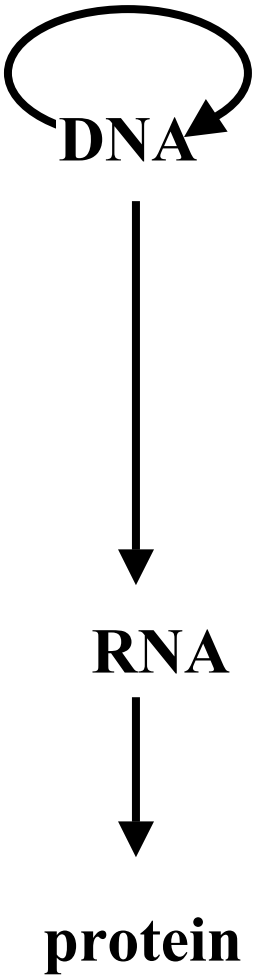
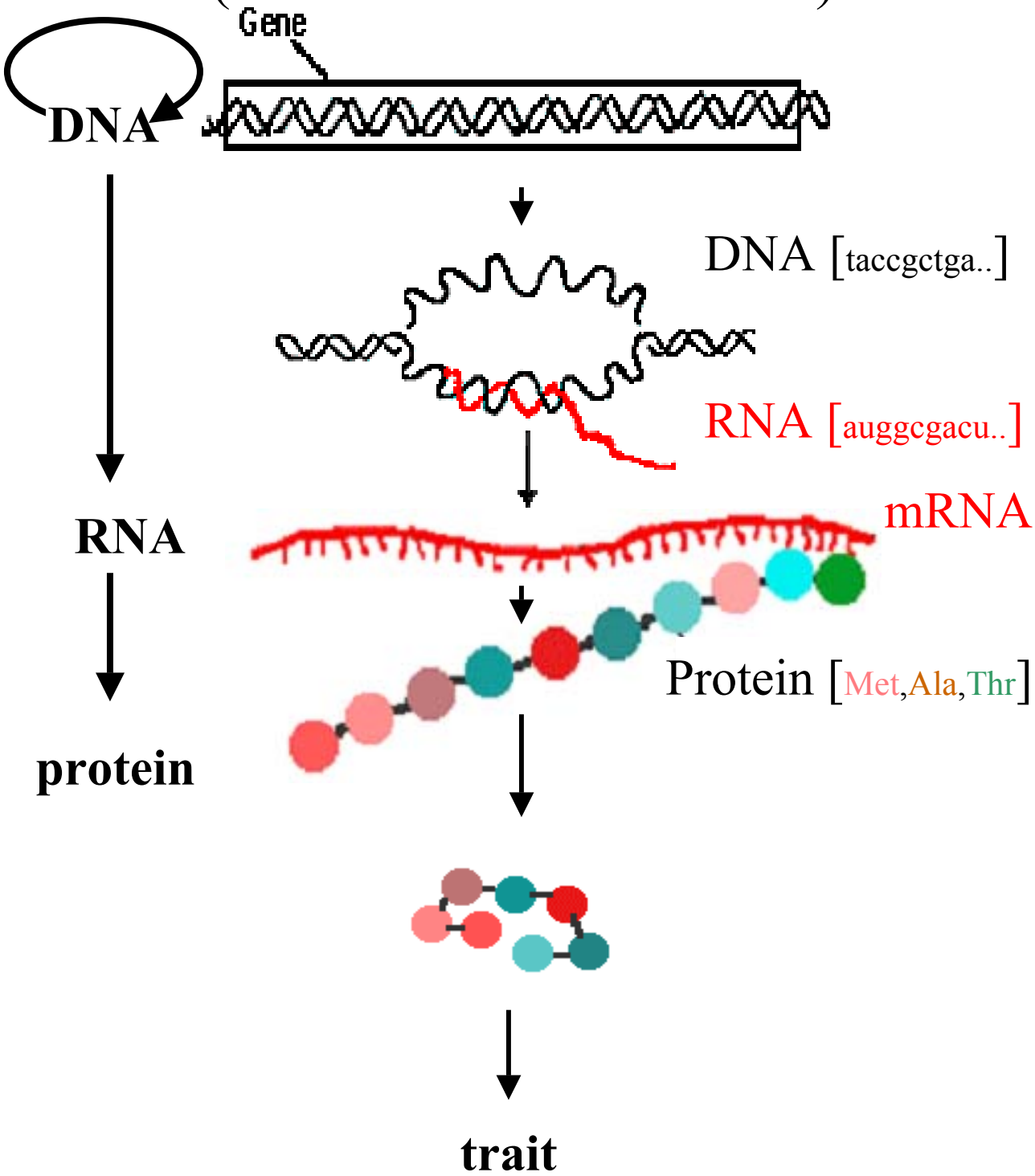
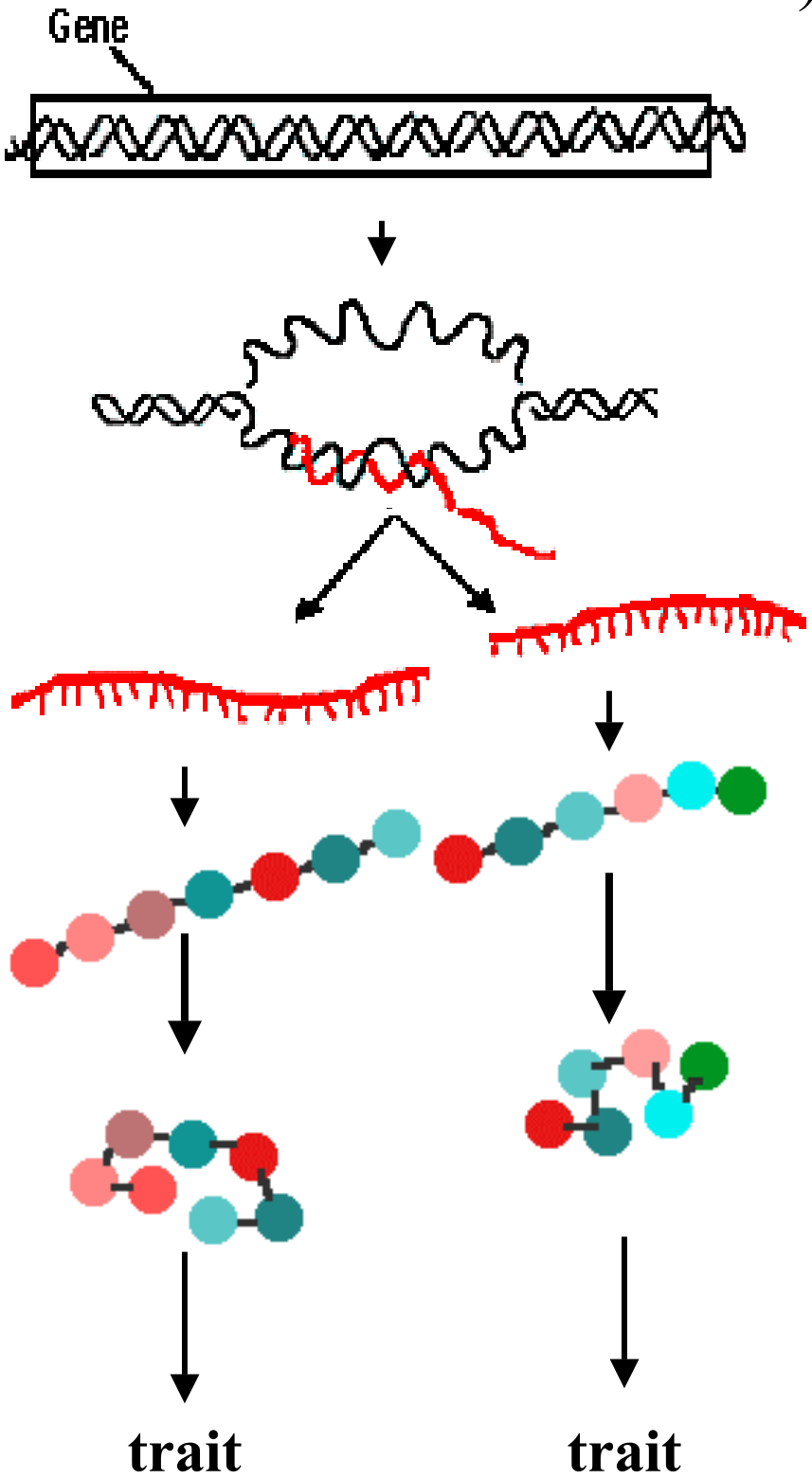
FLOW OF GENETIC INFORMATION (CLASSICAL THEORY)



