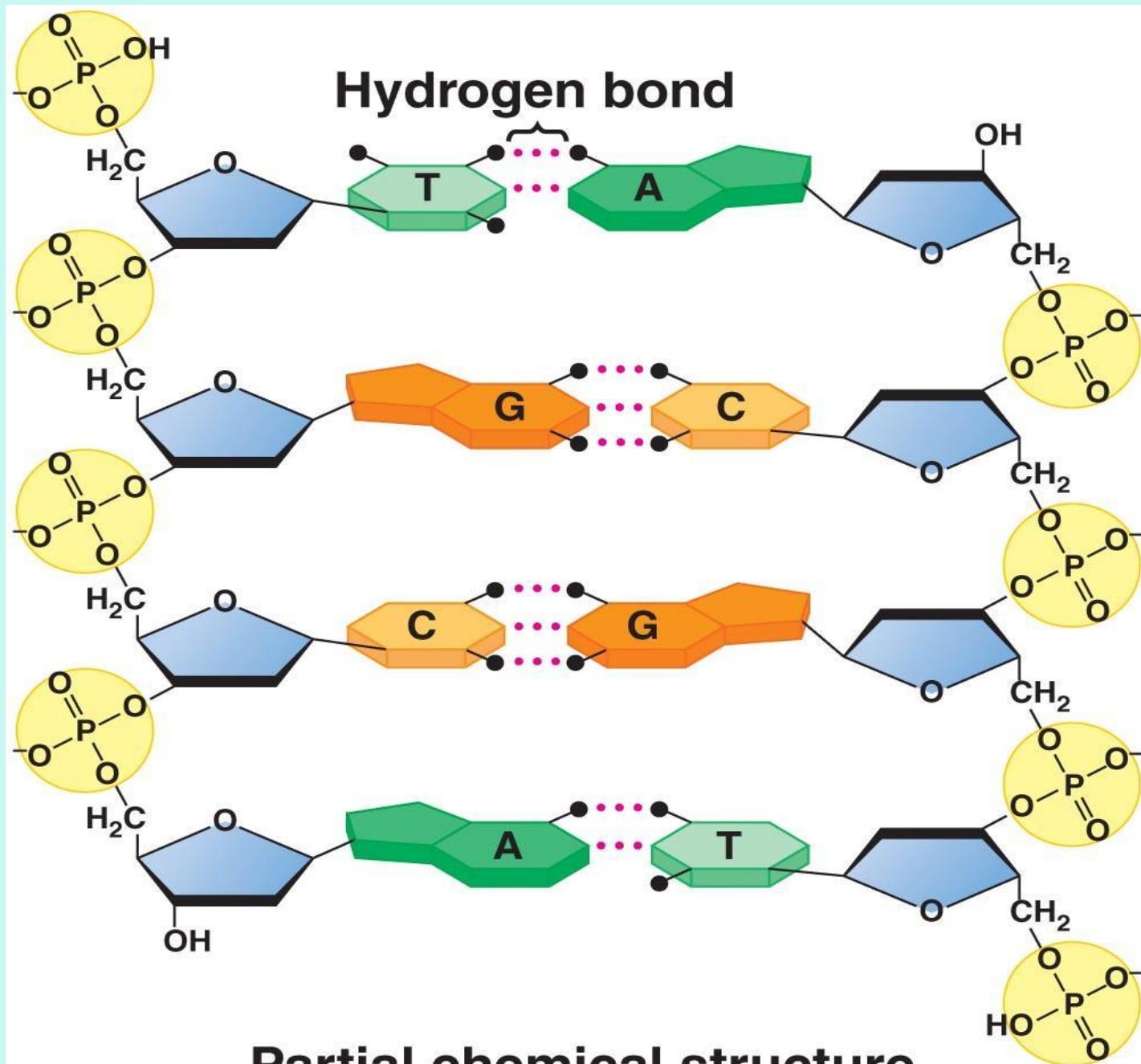
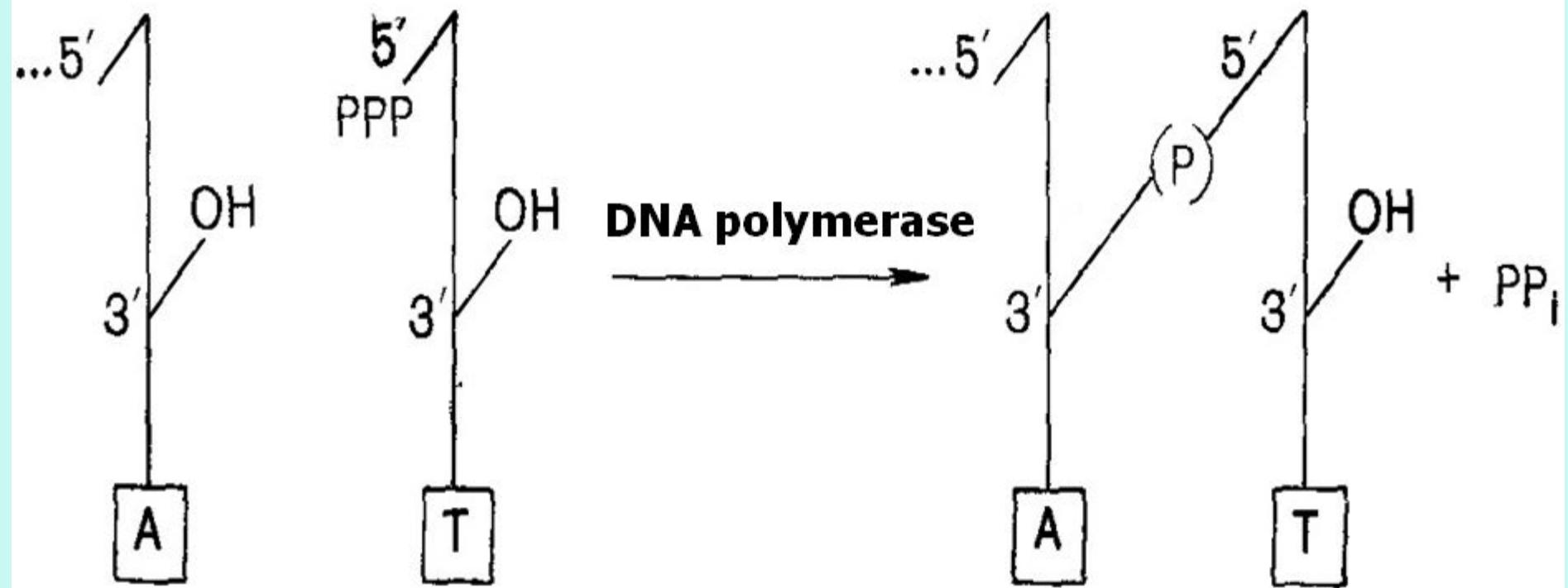


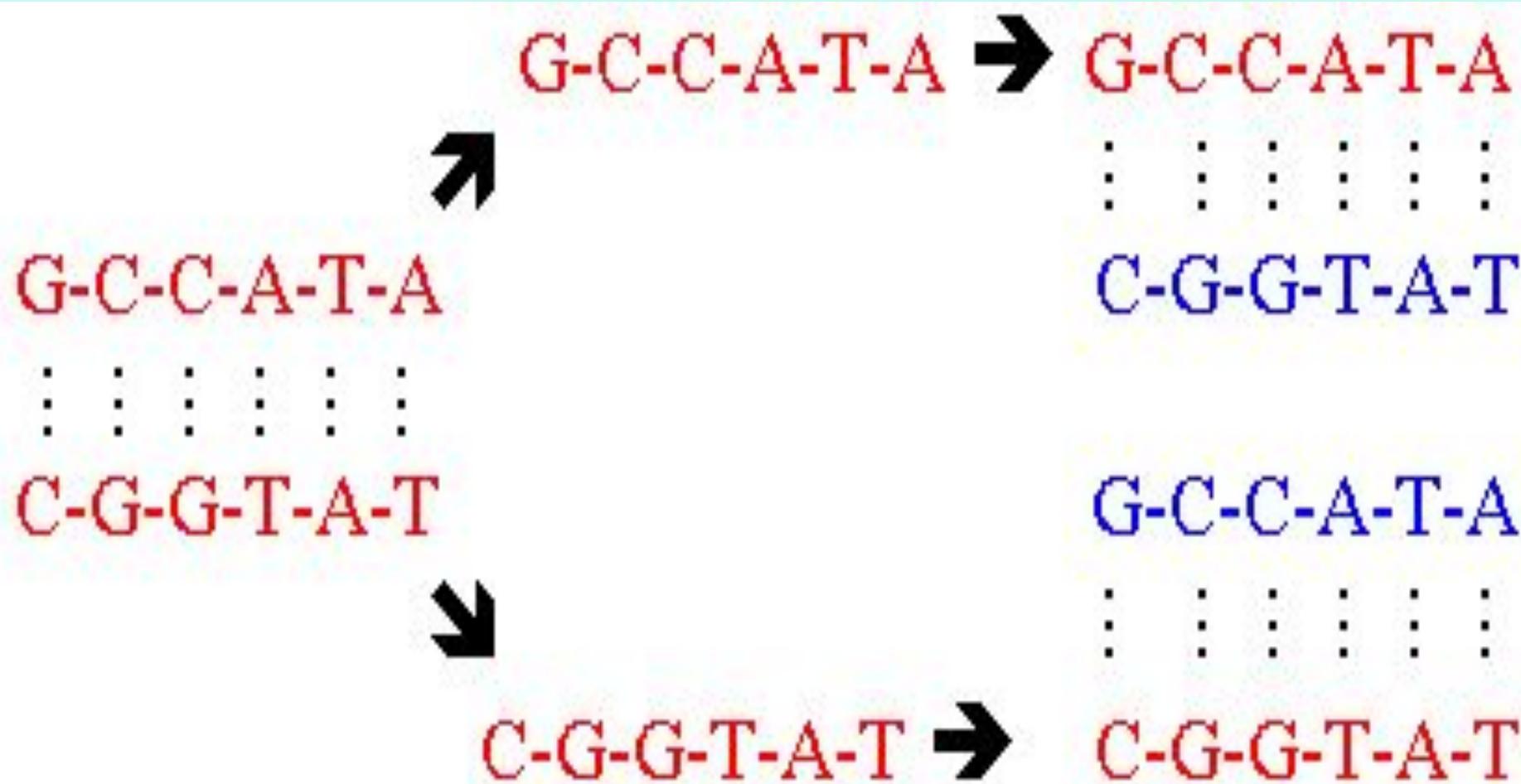
TEMPLATE BIOSYNTHESIS



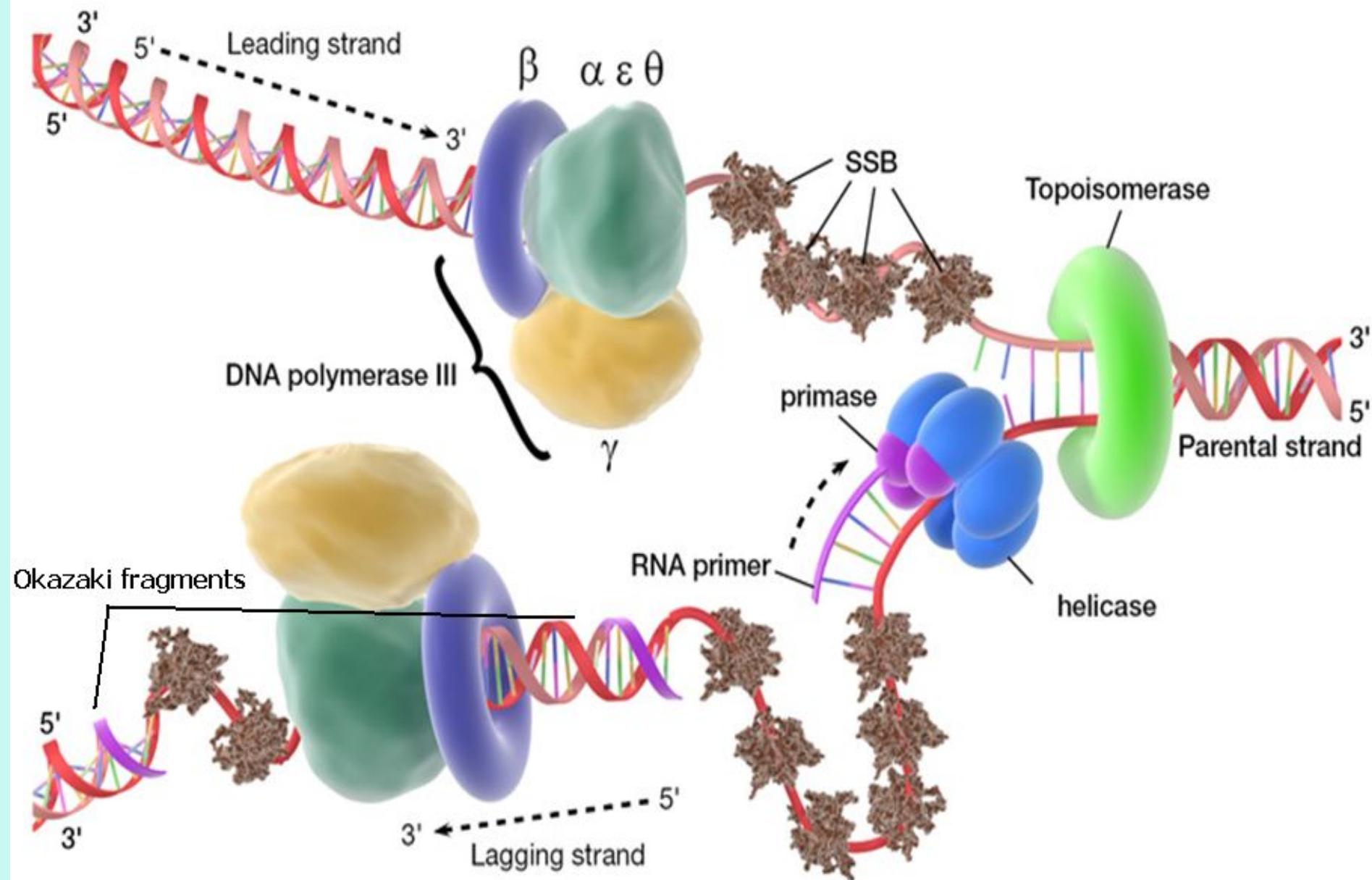
3'-5'-phosphodiester bond formation



DNA biosynthesis (homologous replication)

