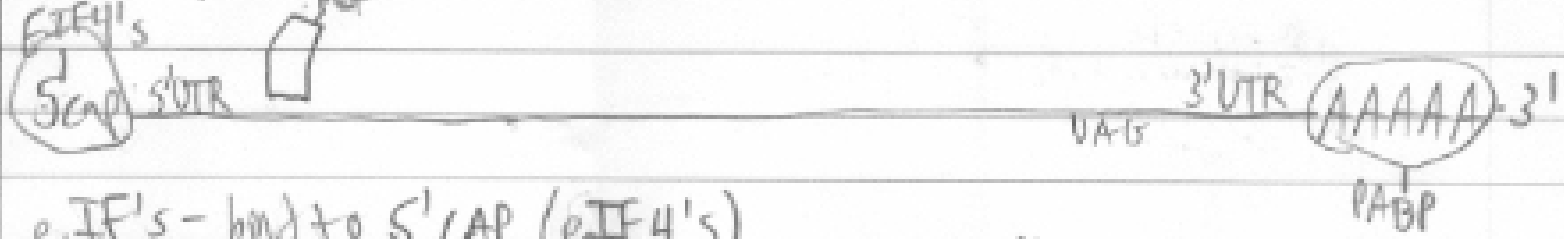
RF3 -> works in tandem with RF1 or 2

### Studying these processes in vitro

#### \*conditional mutants

- temp. sensitive - permissive vs. restrictive temperature

# Eukaryotic Translation



eIF's - bind to 5' CAP (eIF4's)

PABP - poly A binding proteins