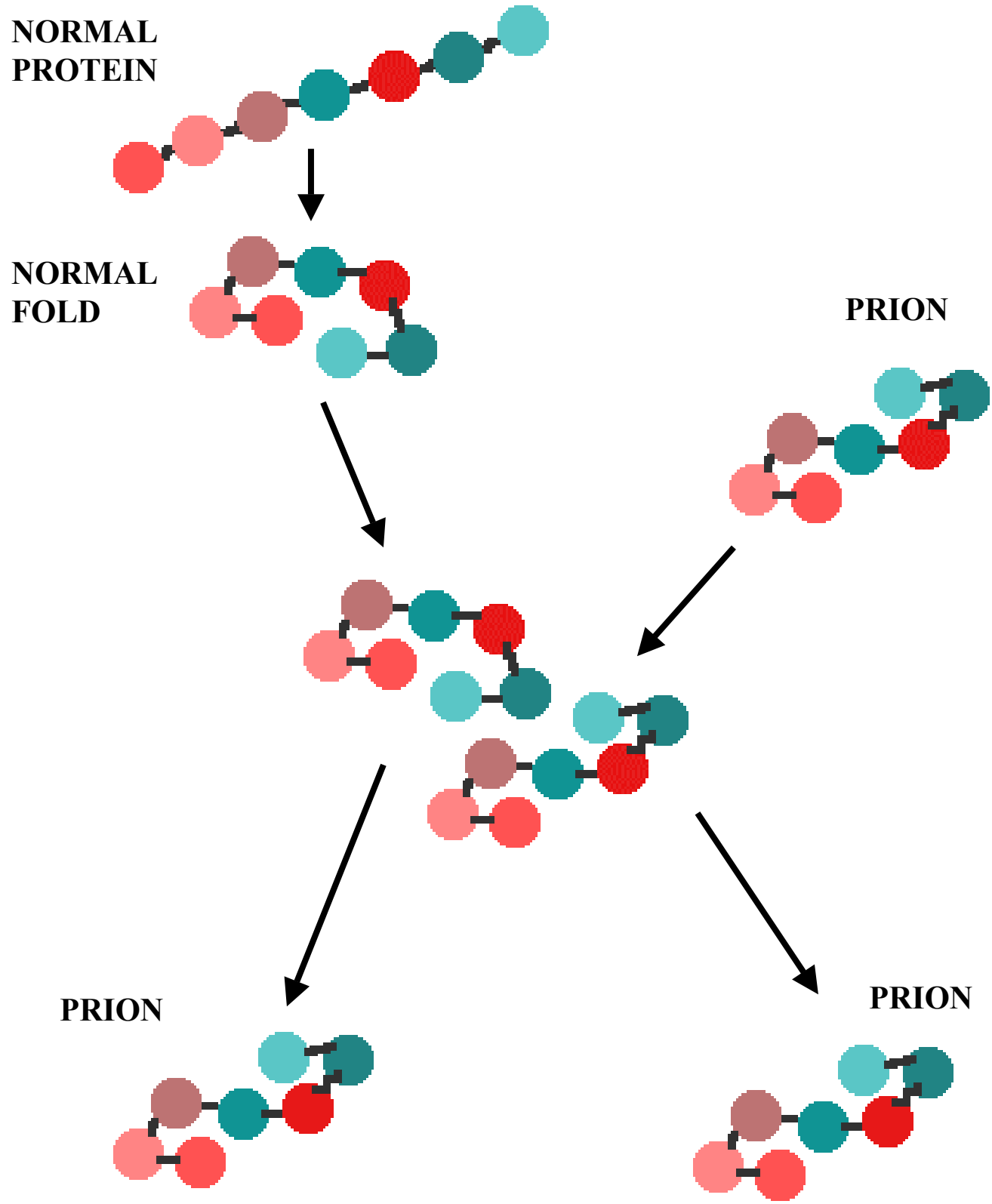
FLOW OF GENETIC INFORMATION (CLASSICAL THEORY)



FLOW OF GENETIC INFORMATION (ALTERNATIVE SPLICING)