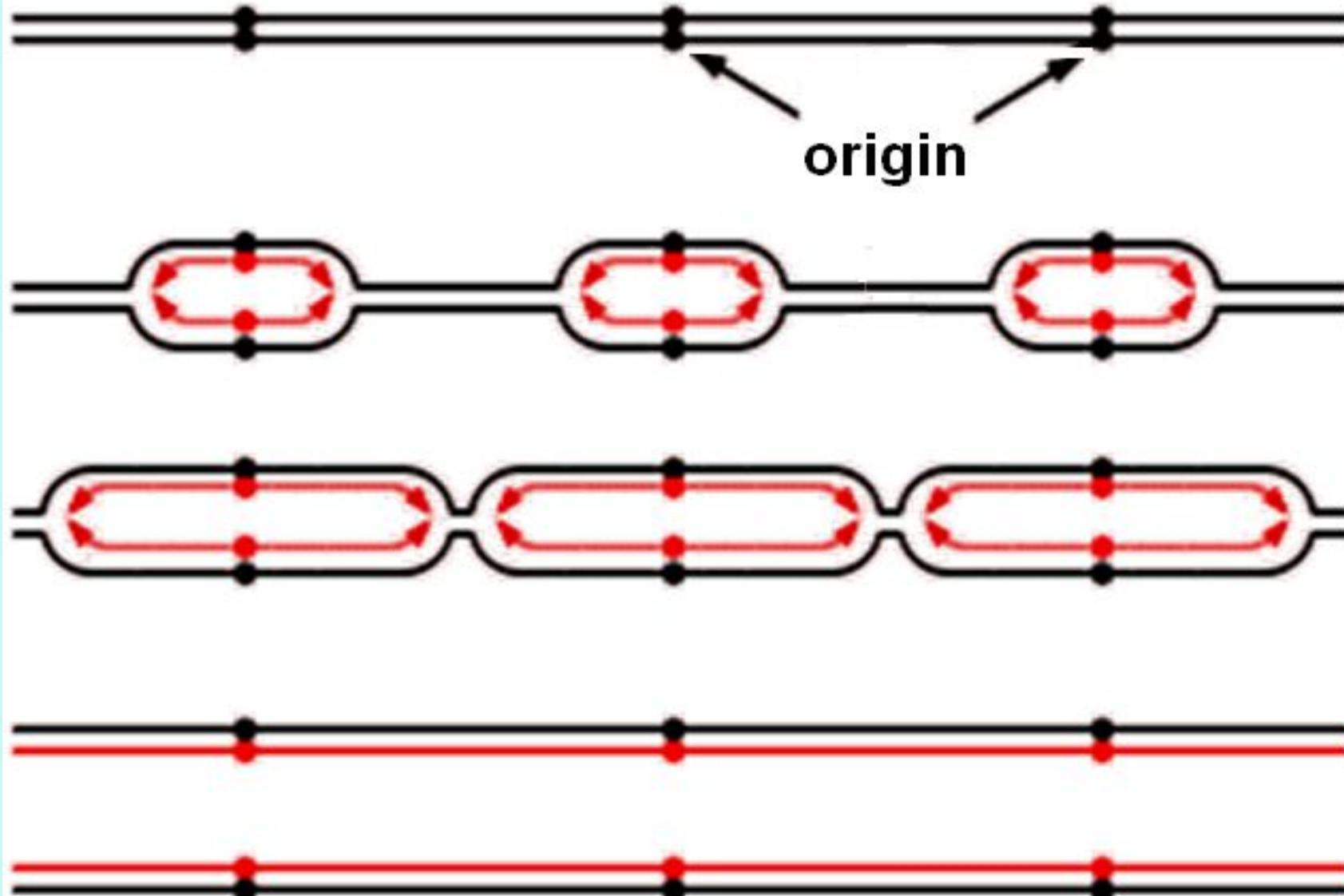


Replicative fork

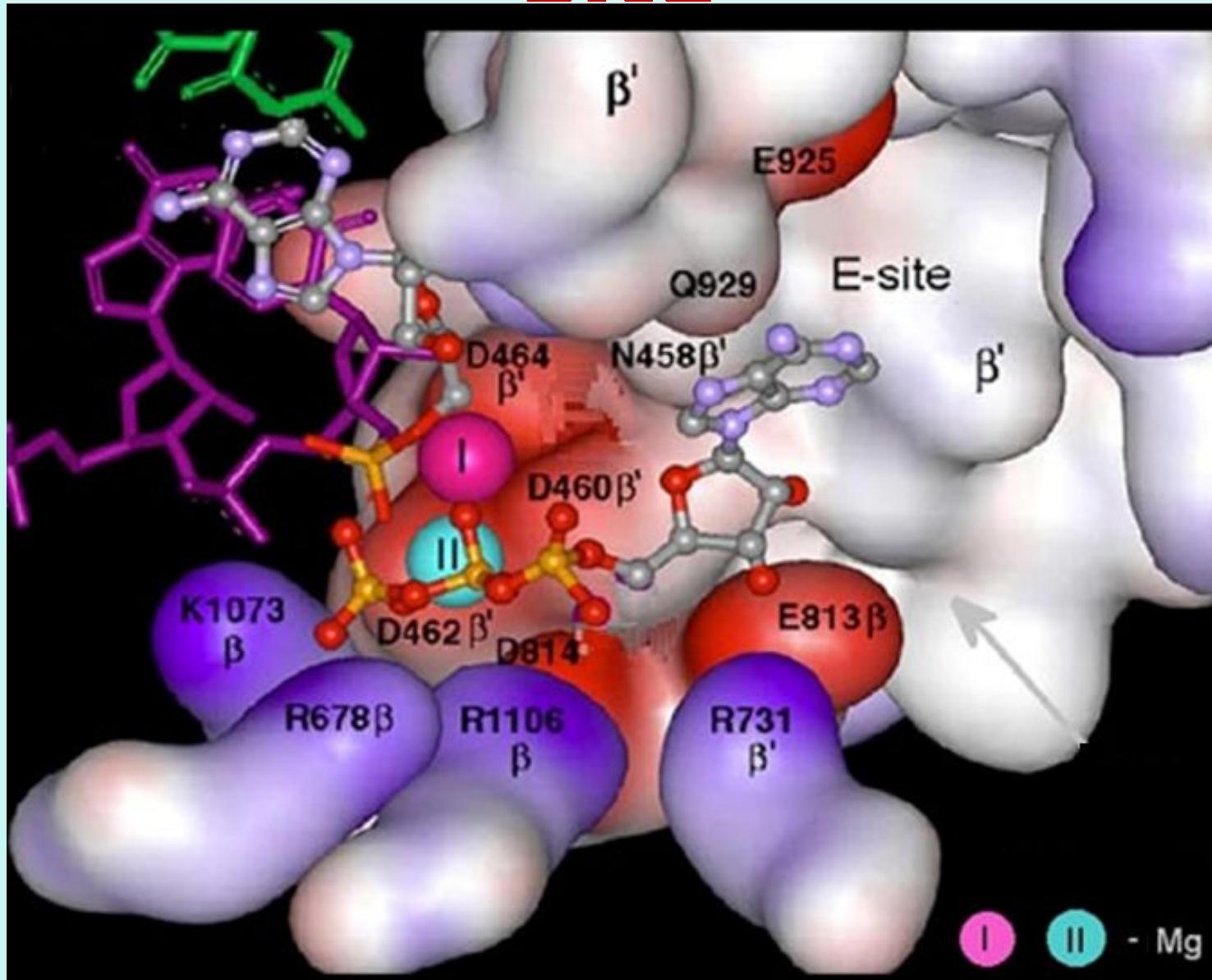


replicon

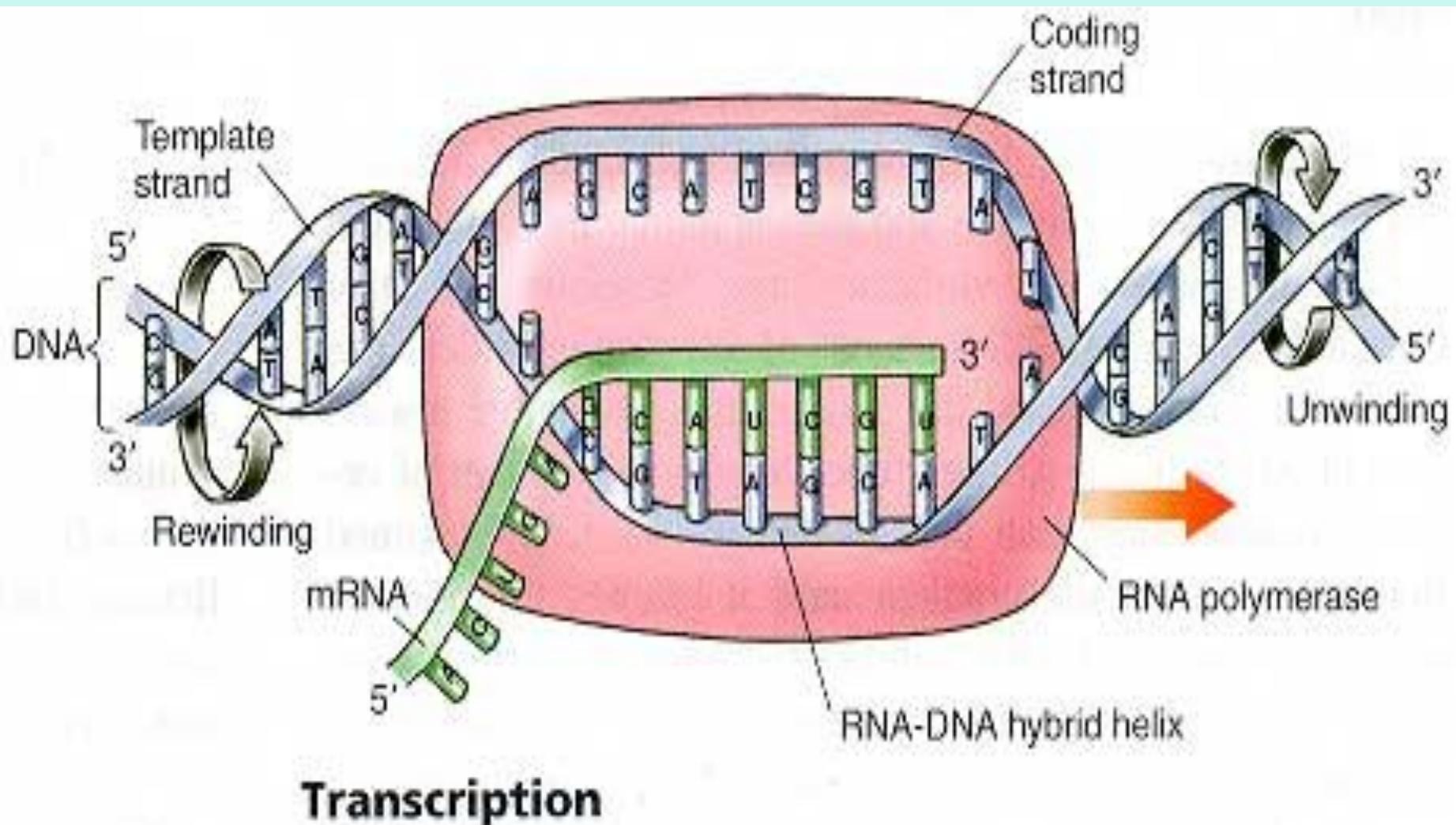
origin



RNA polymerase active site

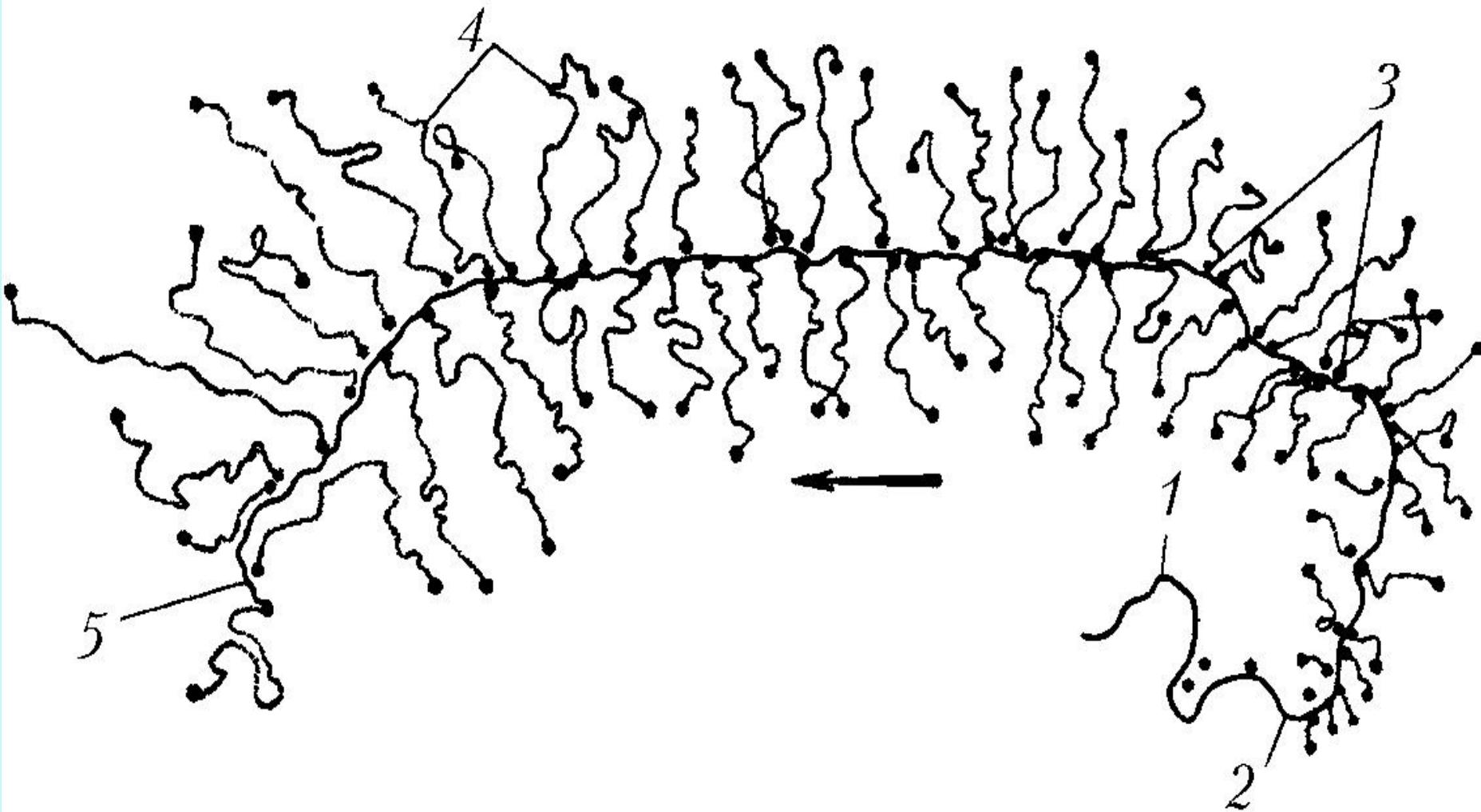


RNA synthesis on DNA template

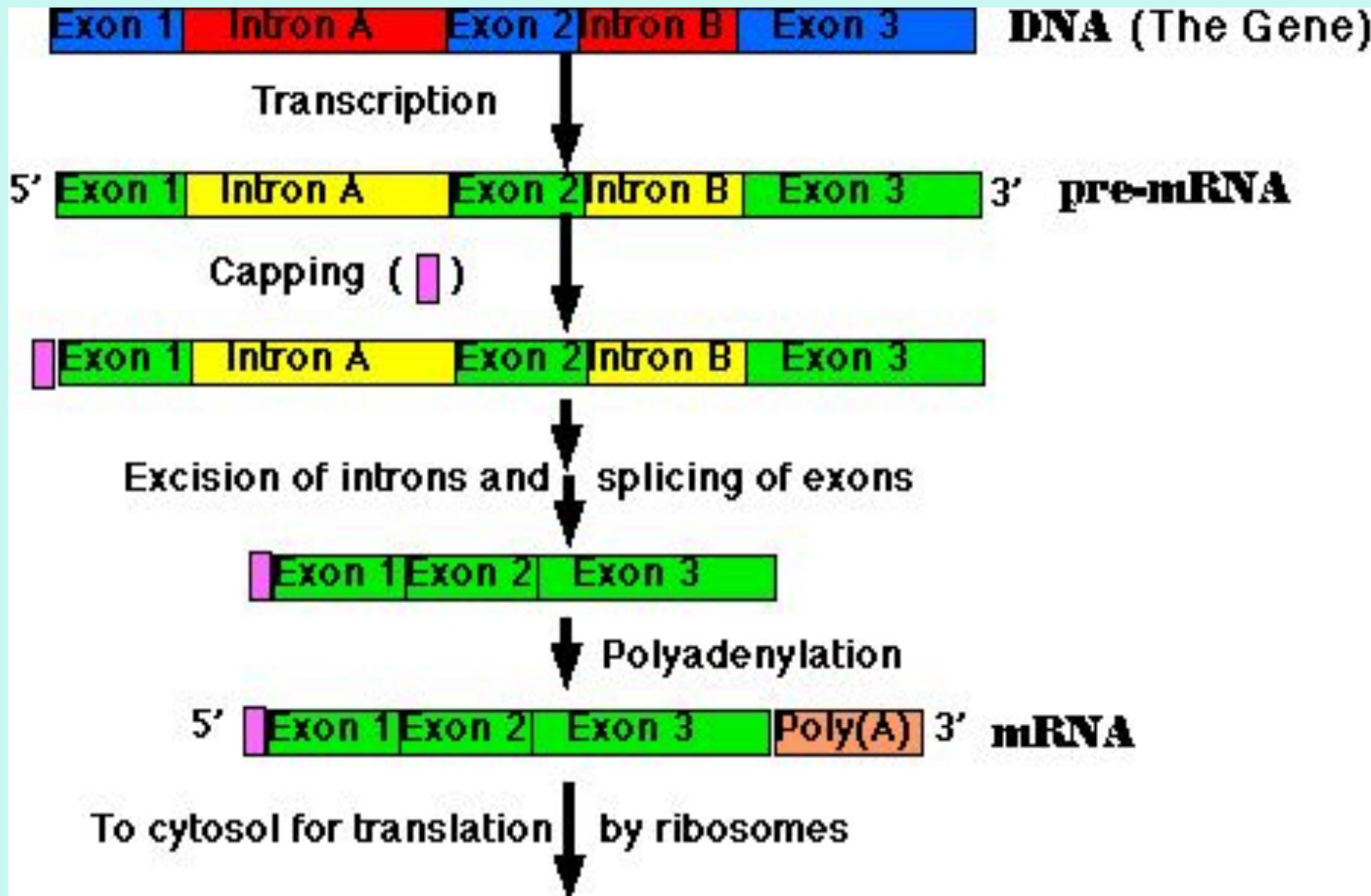


**polymerase;
4 - growing RNA chain; 5 - area
of termination.**

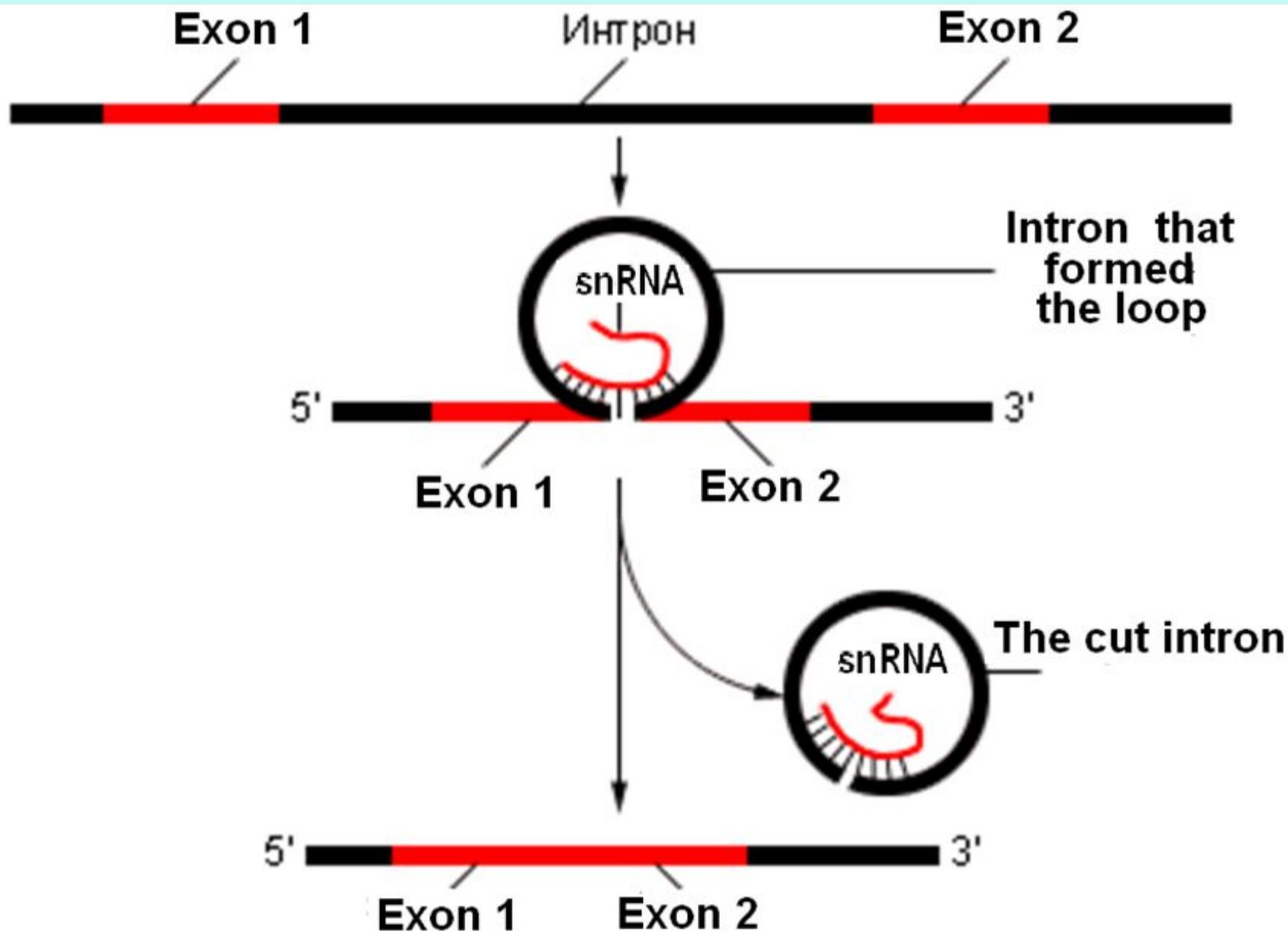
Arrow: direction of RNA polymerase



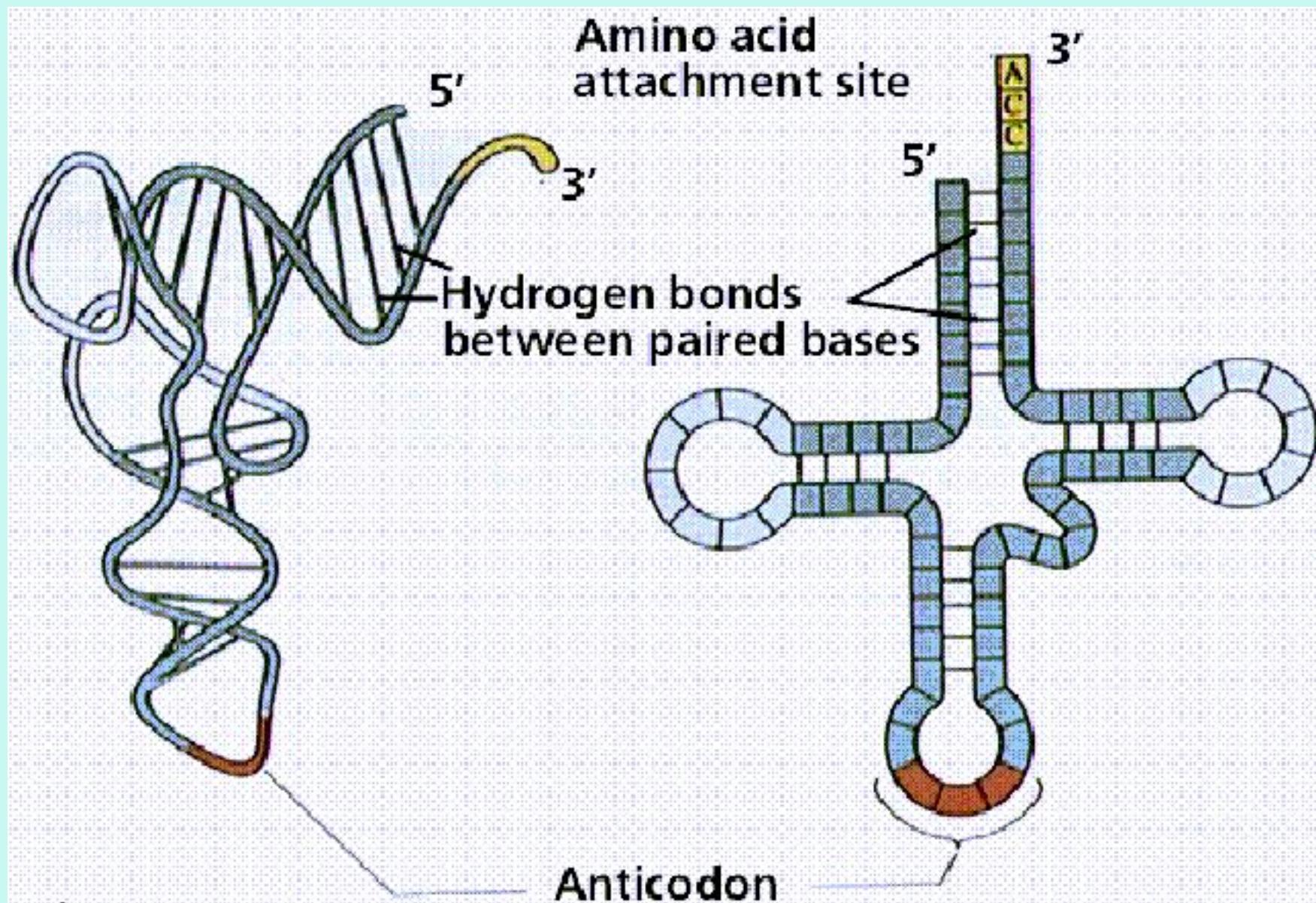
Processing of mRNA



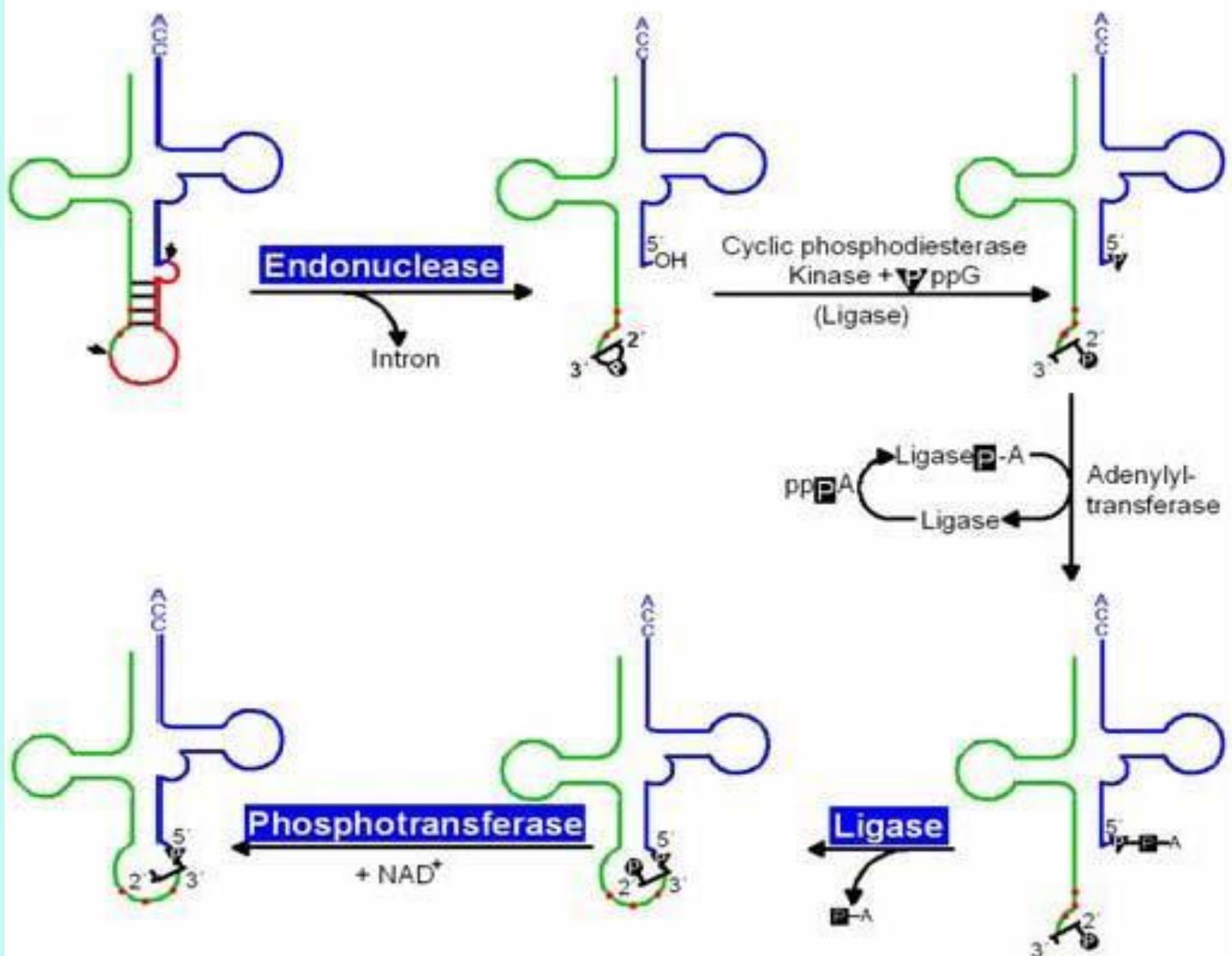
Splicing



tRNA



Processing of tRNA



