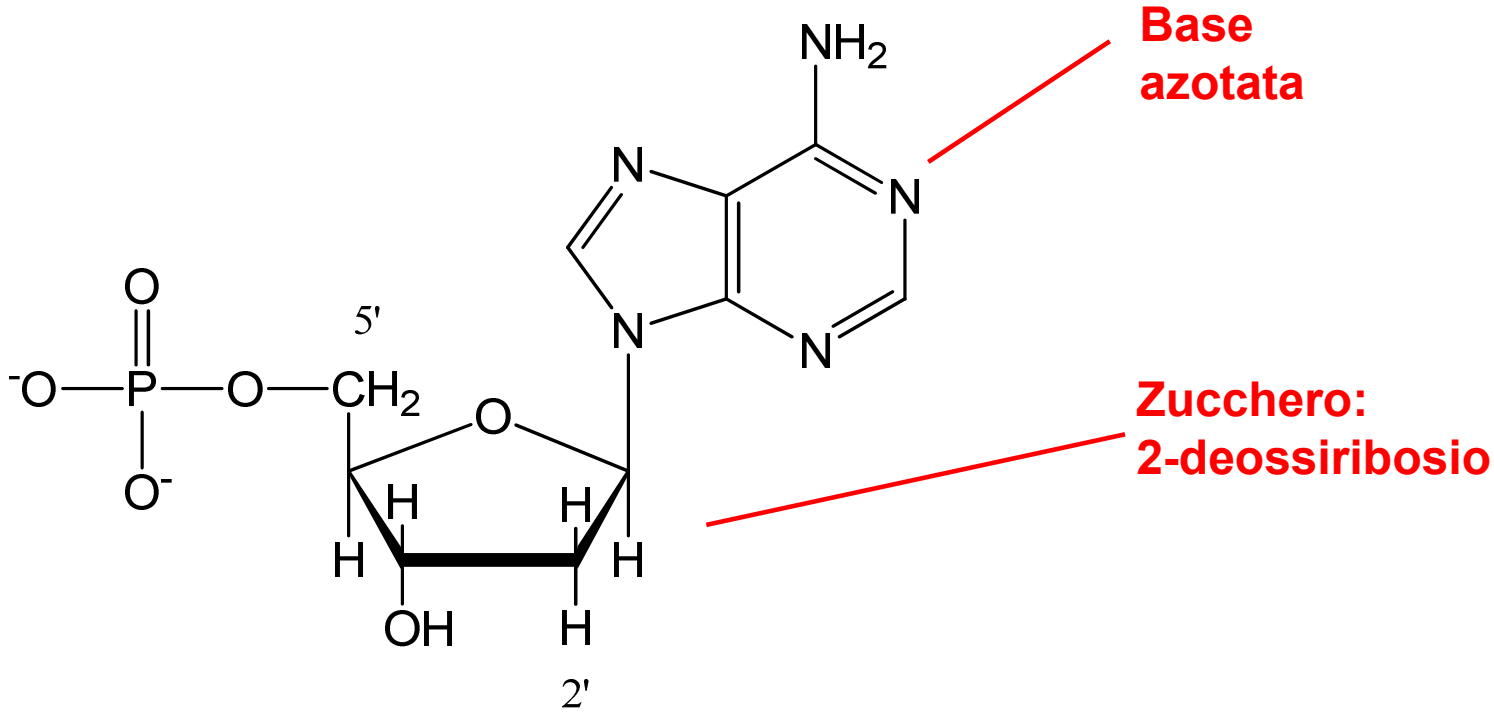
Nucleotidi e acidi nucleici

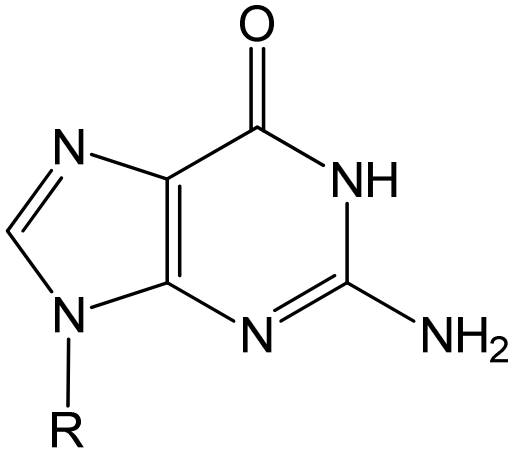
- Gli **acidi nucleici** sono polimeri costituiti da quattro tipi di monomeri, detti ***nucleotidi***
- Esistono due tipi di acidi nucleici:
  - acido deossiribonucleico o DNA
  - acido ribonucleico o RNA

- I due acidi nucleici hanno struttura, proprietà e funzioni molto diverse tra loro.