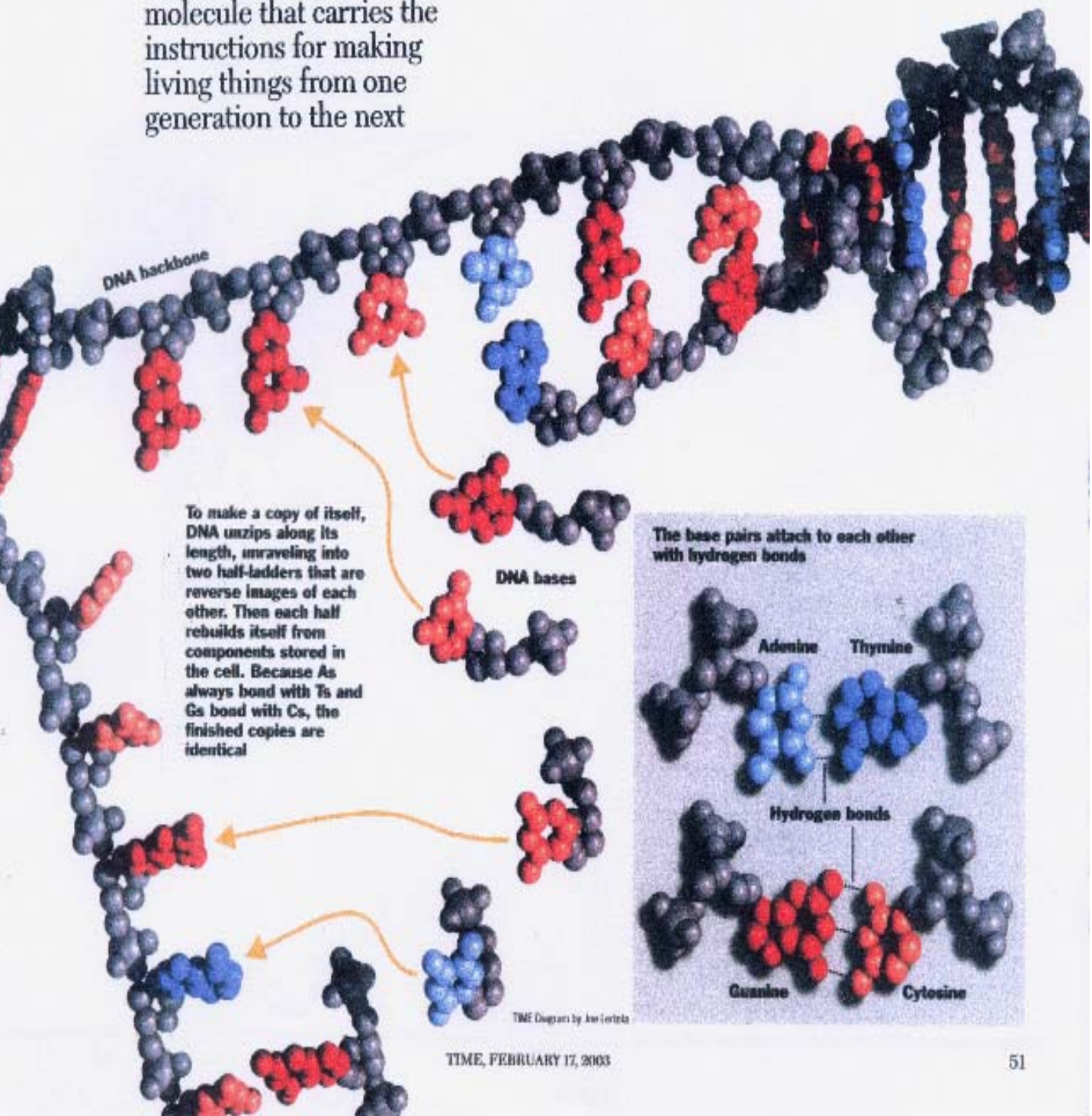


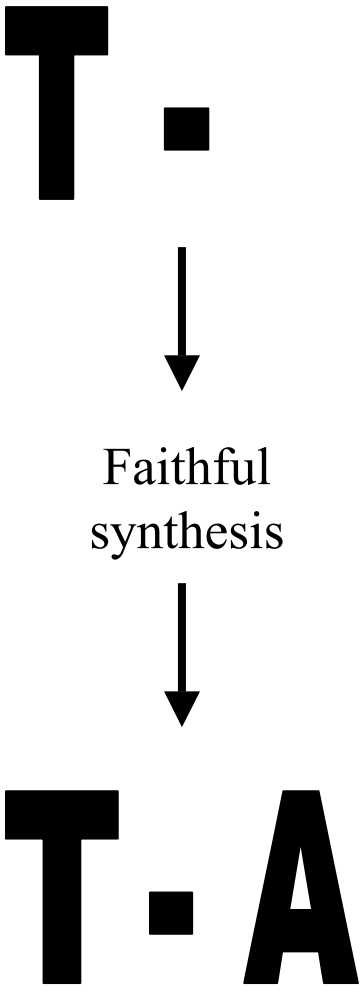
FLOW OF GENETIC INFORMATION (PRION REPLICATION)