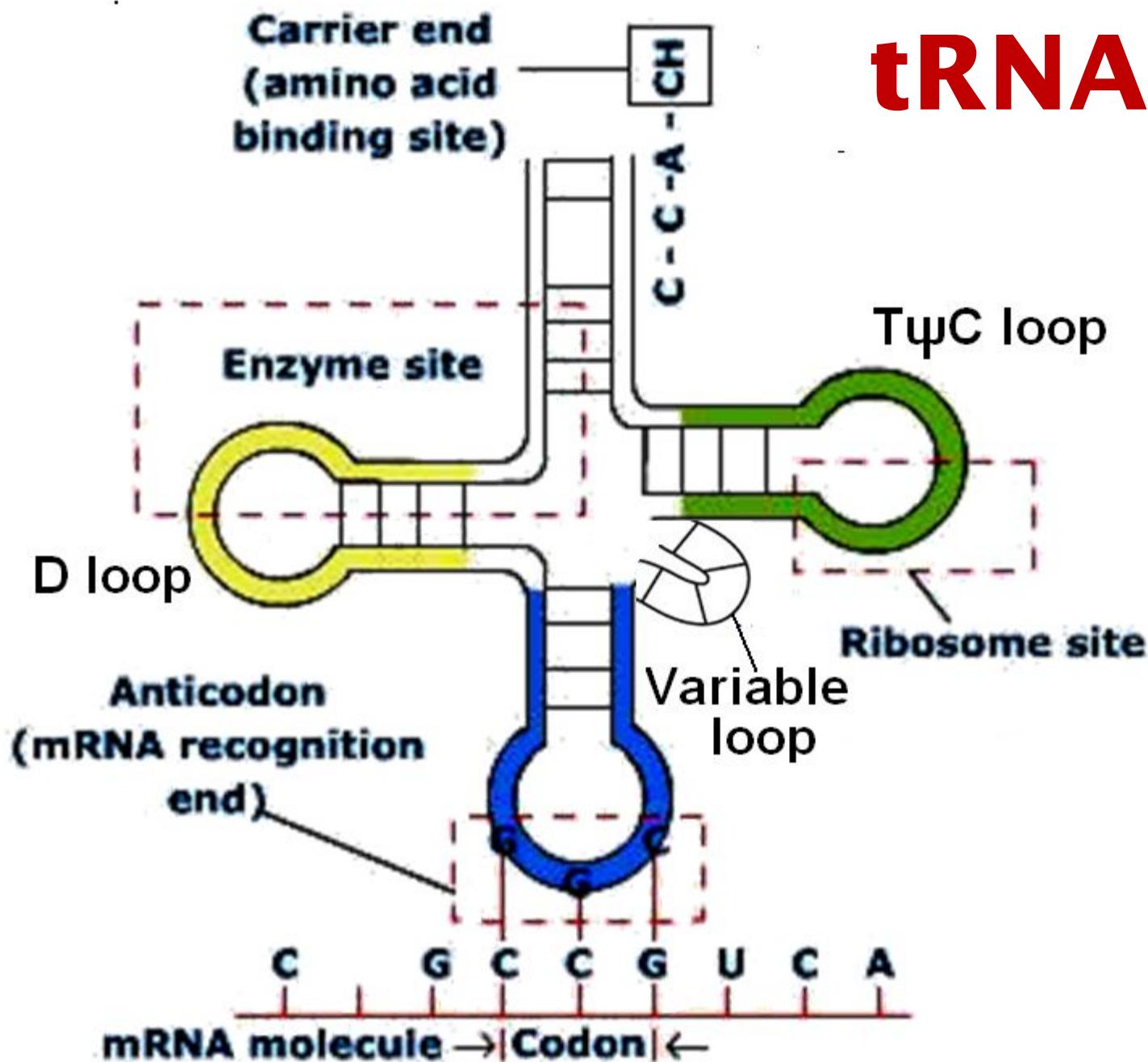
PROTEIN SYNTHESIS

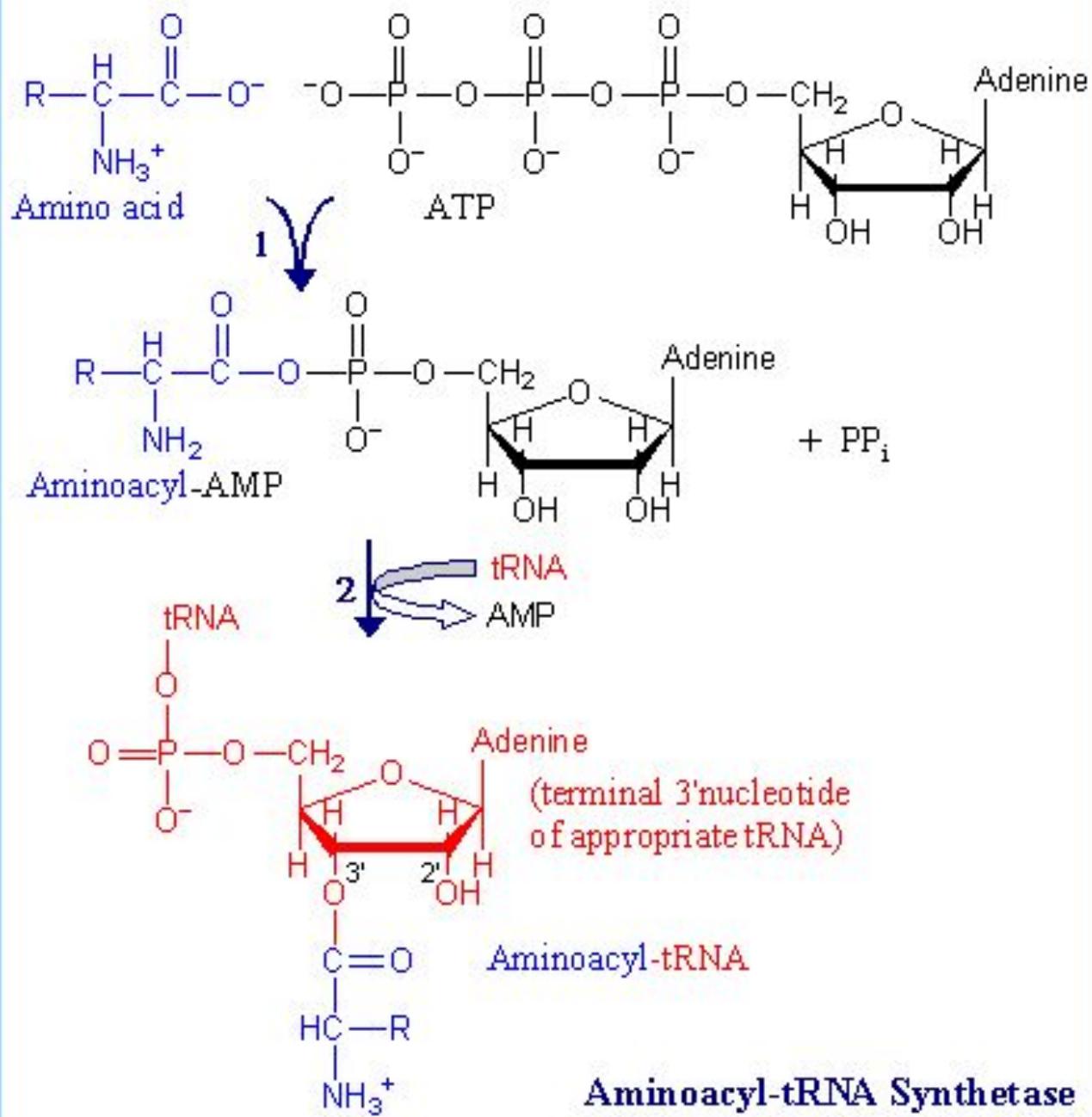
Genetic code

Second letter

	U	C	A	G		
First letter	UUU UUC UUA UUG	UCU UCC UCA UCG	UAU UAC UAA UAG	UGU UGC UGA UGG	Cysteine Stop codon Stop codon Tryptophan	U C A G
C	CUU CUC CUA CUG	CCU CCC CCA CCG	CAU CAC CAA CAG	CGU CGC CGA CGG	Arginine	U C A G
A	AUU AUC AUA AUG	ACU ACC ACA ACG	AAU AAC AAA AAG	AGU AGC AGA AGG	Serine Arginine	U C A G
G	GUU GUC GUA GUG	GCU GCC GCA GCG	GAU GAC GAA GAG	GGU GGC GGA GGG	Glycine	U C A G

tRNA





Mammalian
ribosome (80S)
(4.2×10^6 daltons)