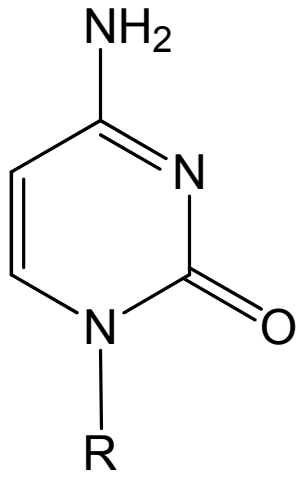


Un nucleotide del DNA: deossiadenosina-5’-monofosfato

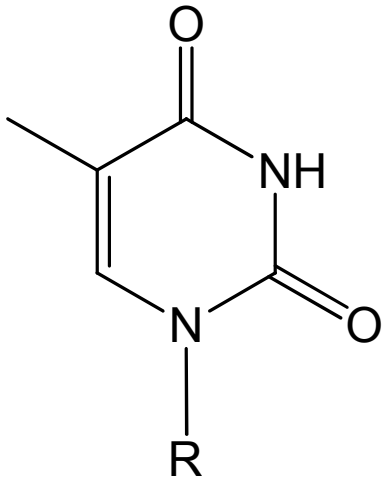
Il DNA è costituito da 4 tipi di nucleotidi



Guanina

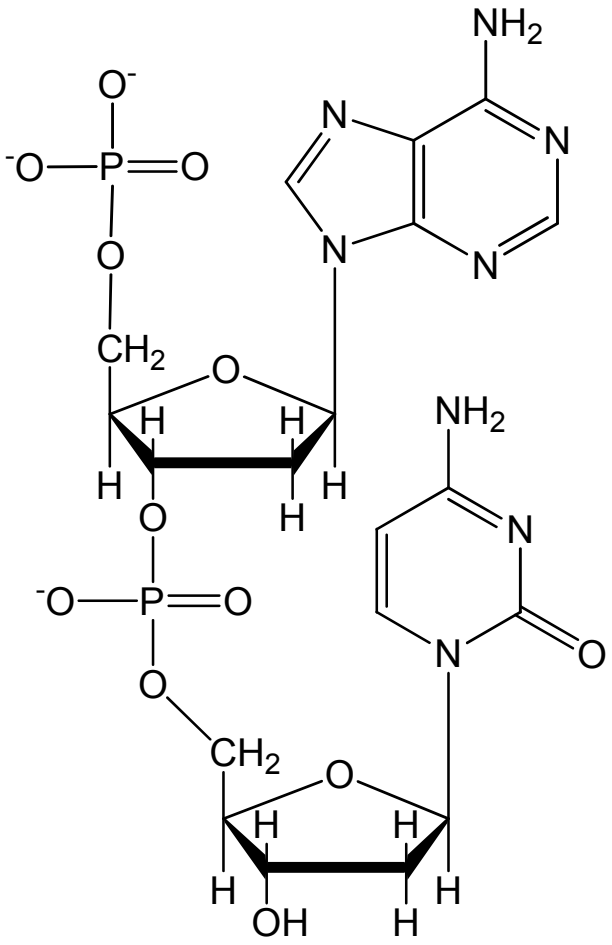


Citosina



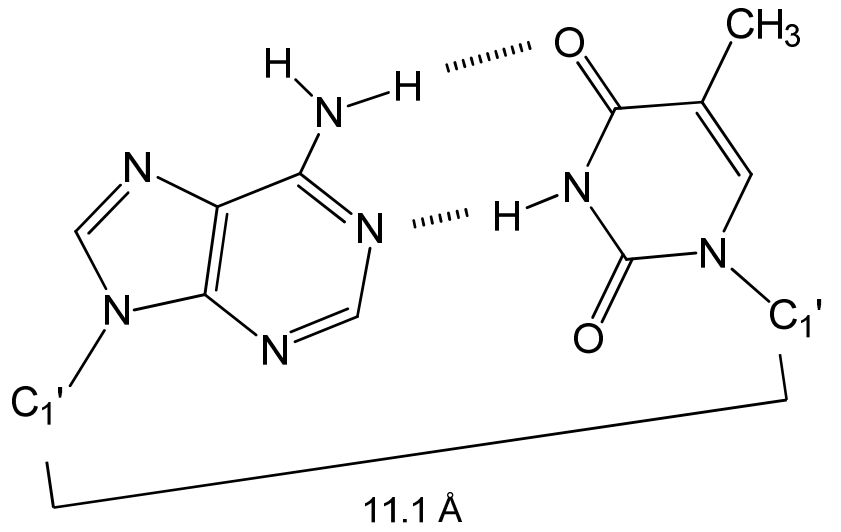
Timina