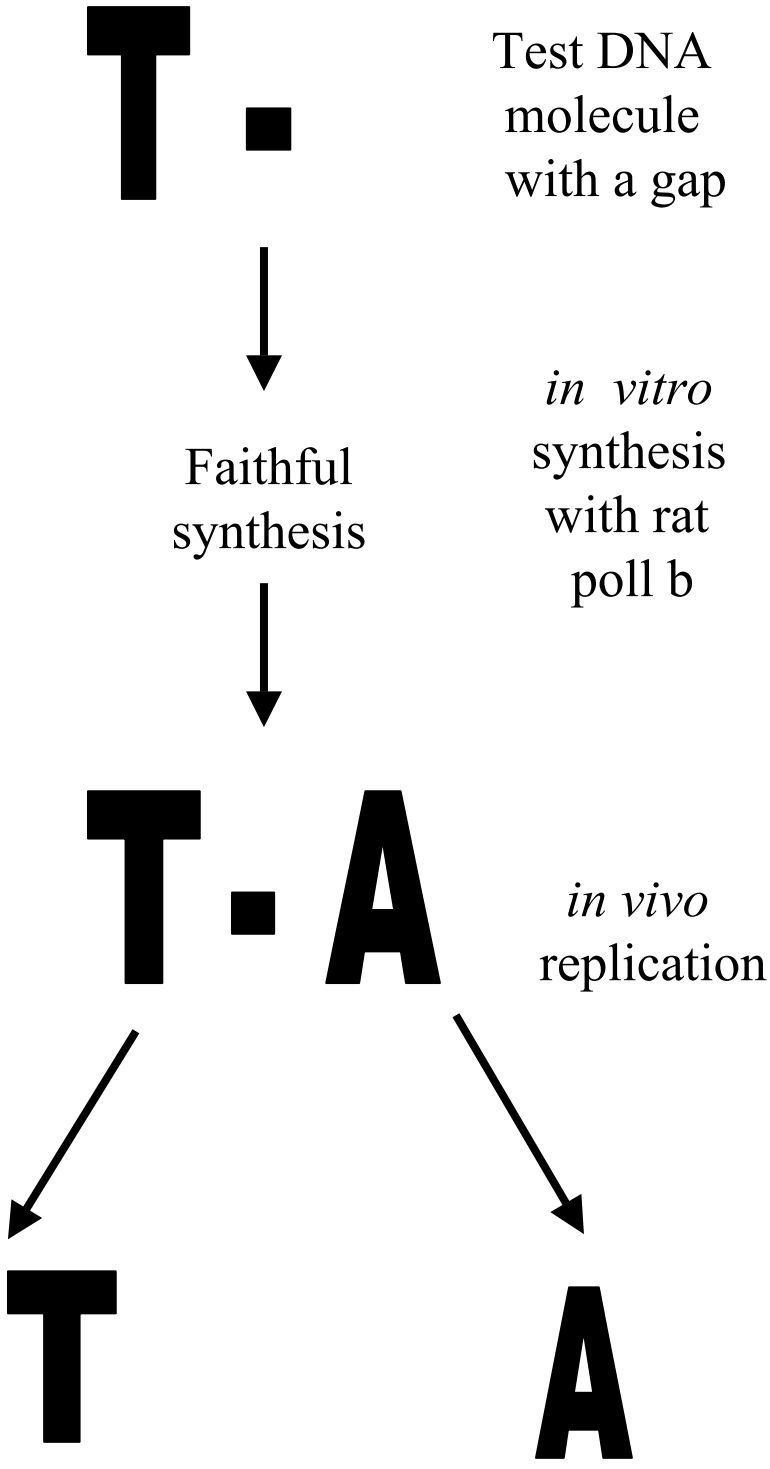


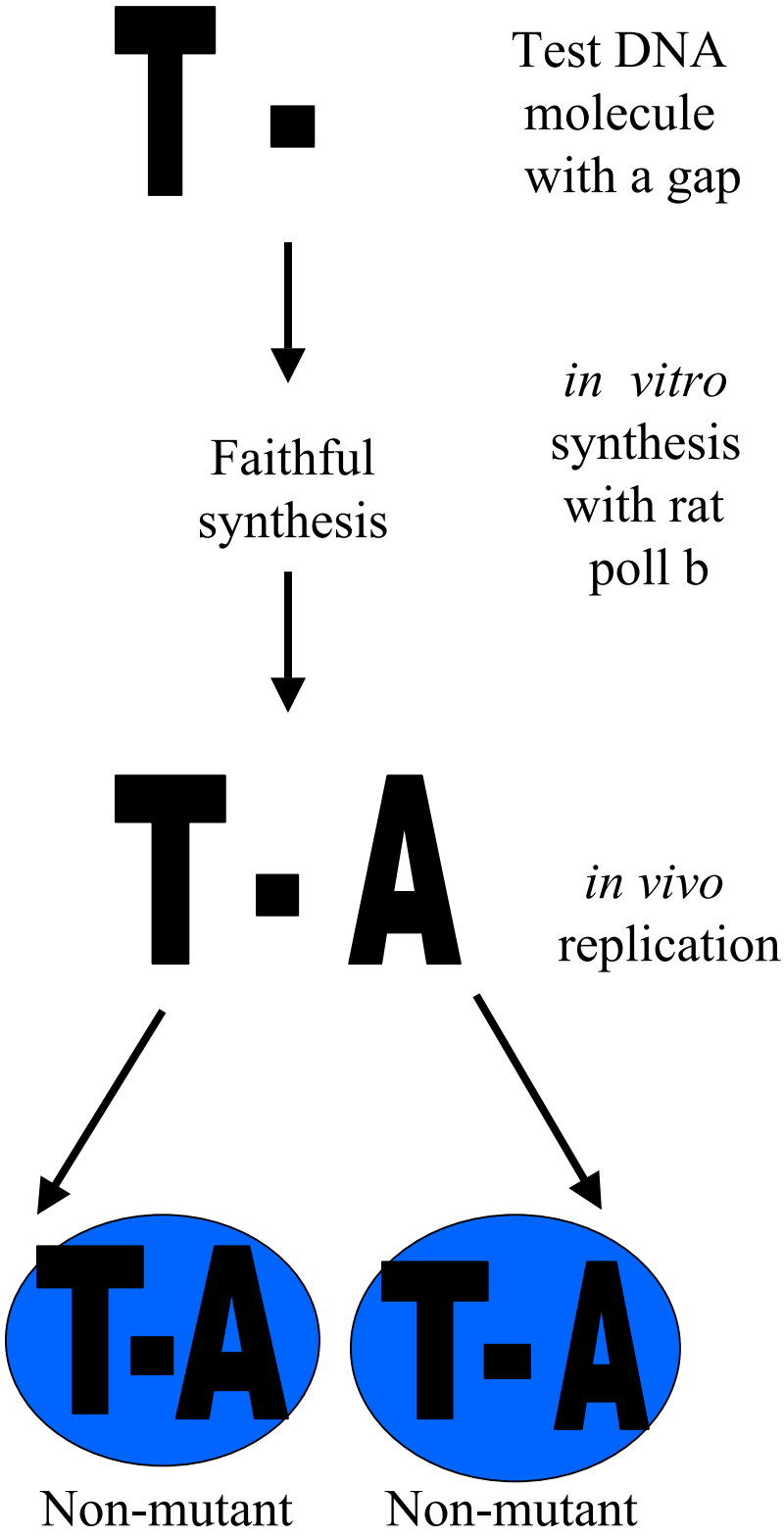
HOW DNA WORKS

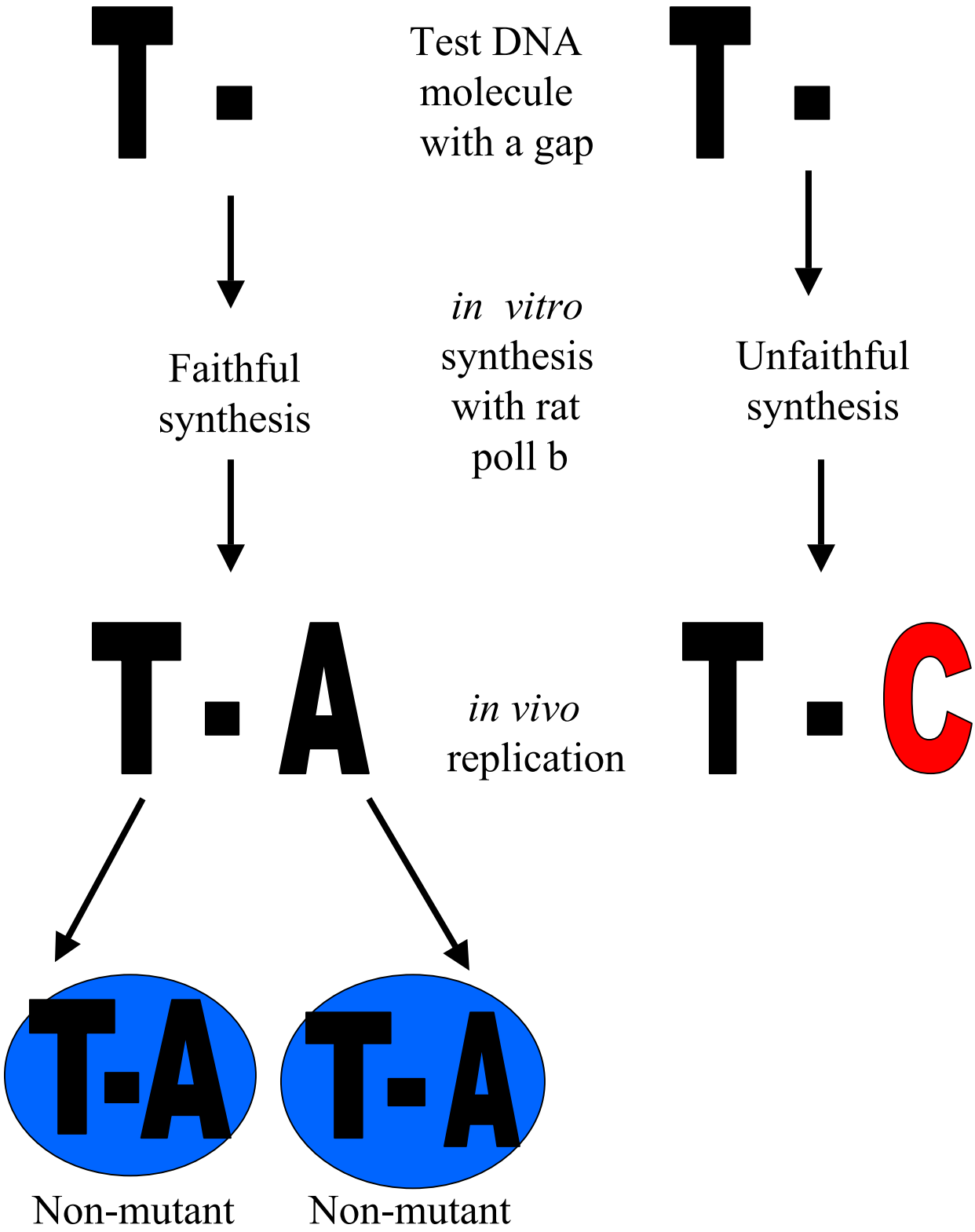
The beauty of DNA is that its form is its function. It's a self-reproducing molecule that carries the instructions for making living things from one generation to the next