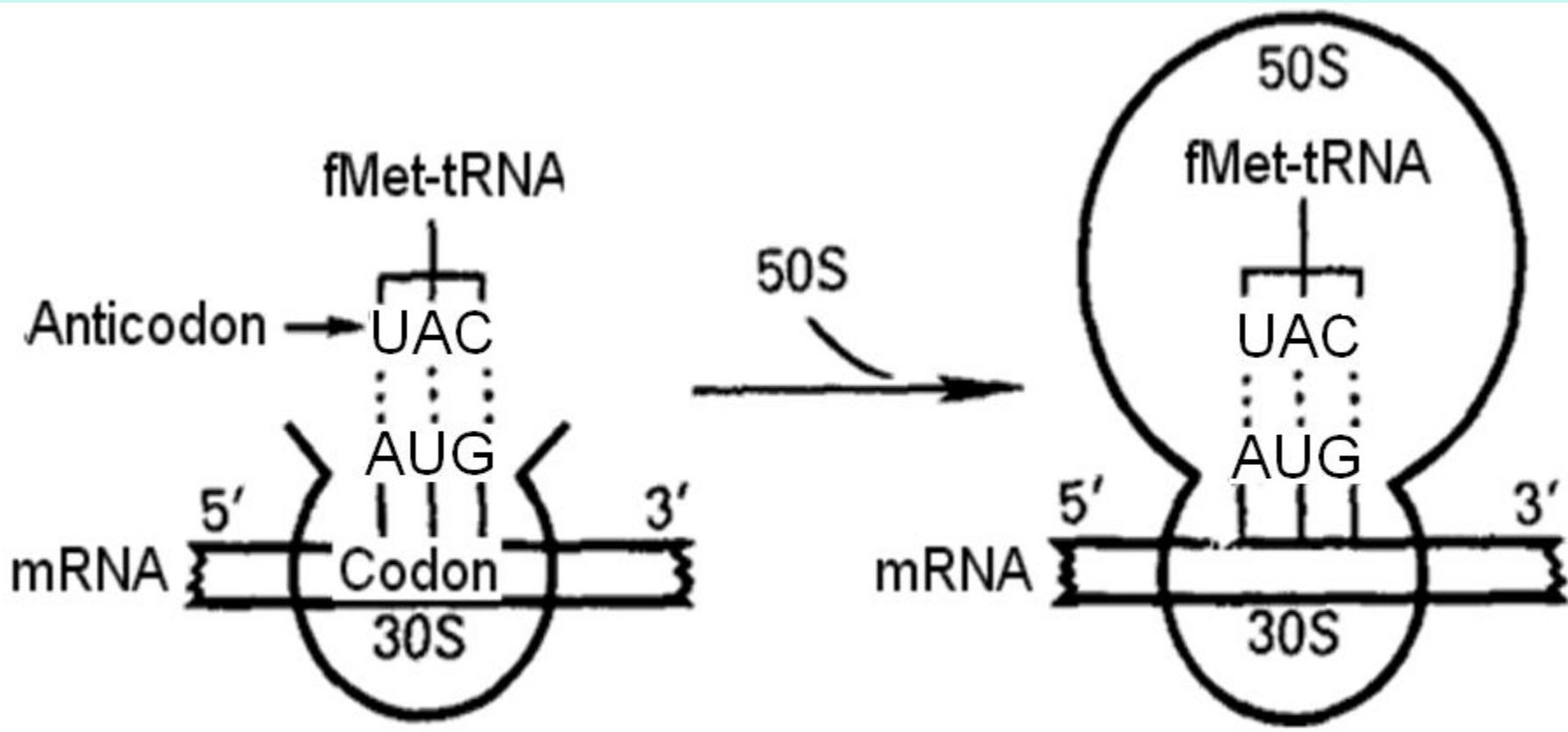


nt = nucleotides



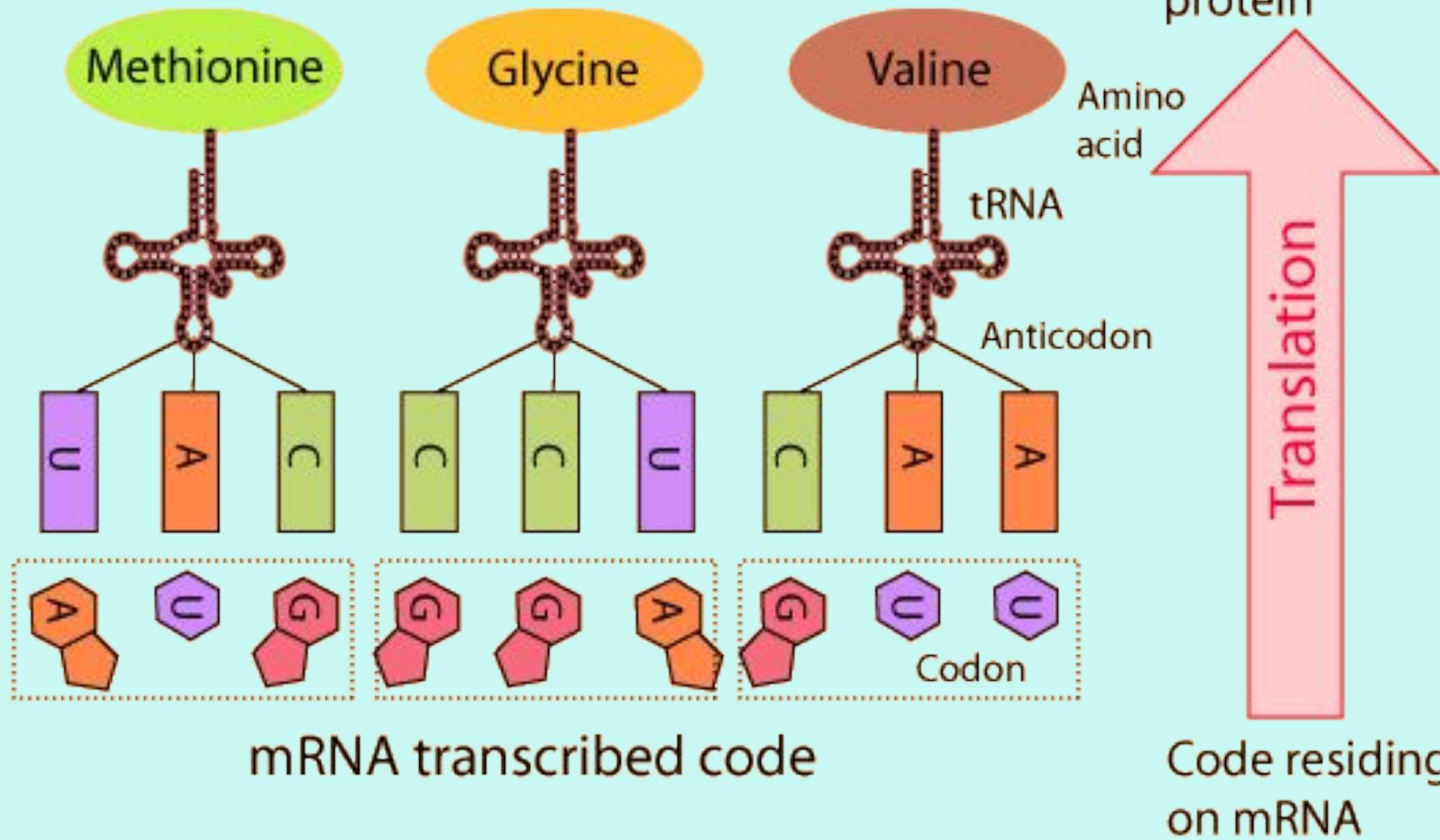
60S subunit

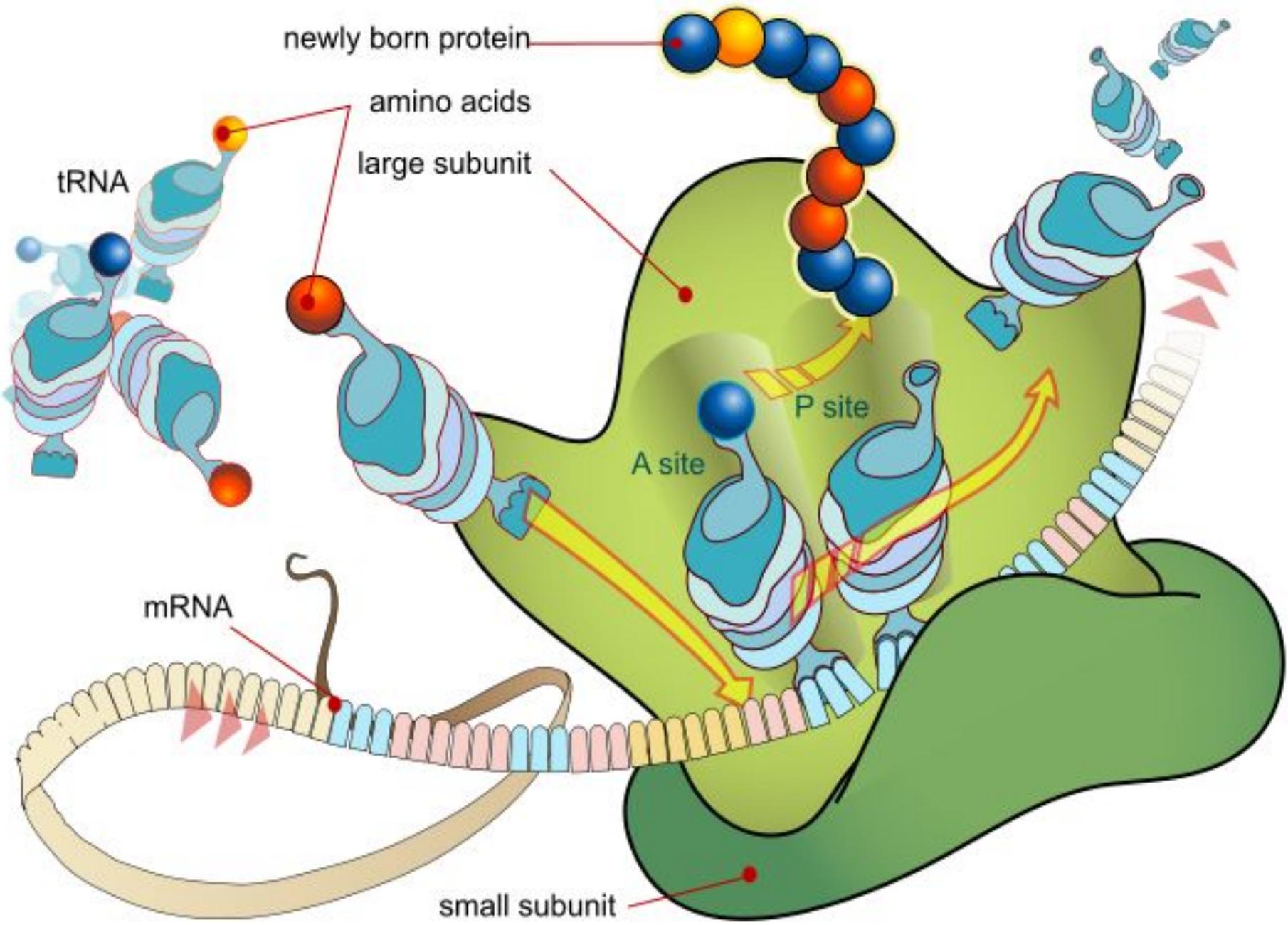
40S subunit



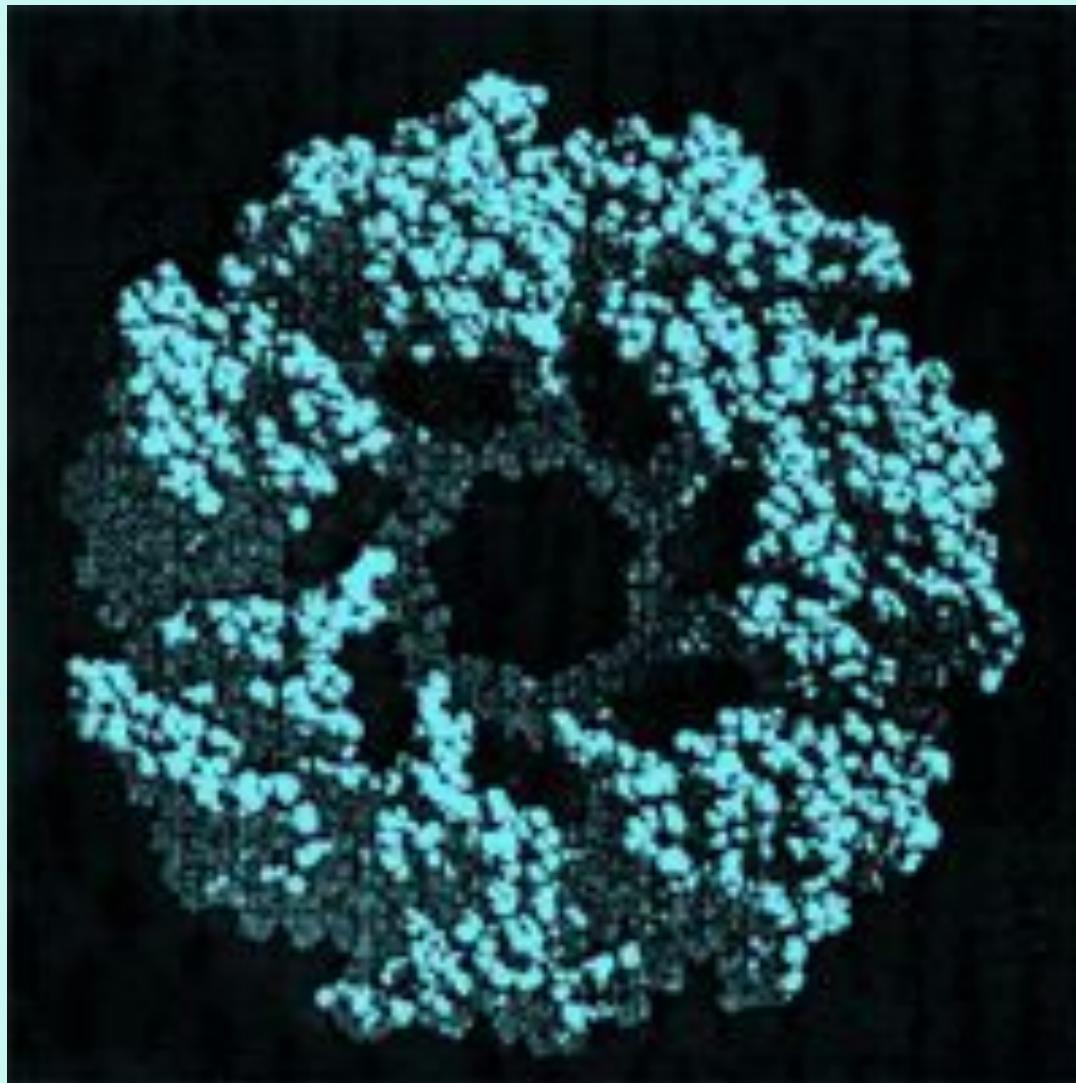
Amino acids corresponding to the codons are added to the growing protein chain.

