Question :- How much GTP/ATP will be utilized for the translation of <u>100</u> amino acid polypeptide chain ?

200 aa

= 300 ATP

= 300 GTP

= 100 ATP + 200 GTP

Answer :- Charging of 100 t-RNA ⟶ (100 ATP)

200 GTP

initiation - 1 GTP ⟶ 1 GTP

Elongation - 2 GTP ─┌─ (EF-Tu) GTP
                               └⟶ (EF-G)·GTP   ⟶ 99×2 <u>GTP</u>

Termination - 1 GTP

⟶ <u>1 GTP</u>

Rate of Translation

Prokaryotes - 20 aa/sec. $\rightarrow$ 1200 aa/min

Eukaryotes - 2-4 aa/sec.
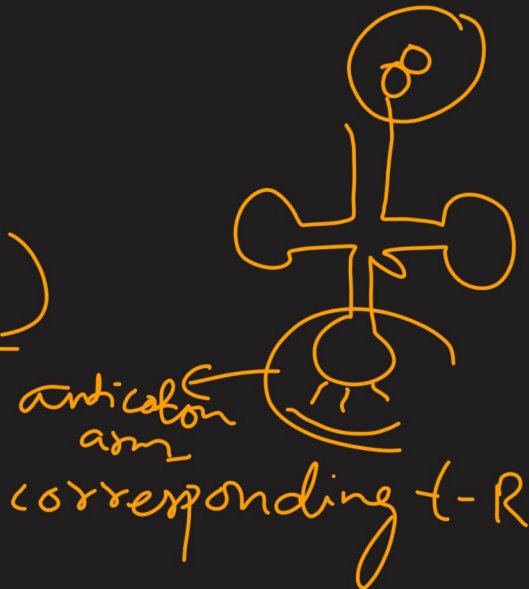
Fidelity of Translation (Proofreading)

charging t-RNA

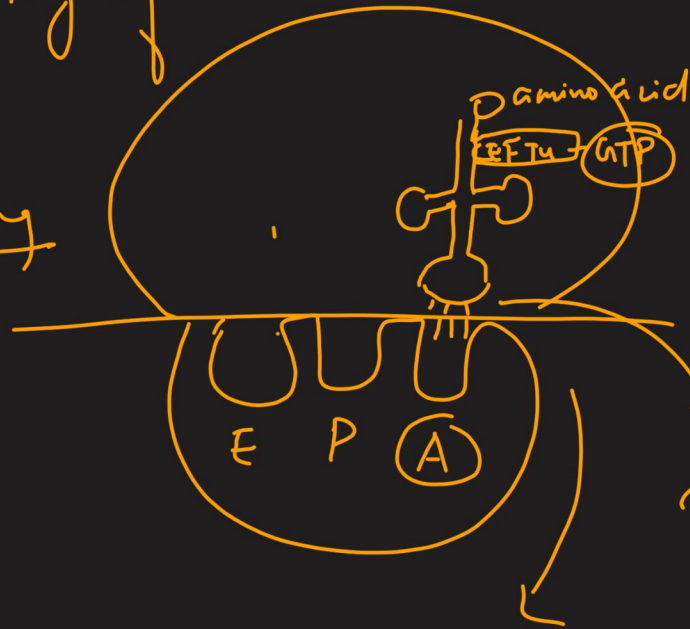1) linking of each amino acid to its corresponding t-RNA.