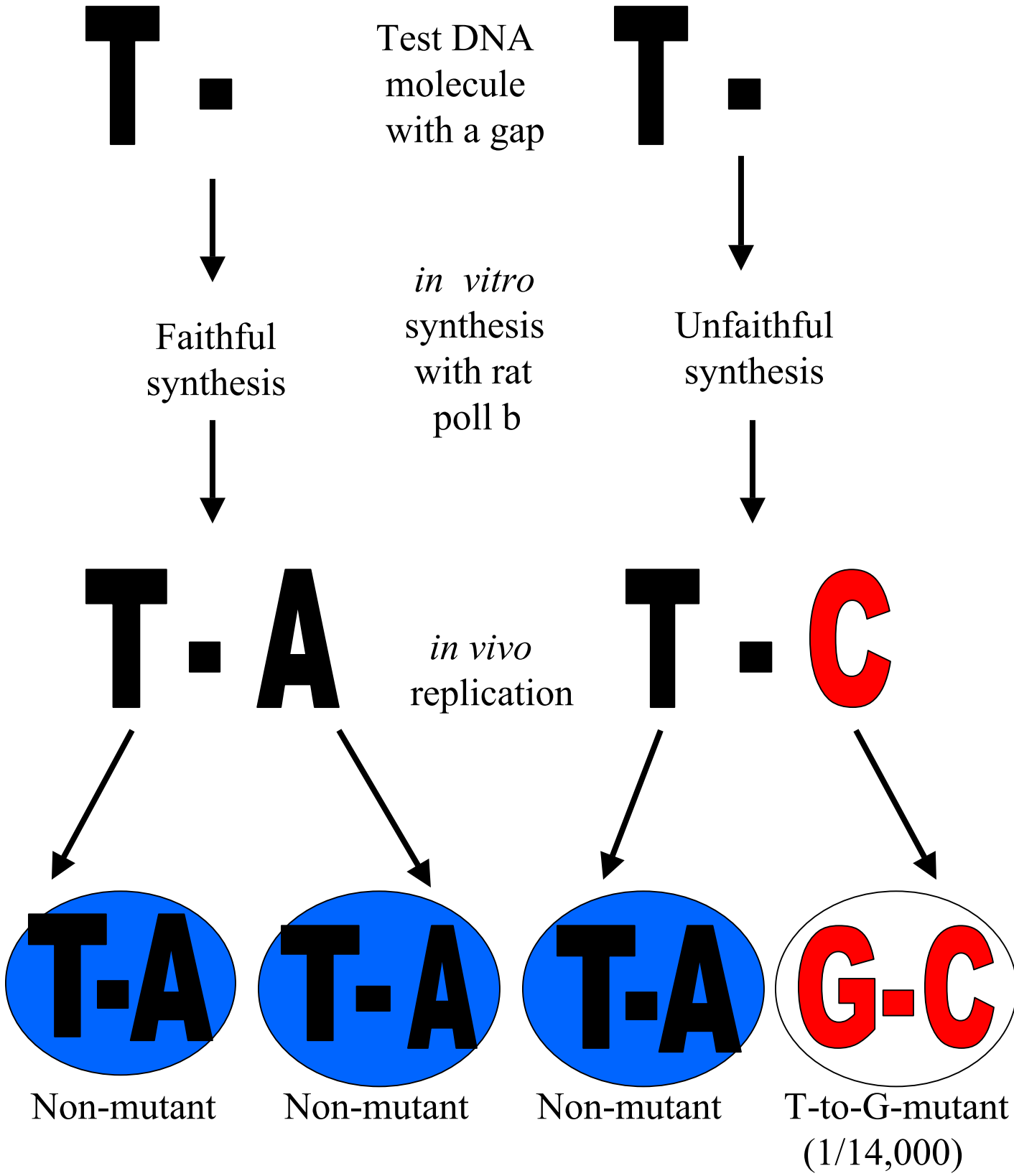



T -
Test DNA molecule with a gap
Faithful synthesis
in vitro synthesis with rat poll b
T - A


T -
Test DNA molecule with a gap
Faithful synthesis
in vitro synthesis with rat poll b
T - A
in vivo replication
T
A


T -
Test DNA molecule with a gap
Faithful synthesis
in vitro synthesis with rat poll b
T - A
in vivo replication
T-A
T-A
Non-mutant
Non-mutant

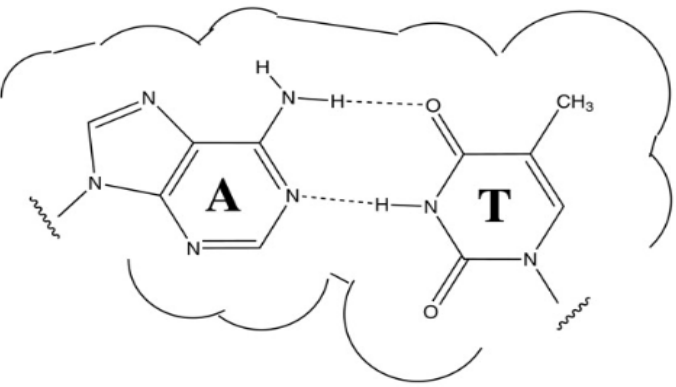

T -
Test DNA molecule with a gap
T -
Faithful synthesis
in vitro synthesis with rat poll b
Unfaithful synthesis
T - A
in vivo replication
T - C
T-A
T-A
Non-mutant
Non-mutant

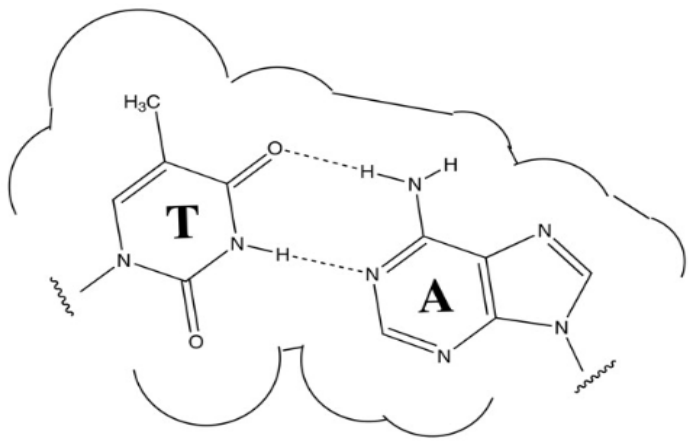

T -
Test DNA molecule with a gap
T -
Faithful synthesis
in vitro synthesis with rat poll b
Unfaithful synthesis
T - A
in vivo replication
T - C
T-A
T-A
T-A
G-C
Non-mutant
Non-mutant
Non-mutant
T-to-G-mutant (1/14,000)