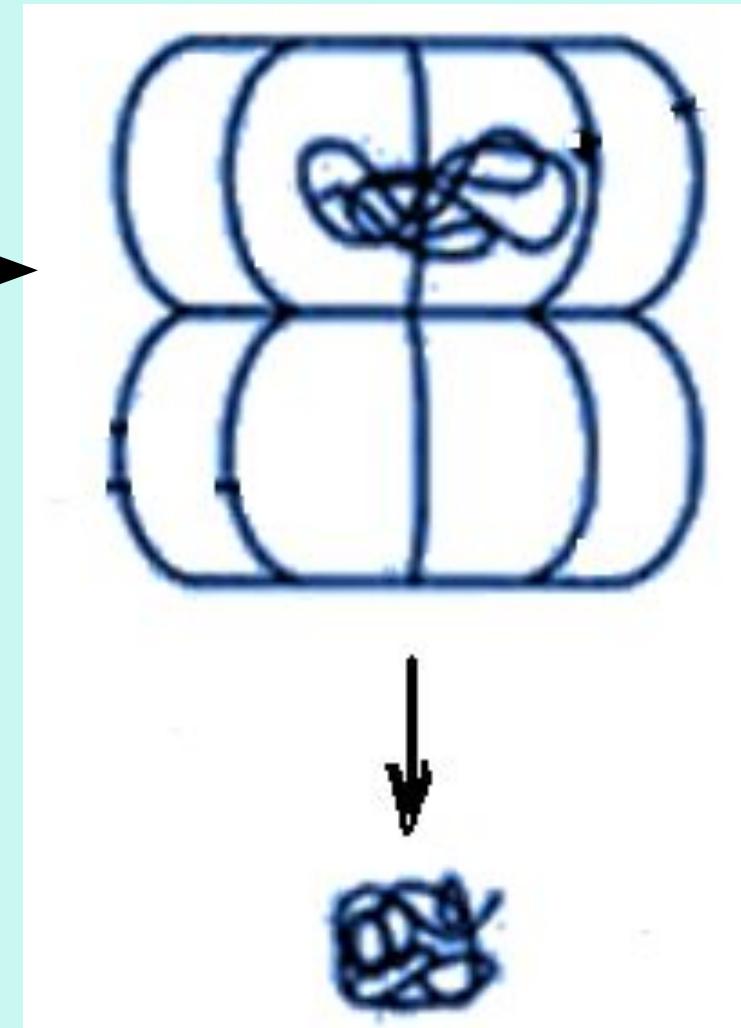
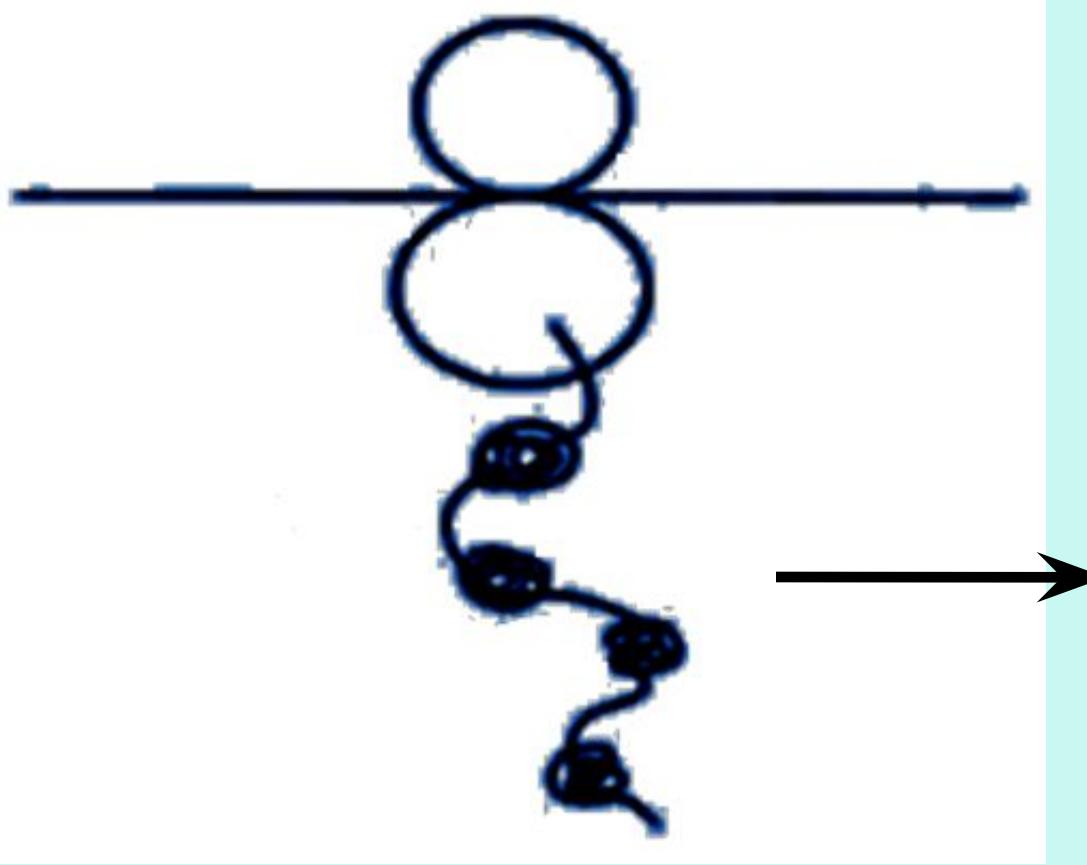
Constructing protein





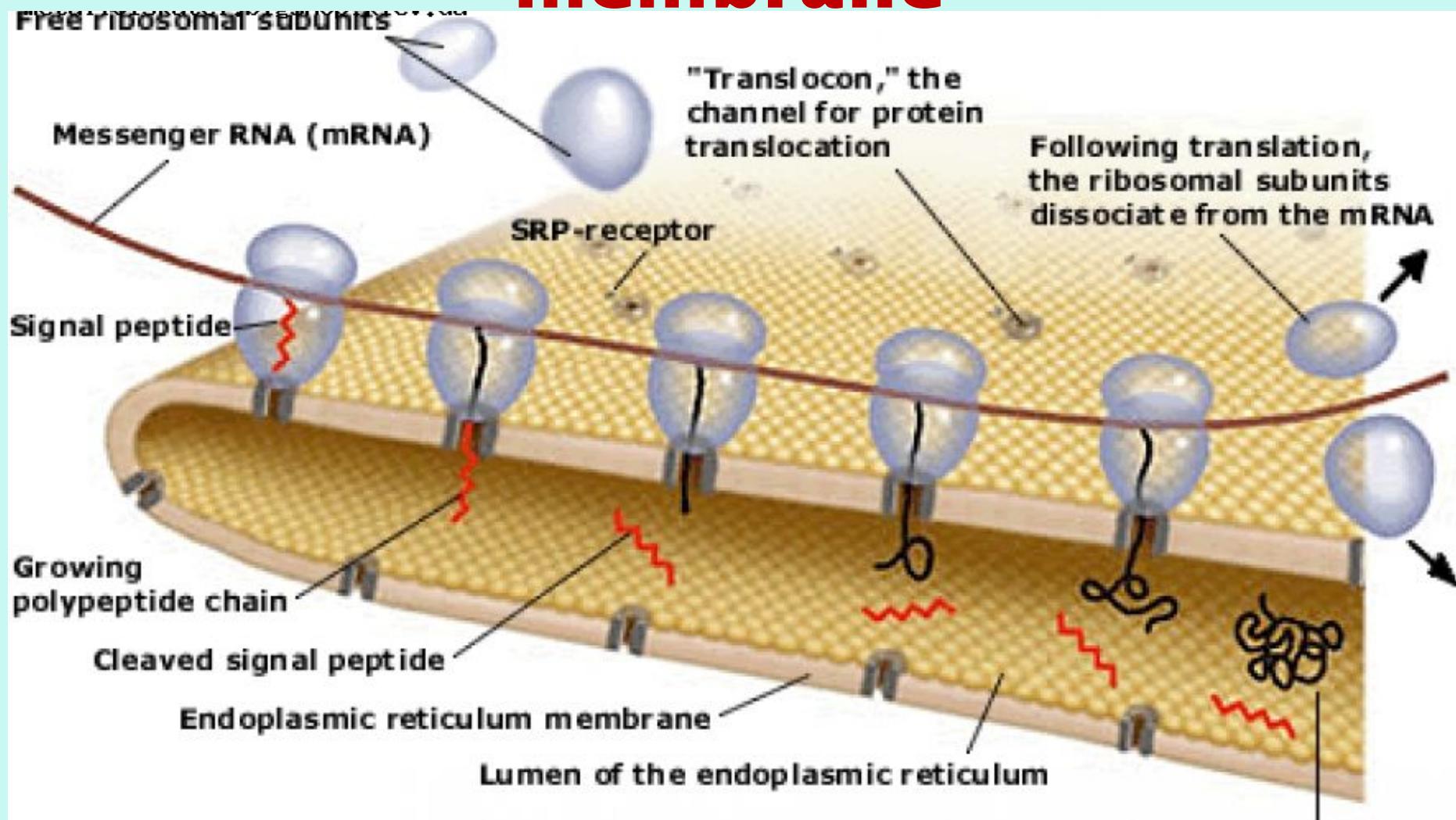
Chaperone





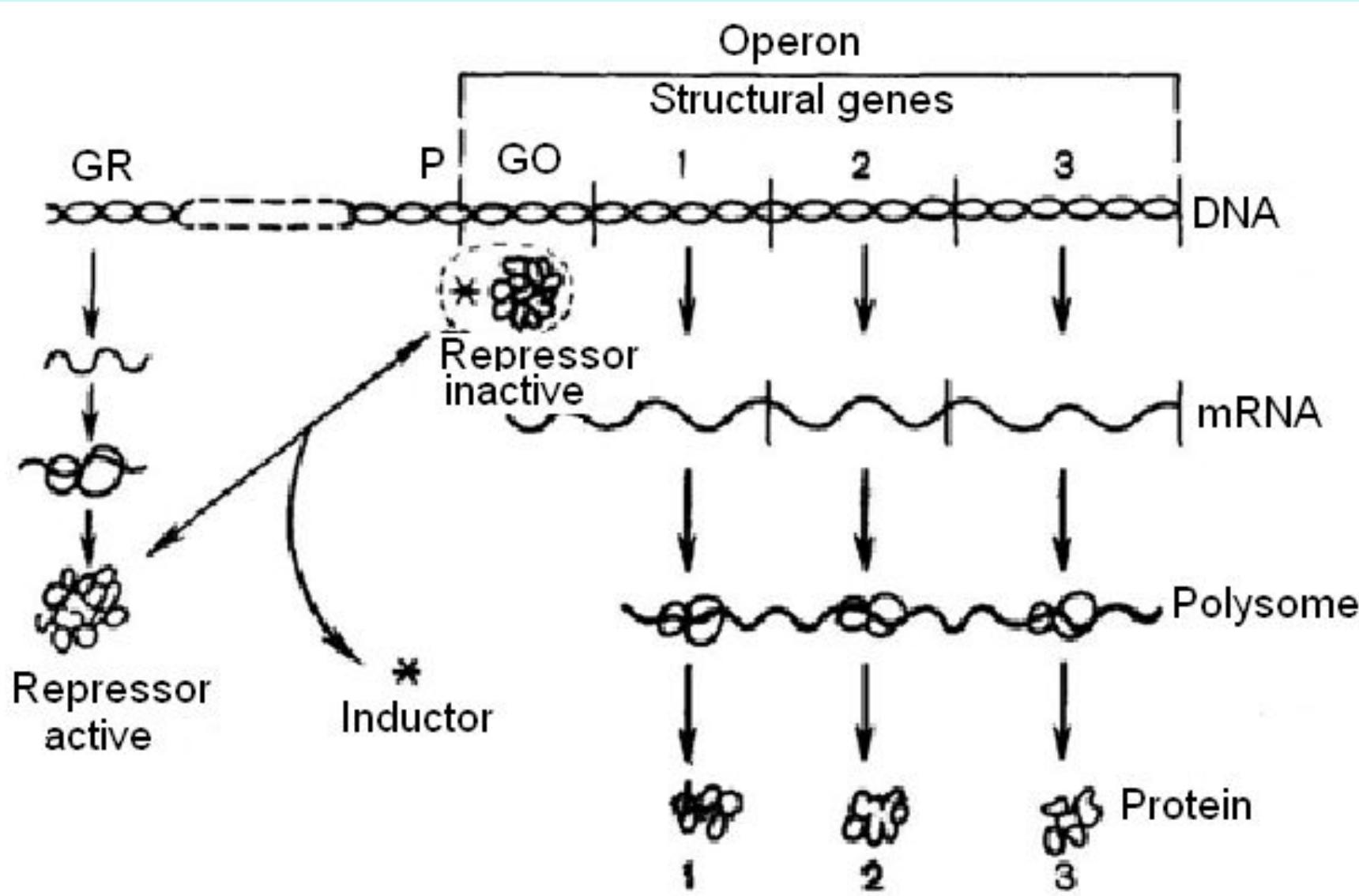
**Participation
of chaperones
in protein foldin
g**