anticodon arm

aminoacyl - tRNA synthetase

Chemical Proofreading

2) Base pairing of codon and anticodon loop of t-RNA

Kinetic proofreading

amino acid

EF-Tu   GTP
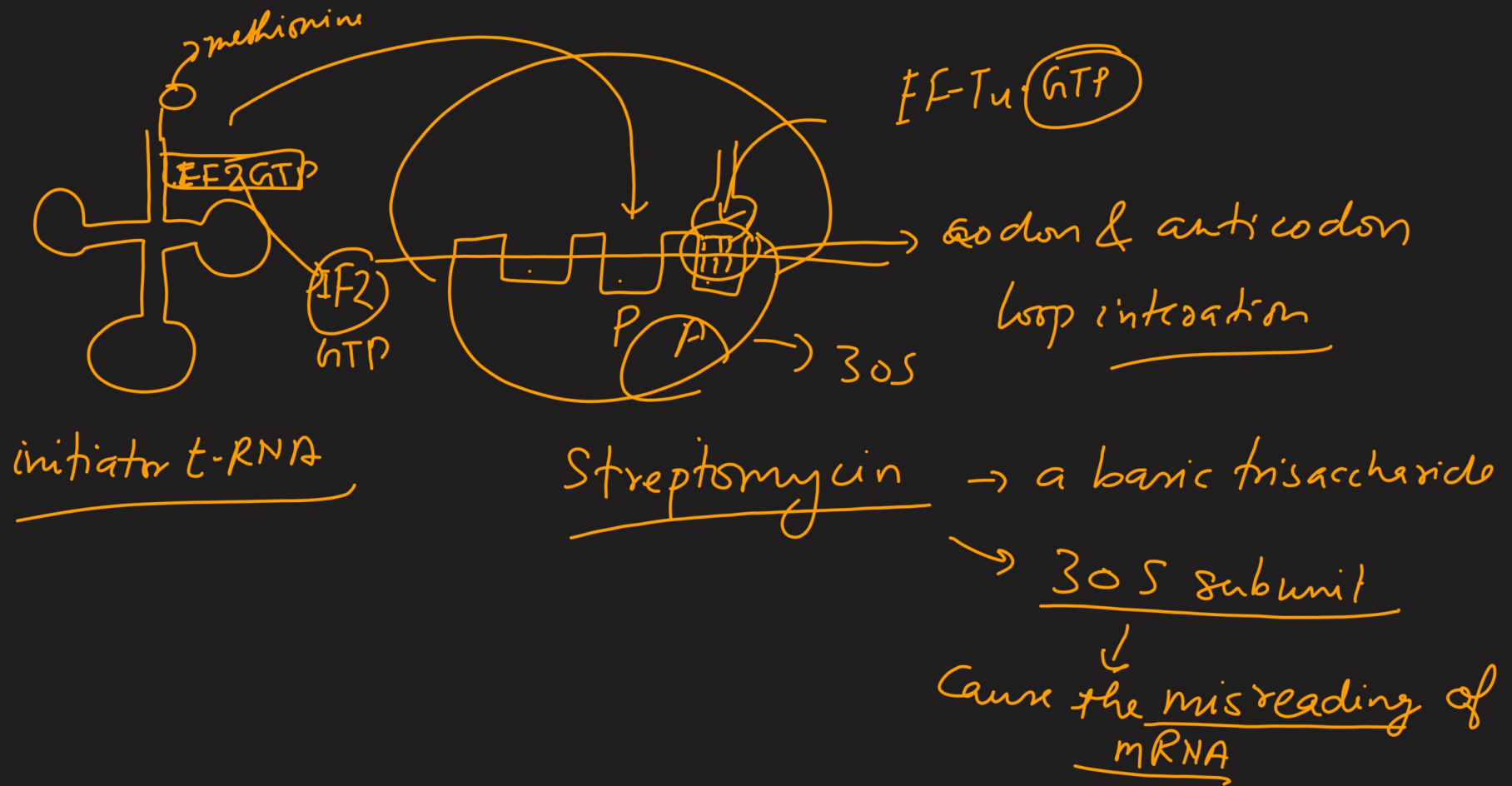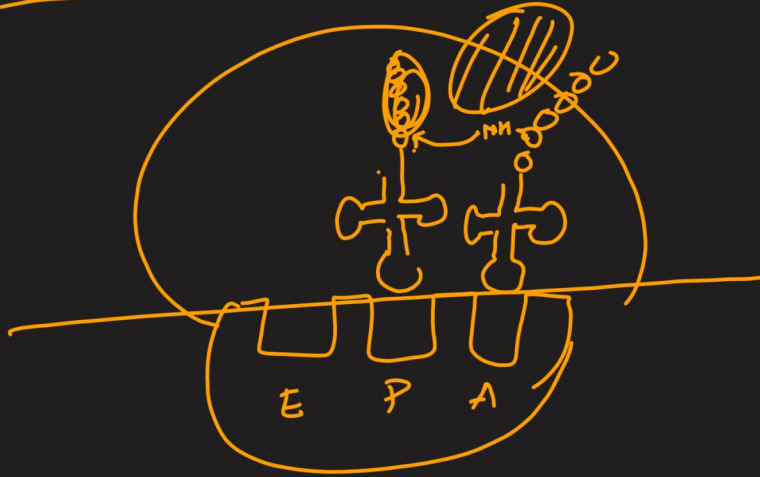
E   P   (A)

→ This interaction between codon and anticodon loop of f-RNA

If there will strong binding th, GTP will be hydrolyzed
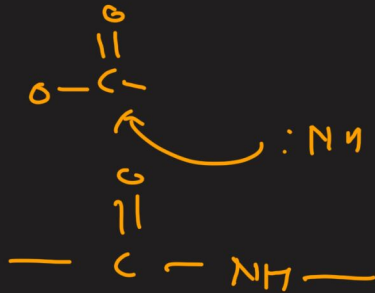
Inhibitors of Translation

methionine

EF-Tu (GTP)

EF2 GTP

IF2
GTP

→ codon & anticodon loop interaction

→ 30S

P   A

initiator t-RNA

Streptomycin → a basic trisaccharide

→ 30S subunit

↓

Cause the misreading of mRNA

Chloramphenicol → 50 S Subunit.

⑤ inhibit the peptidyl Transferase activity.

↓

inhibit the peptide bond formation.

E P A

$$O - \overset{\overset{O}{\|}}{C} \xleftarrow{} :NH$$

$$- \overset{\overset{O}{\|}}{C} - NH -$$

Tetracyclin

$\rightarrow$ 30 S subunit

interfere with aminoacyl - tRNA binding.