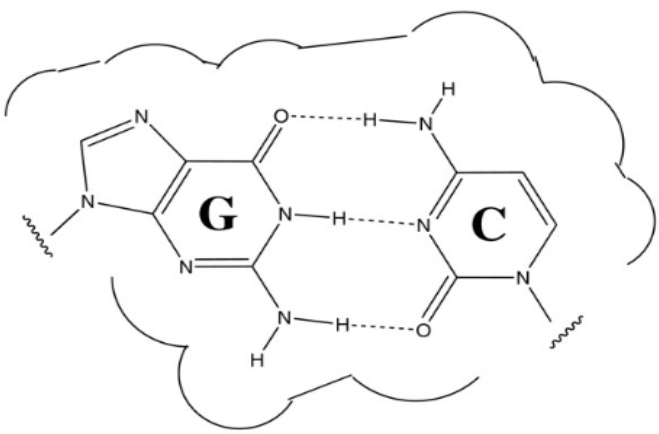
		mutation	
		T into G	G into T
	rat b	1/14,000	1/3,500
	chick b	1/3,100	1/14,000

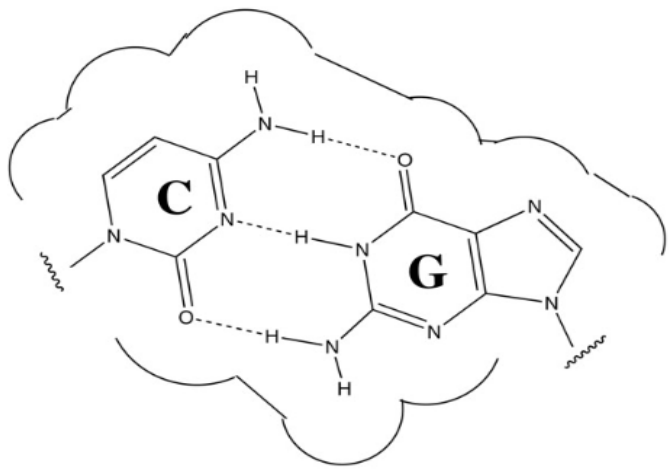
	mutation	
	C into T	T into G
calf a	1/2,100	1/21,000
chick a	1/2,000	1/110,000