Transport of protein across membrane

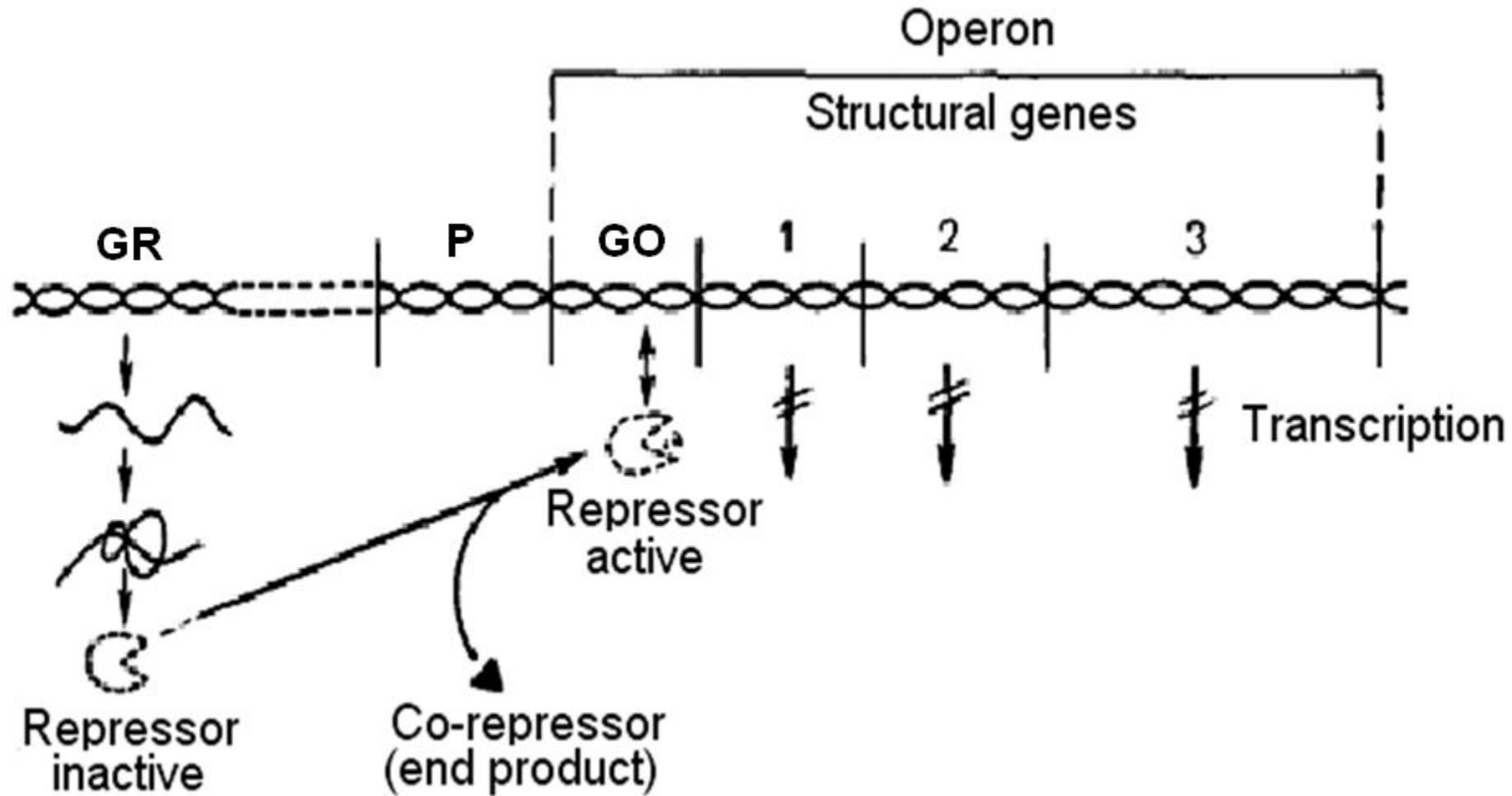


After completed synthesis, the protein folds into a mature form and is secreted out of the cell.

Regulation of protein synthesis by induction



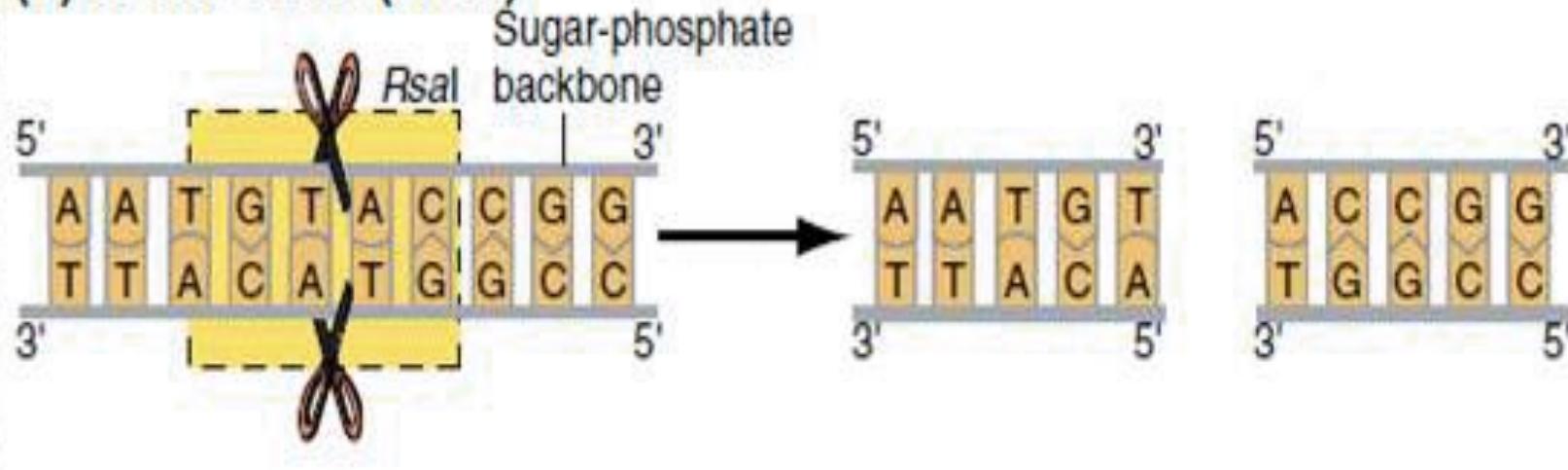
Regulation of protein synthesis by repression



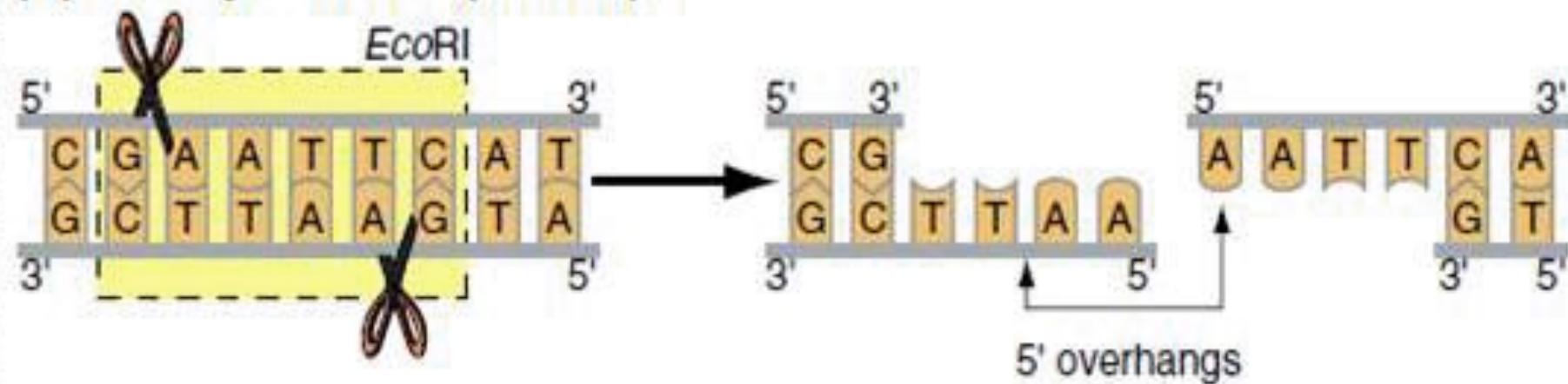
GENETIC ENGINEERING

Cleavage of DNA with restriction enzymes

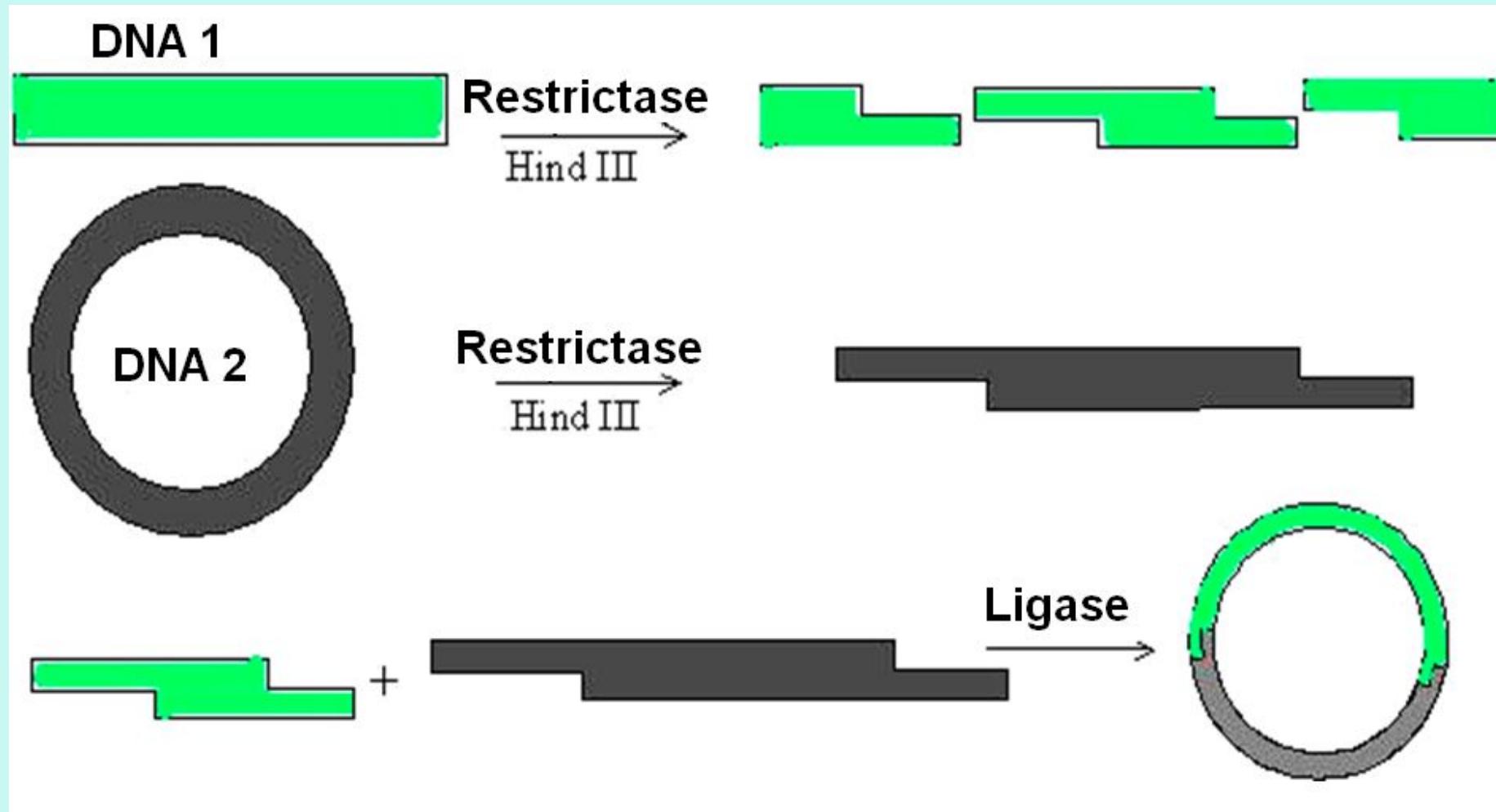
(a) Blunt ends (RsaI)



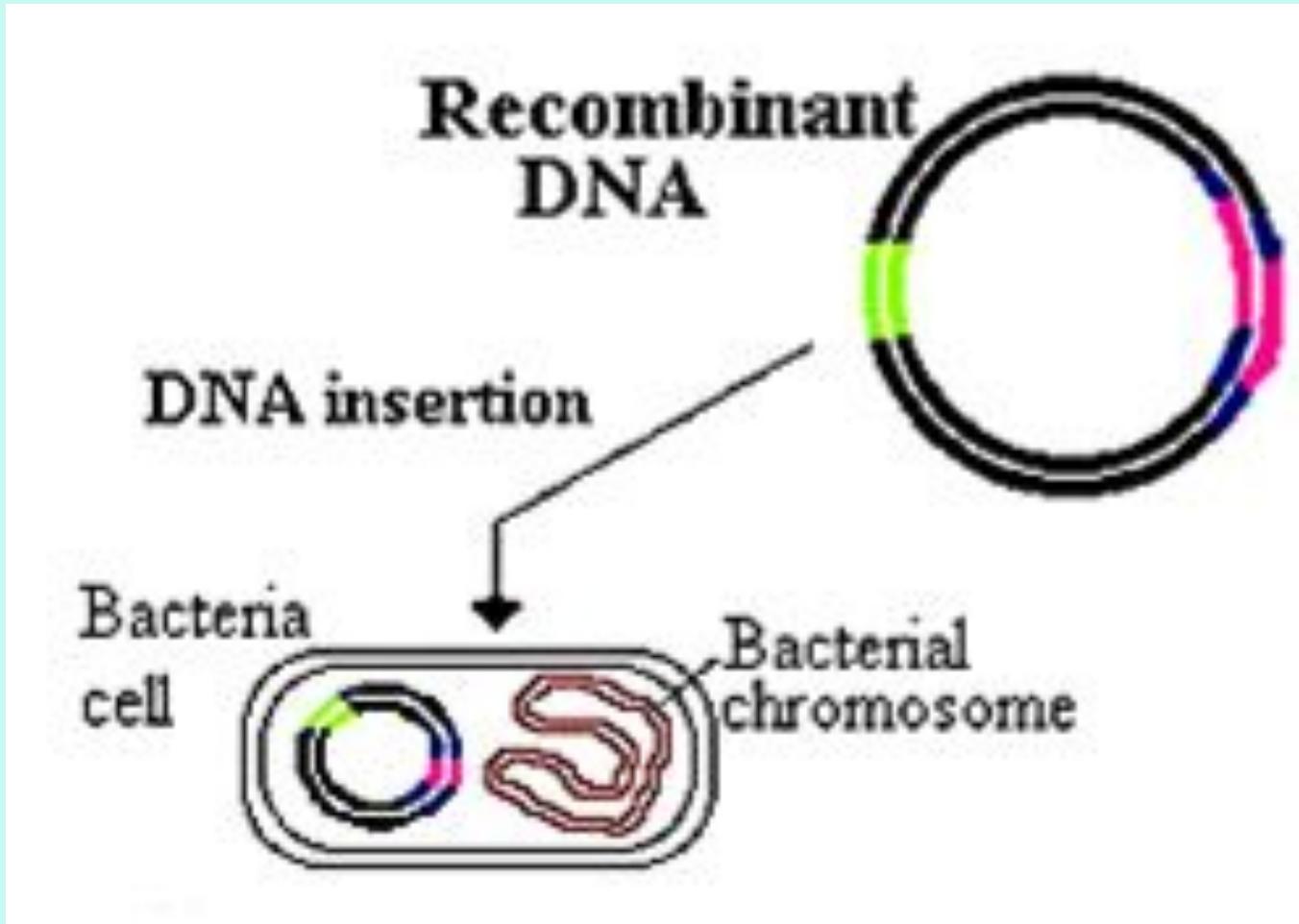
(b) Sticky 5' ends (EcoRI)

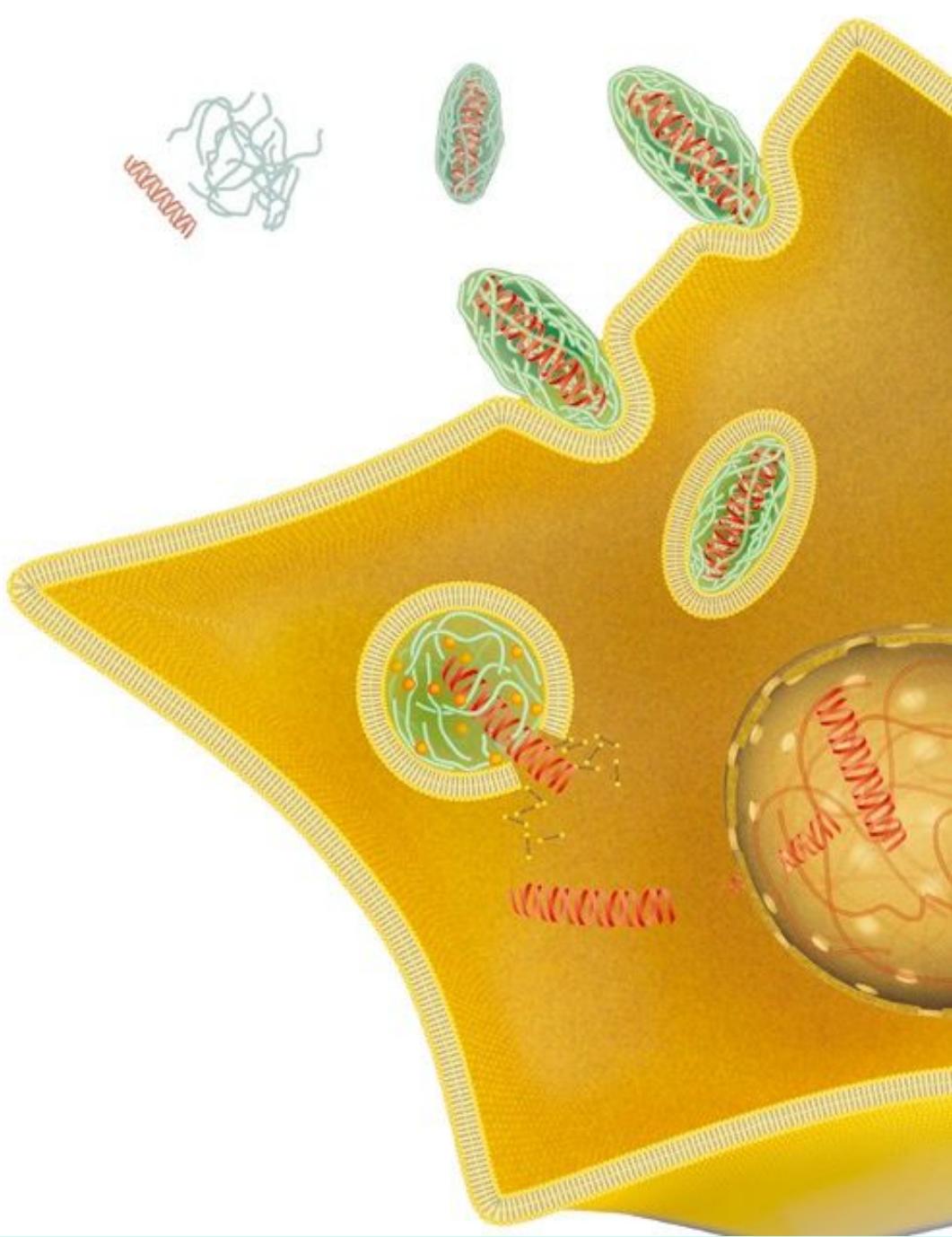


Construction of recombinant DNA



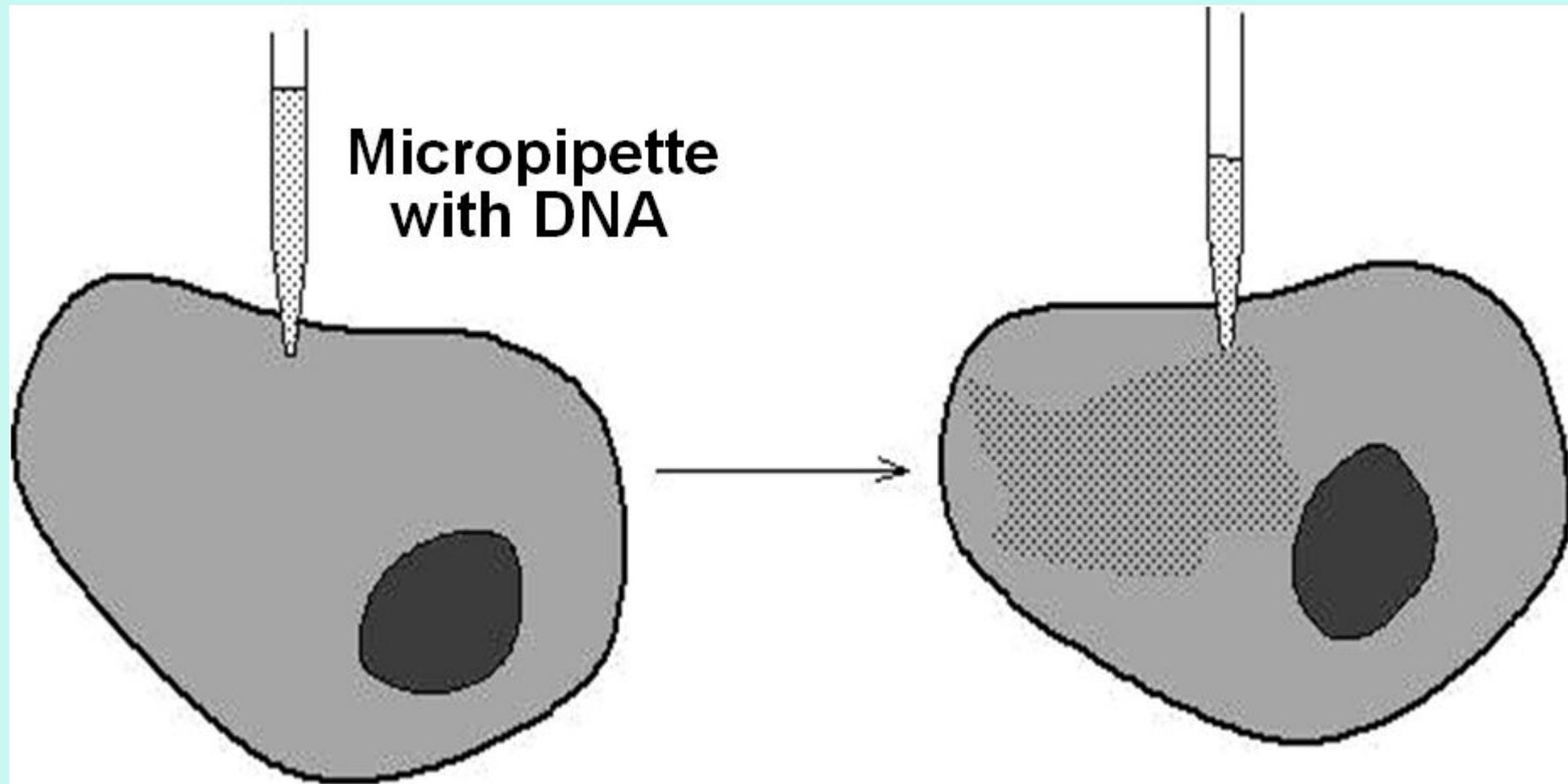
Introduction of DNA into the cell with plasmids