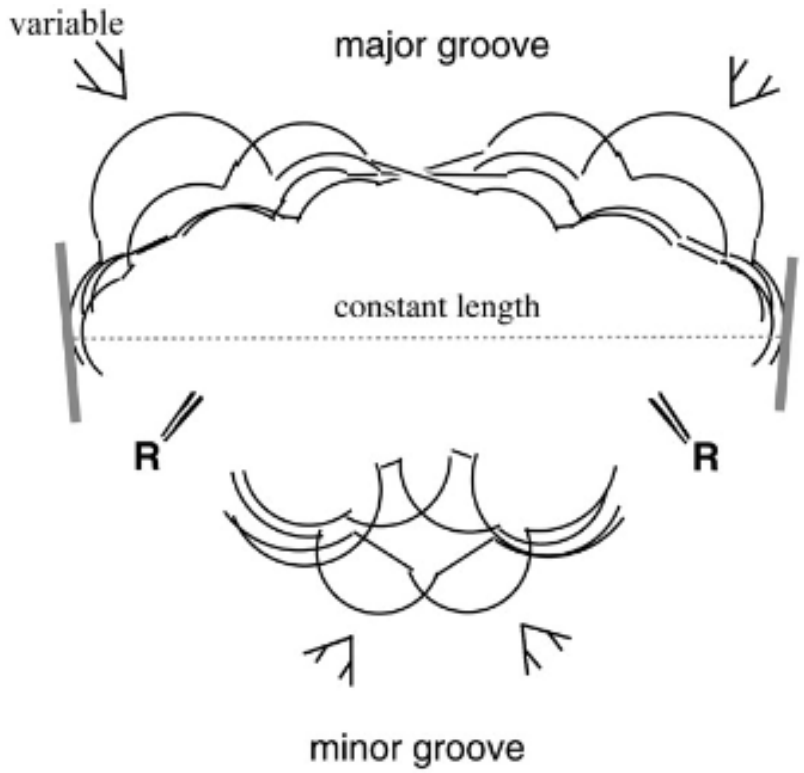
THE SPACE-FILLING SHAPES OF THE FOUR BASE PAIRS OF THE DNA DOUBLE HELIX



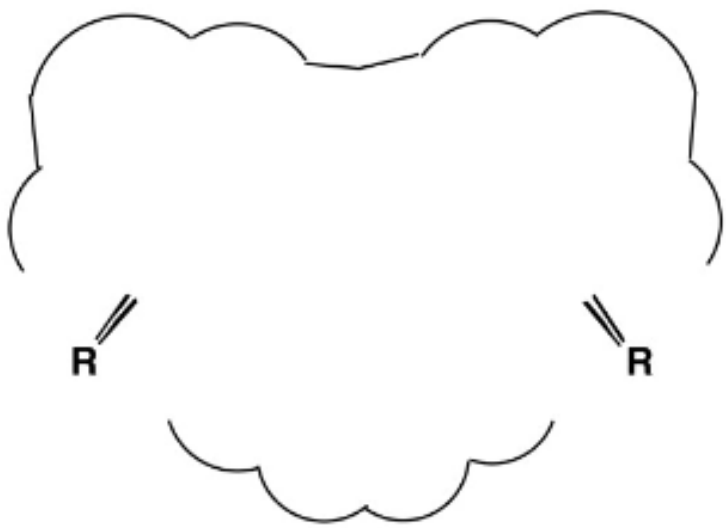








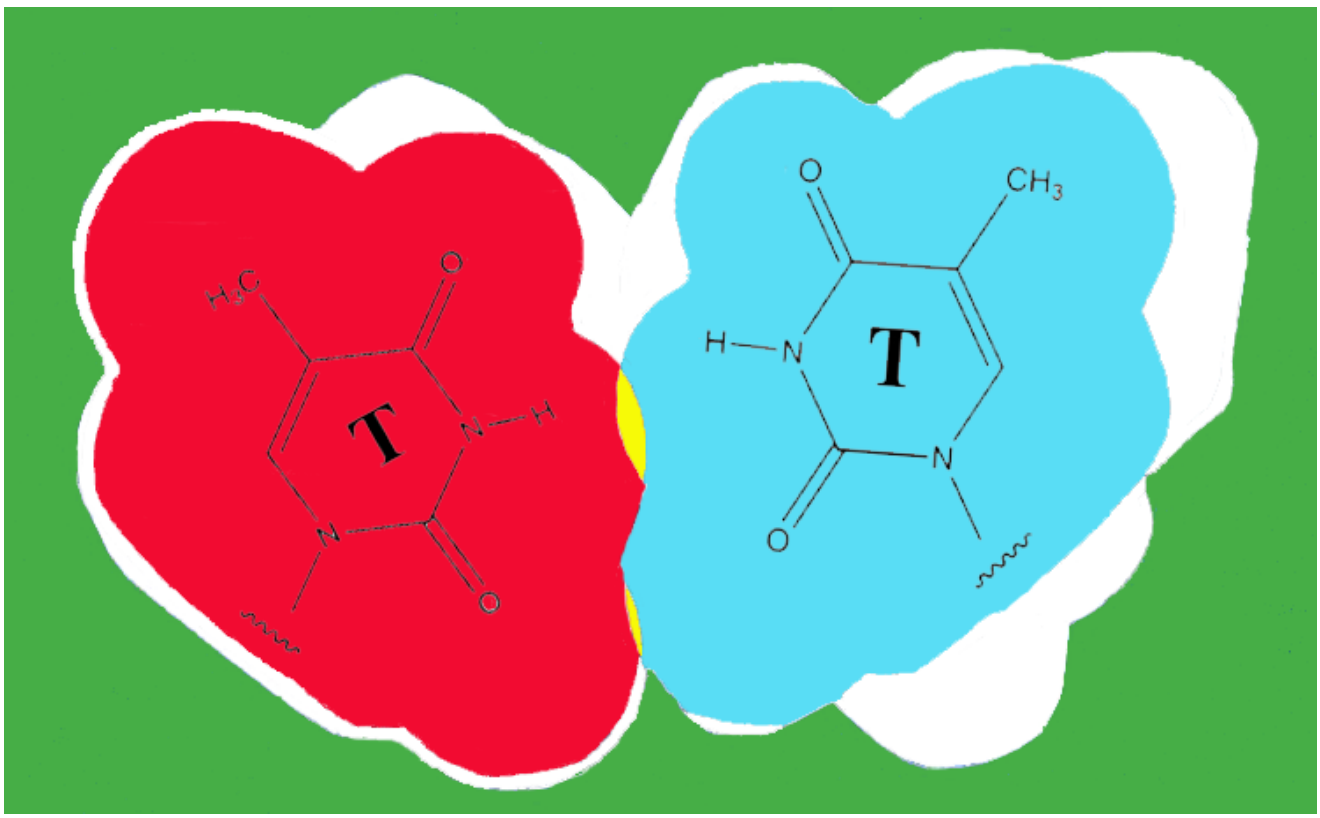
(A) OVERLAID SHAPES -
4 natural pairs



(B) CONSENSUS
POCKET NEEDED

TEMPLATE-BOUND NUCLEOTIDE	FREE NUCLEOTIDES	
	SIZE & SHAPE FIT DNA/POLYMERASE POCKET	SIZE & SHAPE DO NOT FIT DNA/POLYMERASE POCKET
T	A	T, C, G
A	T	A, C, G
C	G	C, T, A
G	C	G, T, A

T
A


T
T

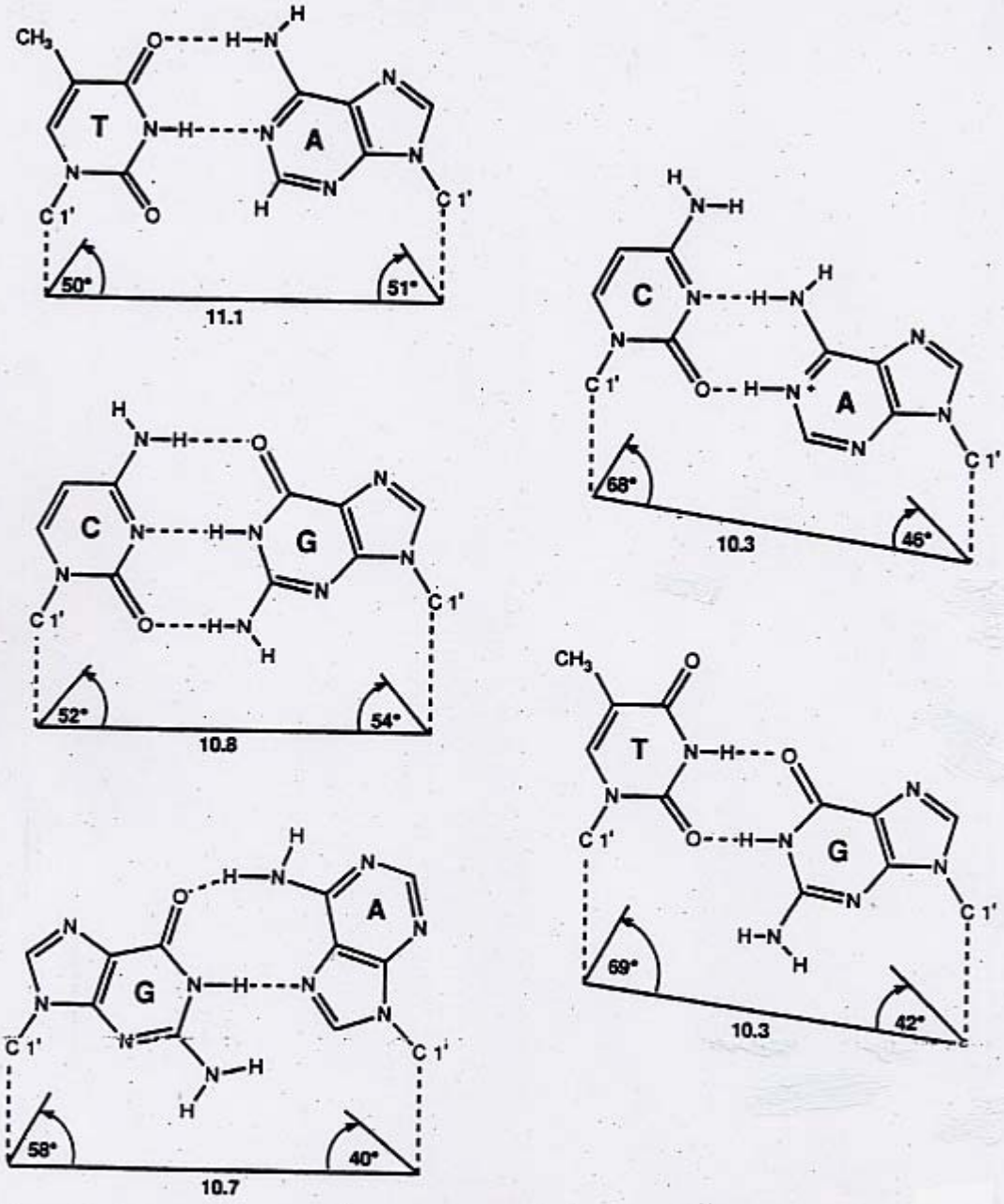
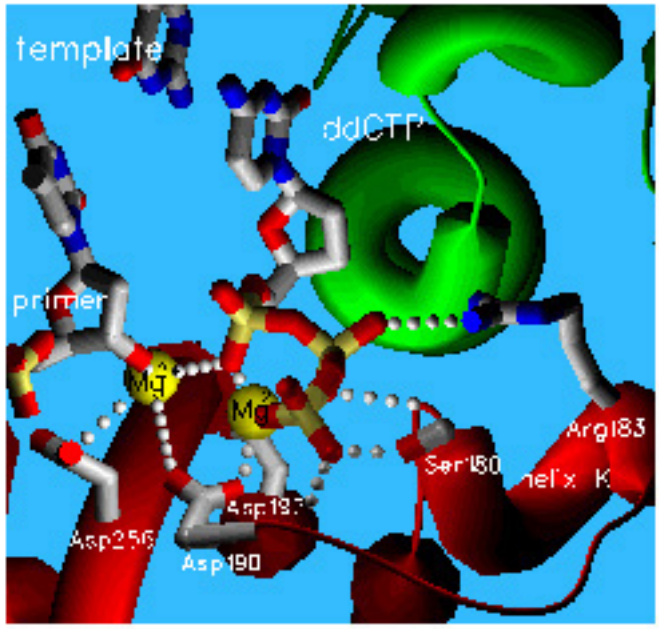
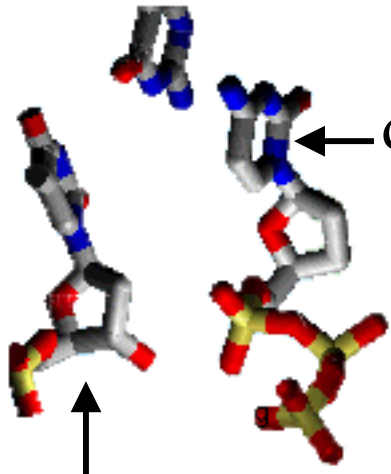