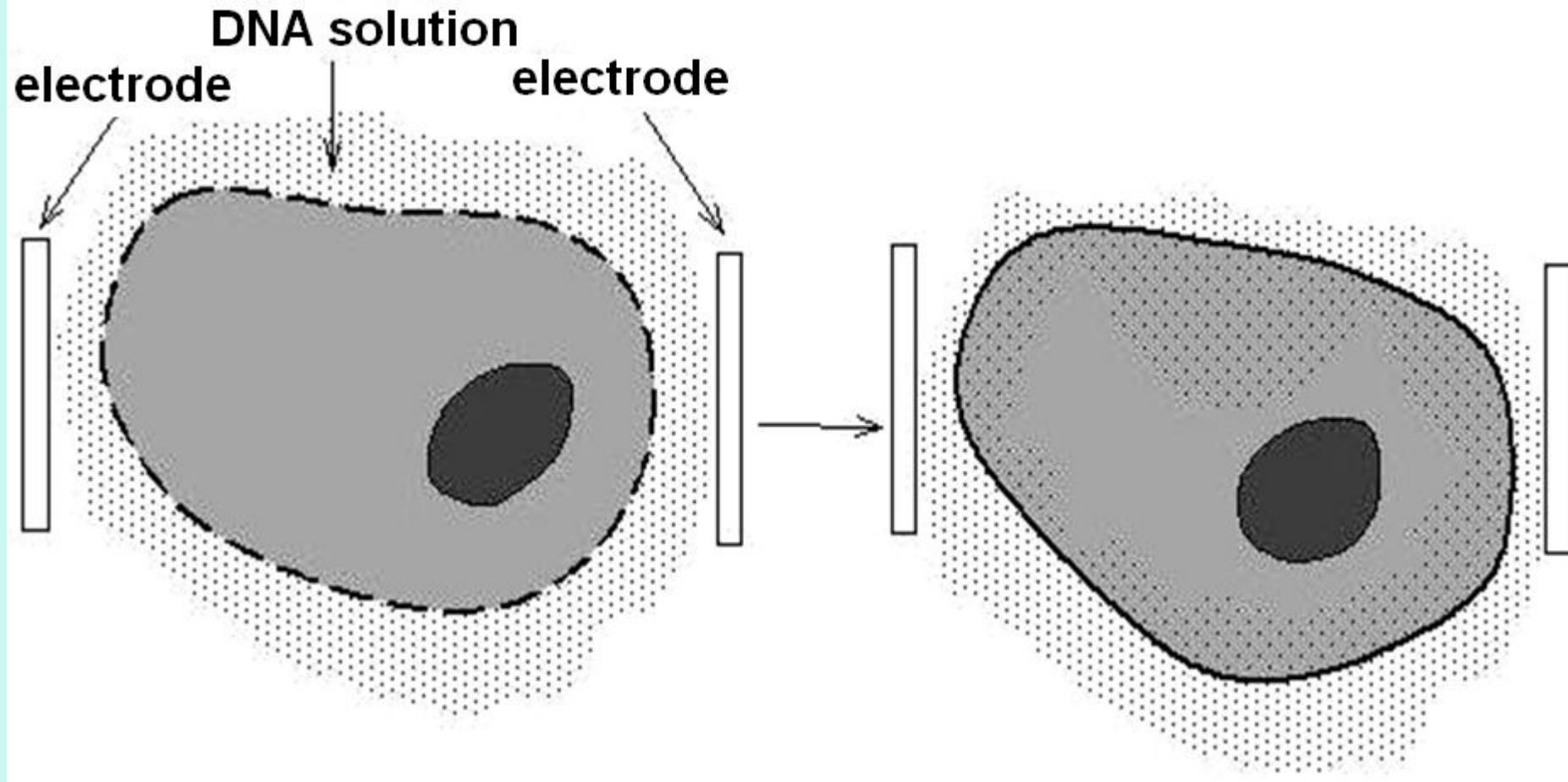


Transfecti on

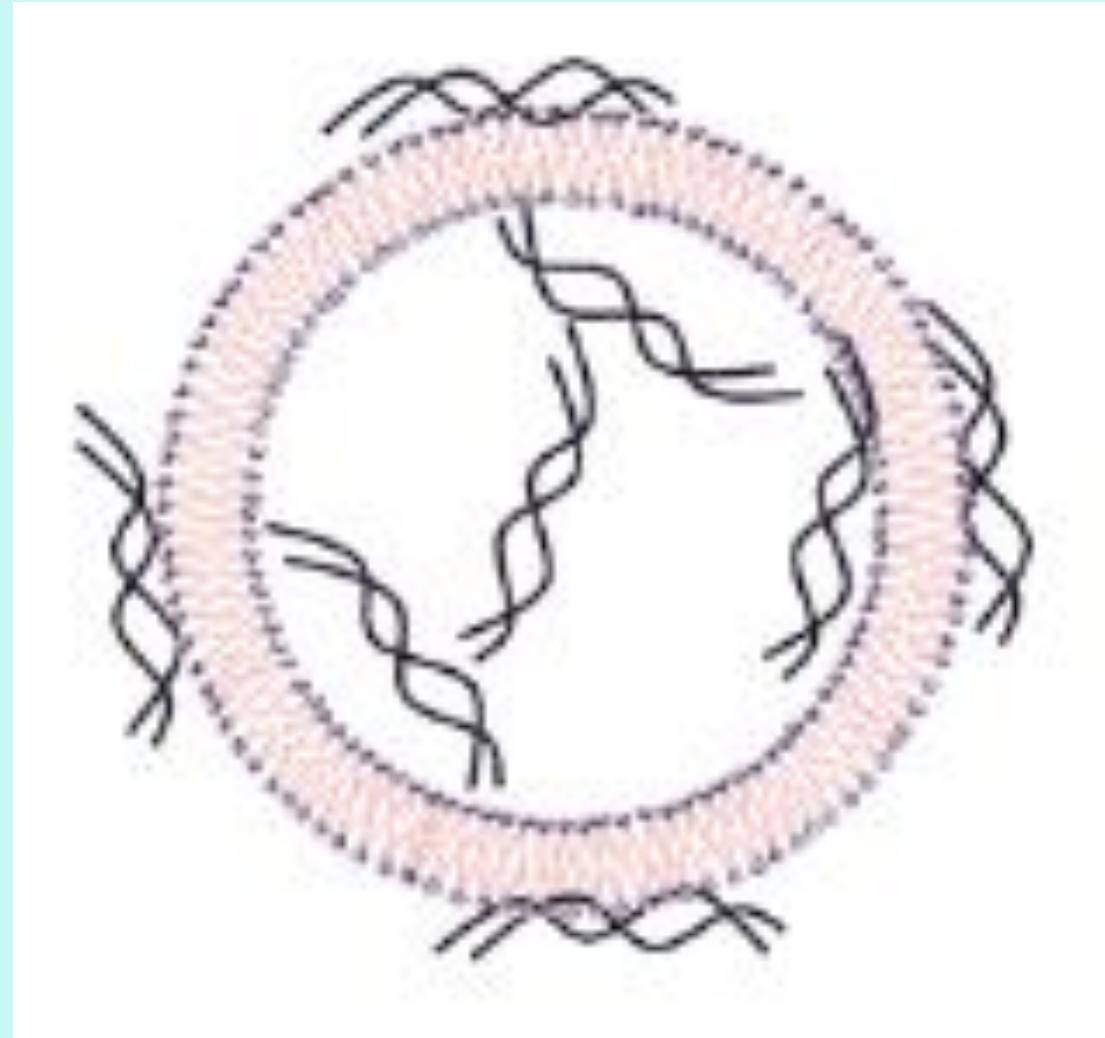
Microinjection of DNA



Electroporation

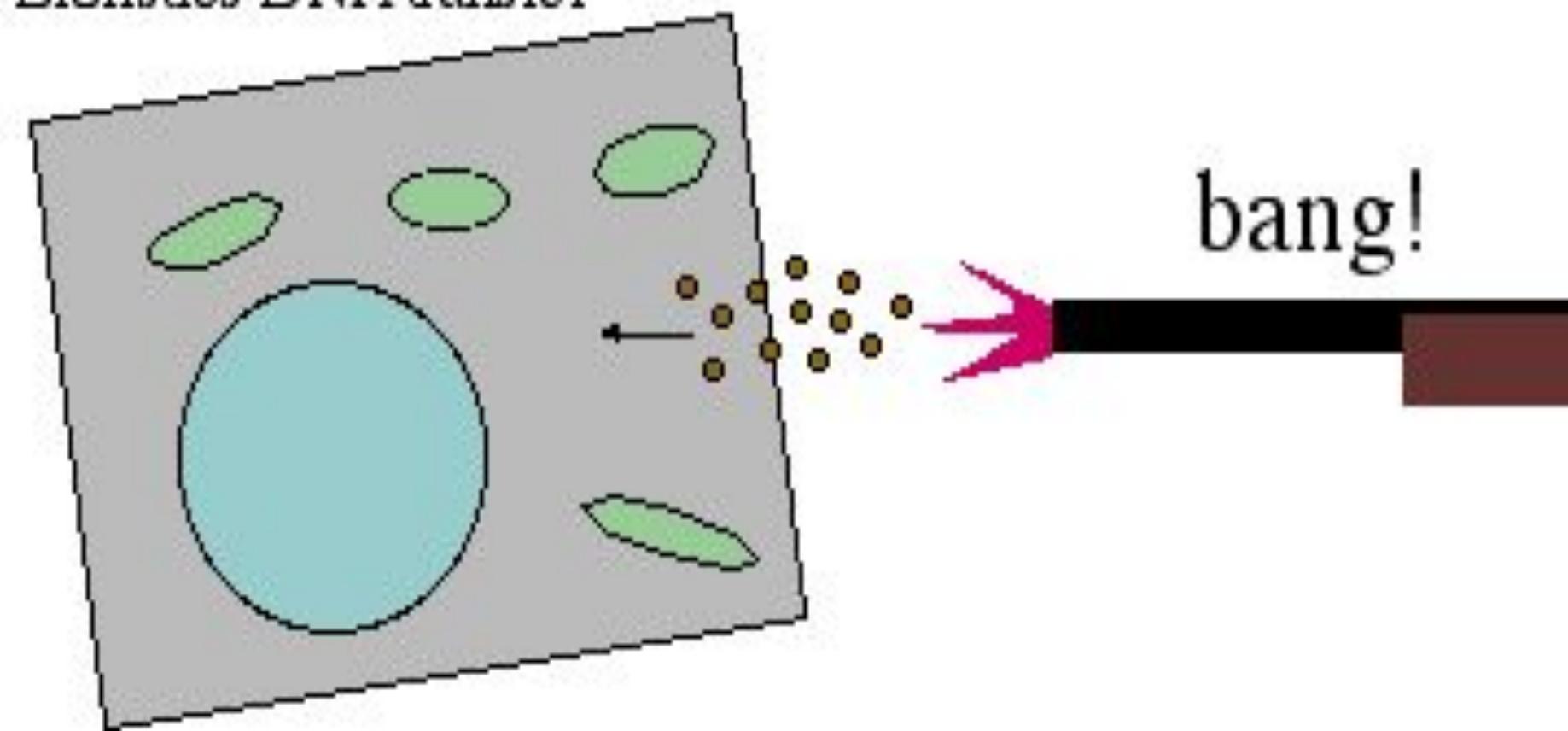


Packing in liposomes



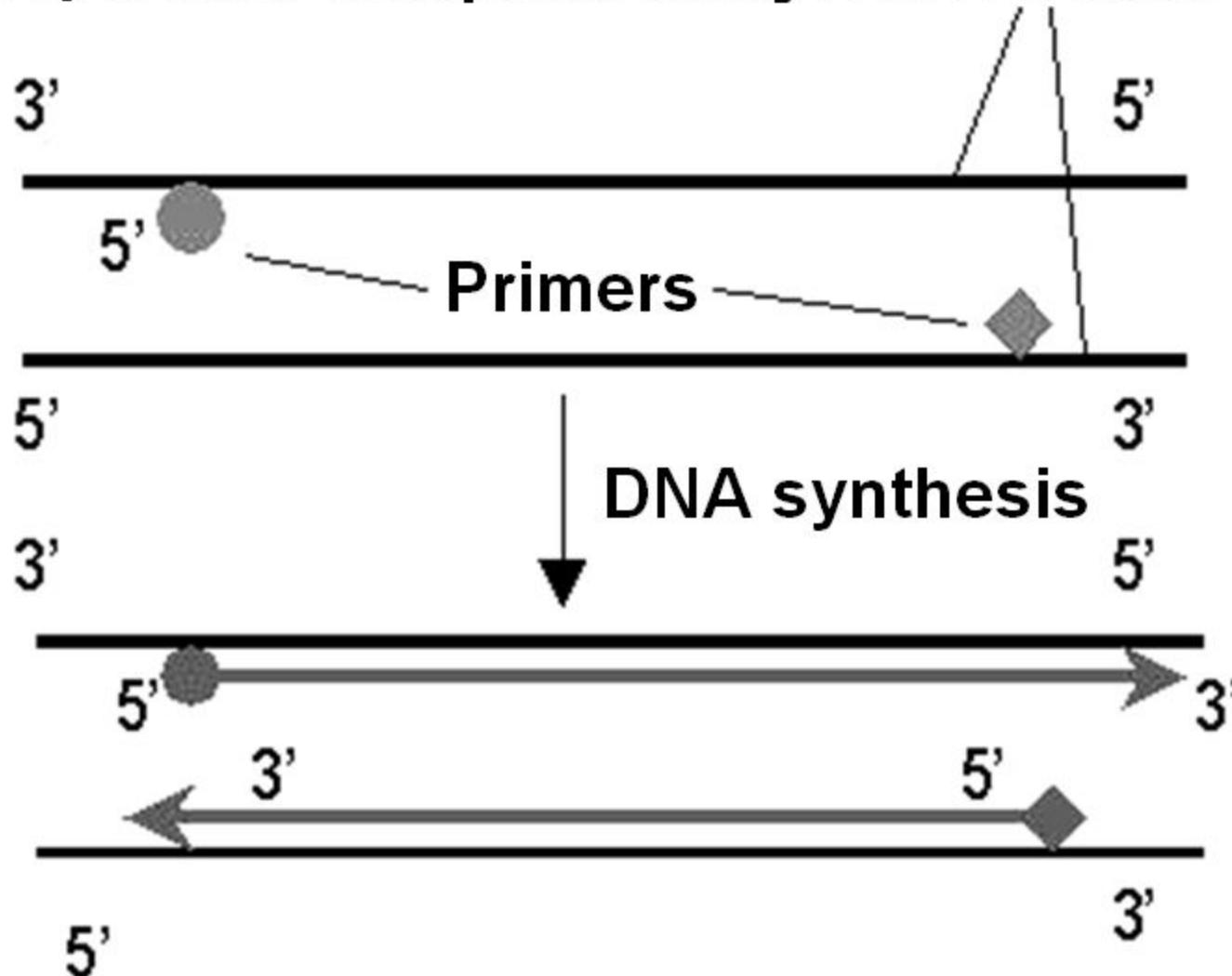
The method of biological ballistics

Biolistics DNA transfer

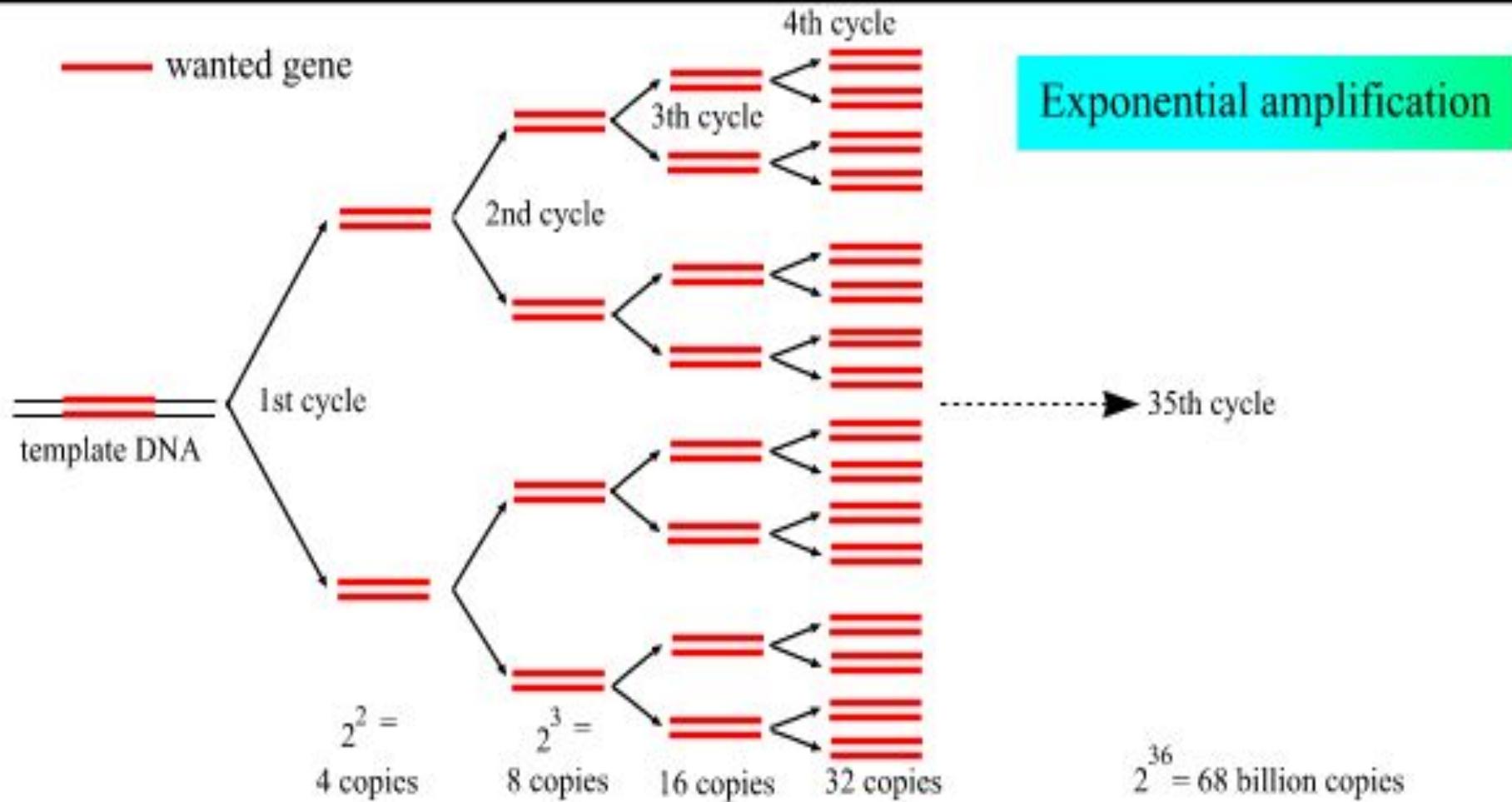


Polymerase chain reaction (PCR)

Separated complementary DNA strands

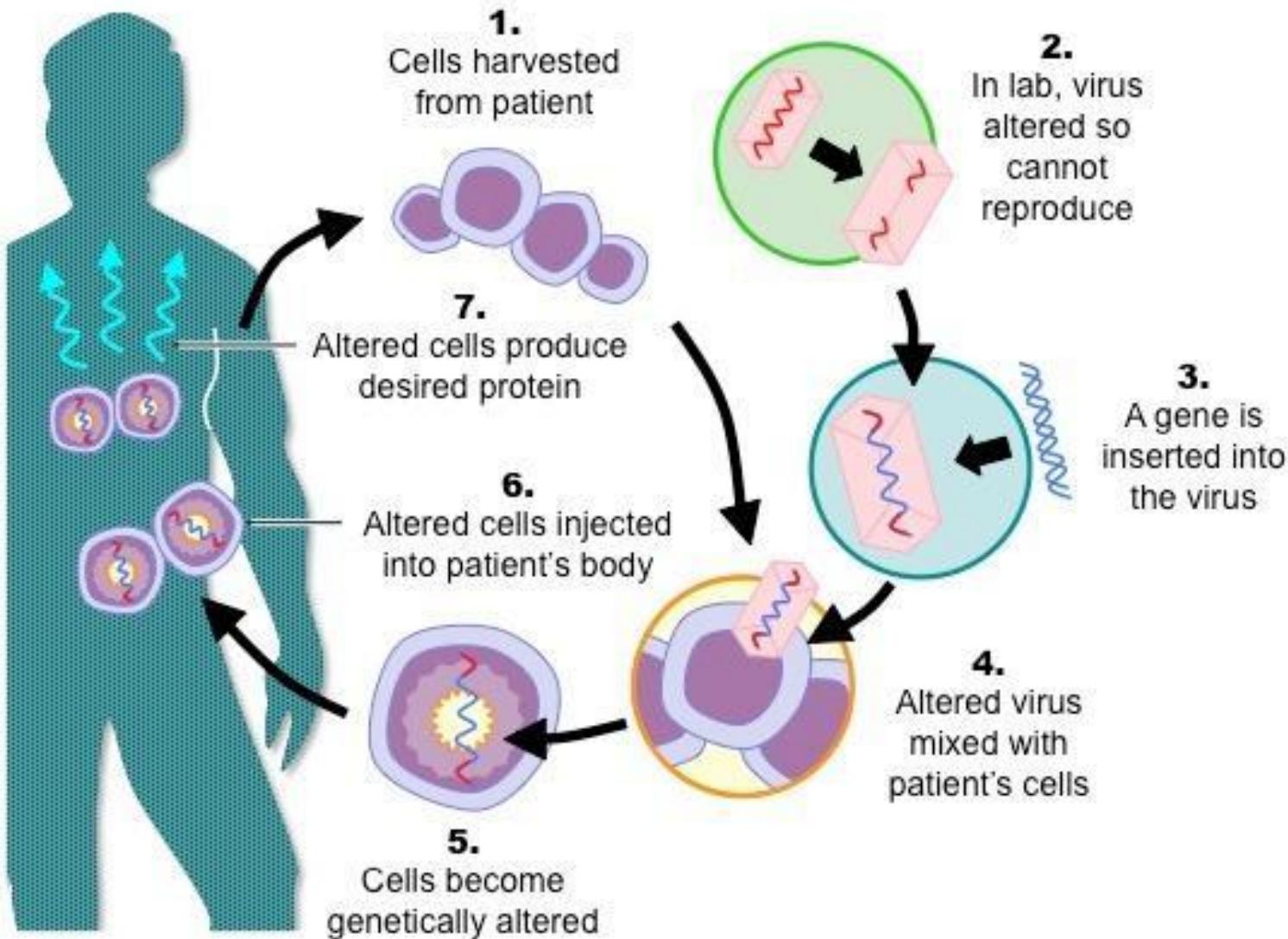


Polymerase chain reaction DNA amplification



(Andy Vierstraete 1999)

Gene Therapy



Treatment with Gene Therapy