Figure 3 Geometric characteristics of Watson-Crick and of mismatched base pairs. The figure is based on X-ray crystallography of duplex B-DNA oligonucleotides (reproduced from Ref. 253). The striking geometric identity of the Watson-Crick pairs is not matched by the A·C and G·T wobble pairs or by the G(*anti*)·A(*syn*) pair.

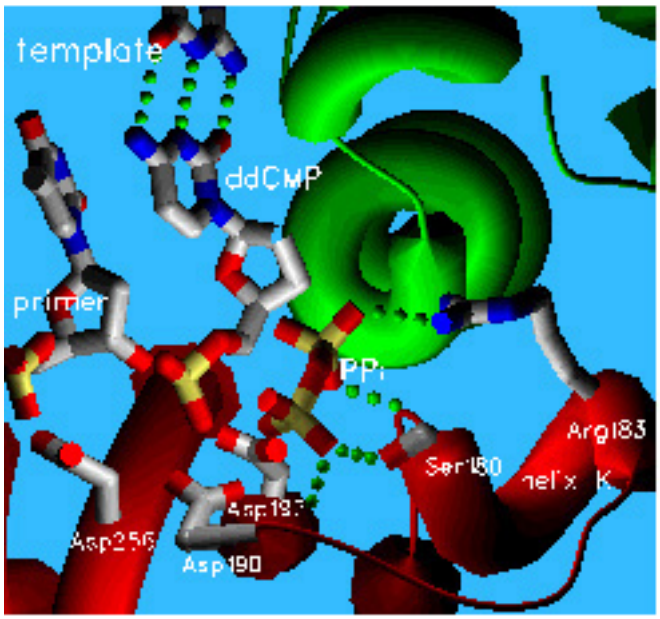


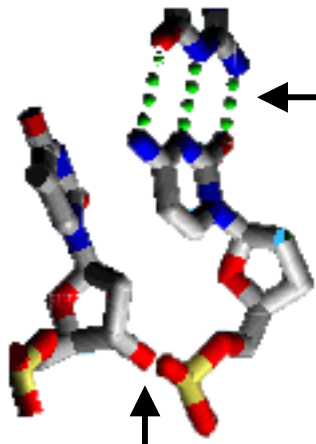


template

ddCTP

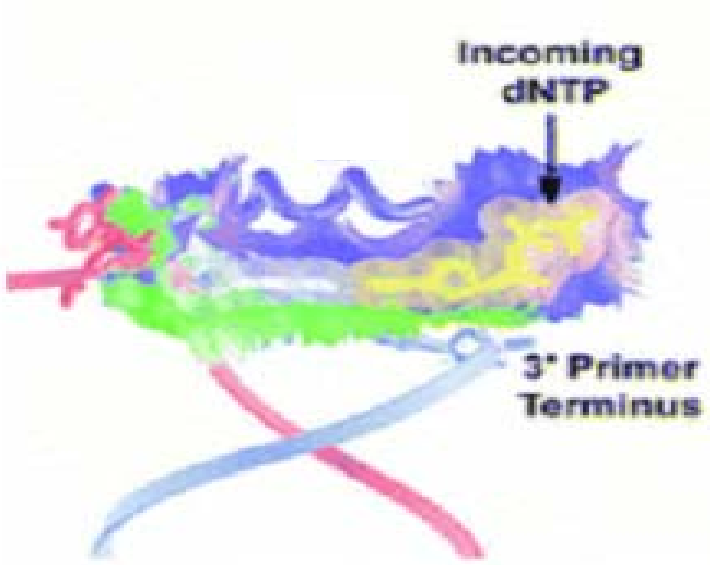
primer



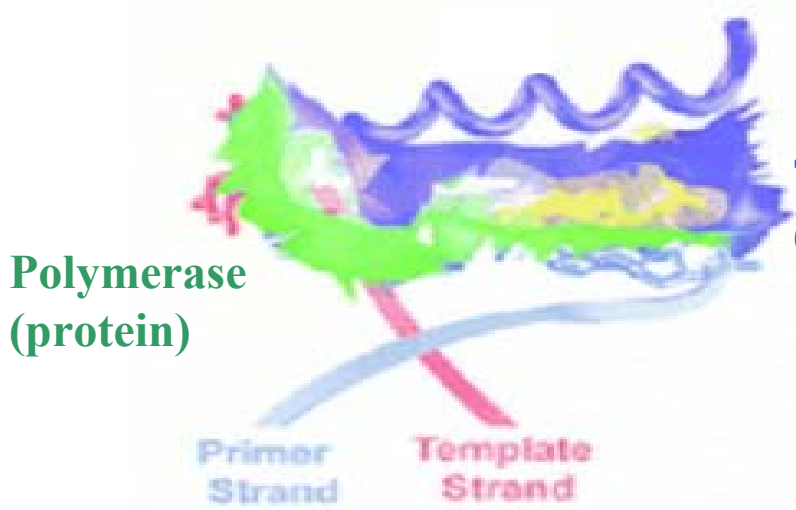


Hydrogen bonds

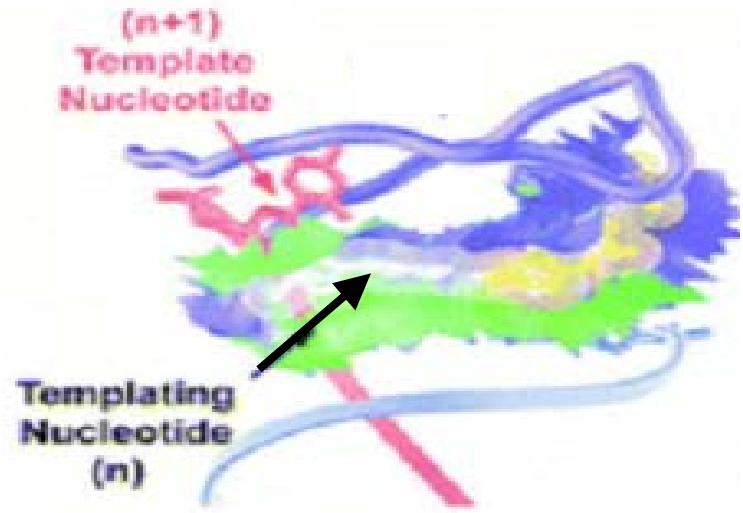
Phosphodiester bond



Pol B



T7 pol



HIV-1 RT