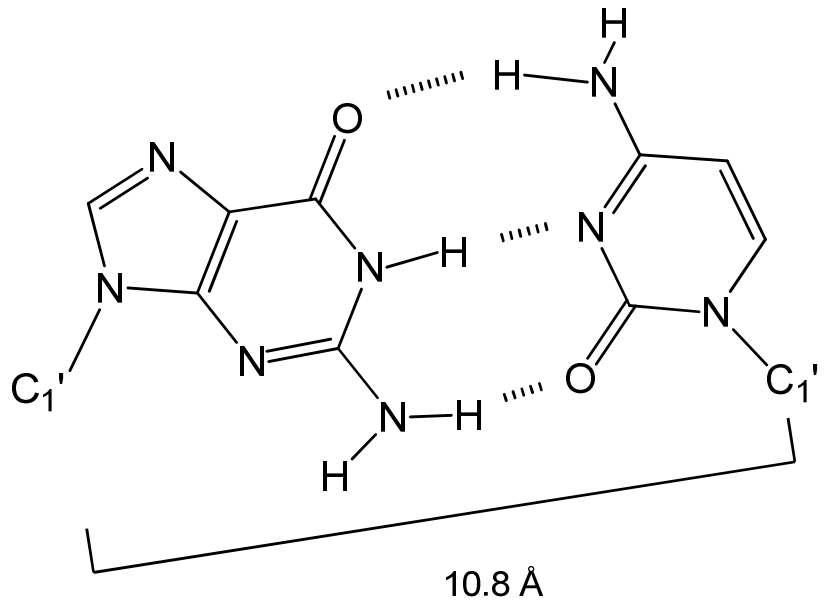
Legame fosfodiestere

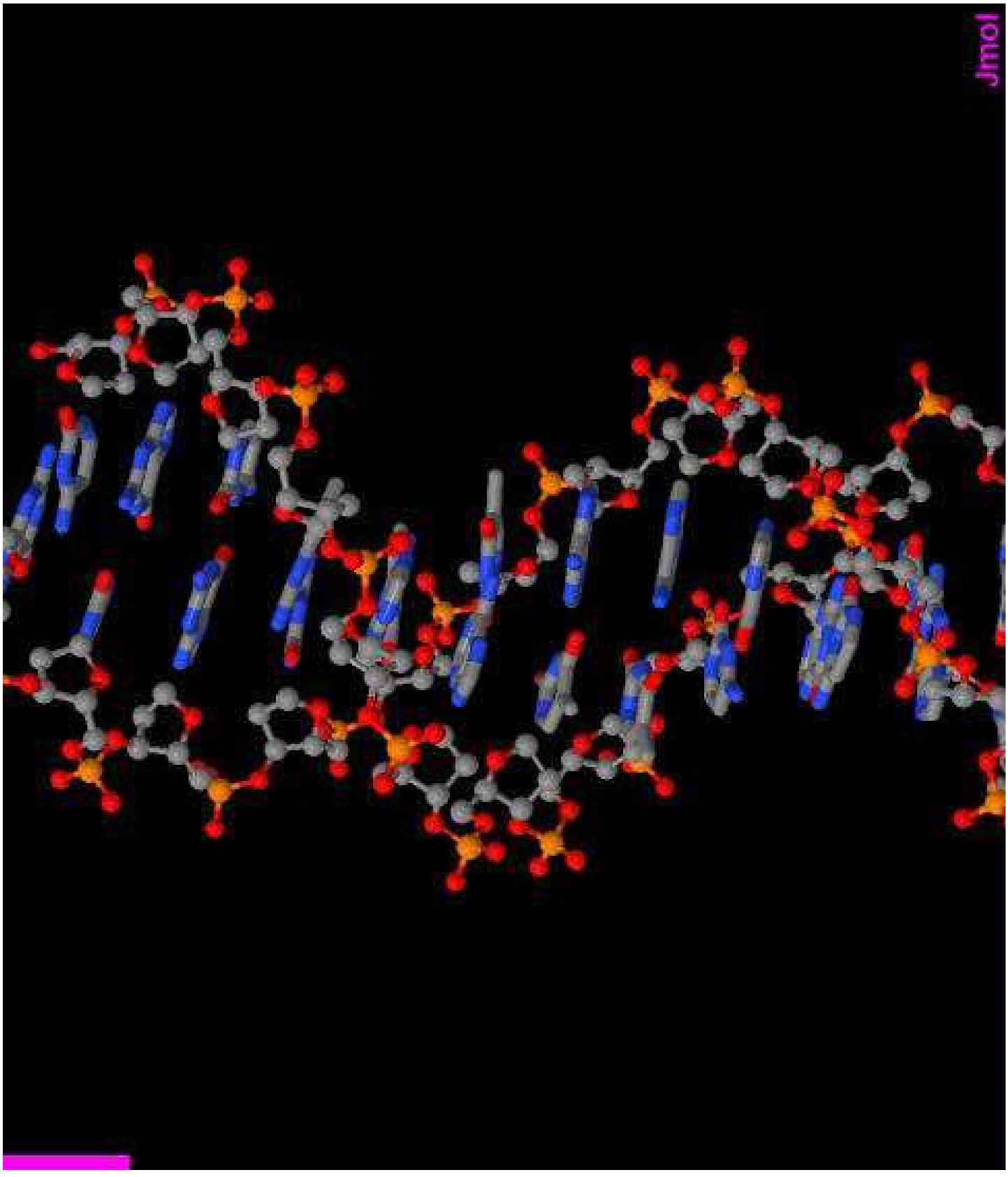


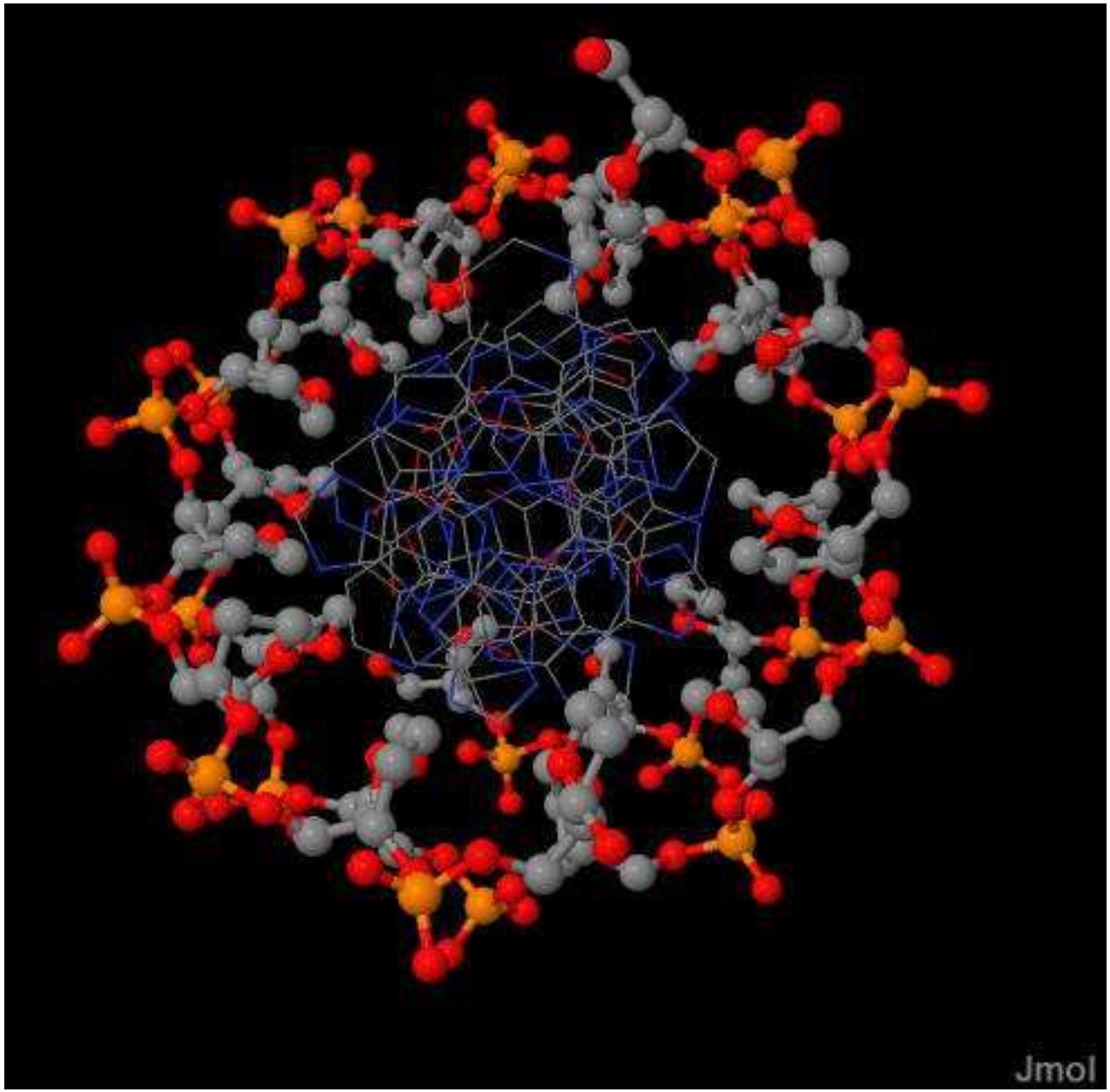
testa: estremità 5’

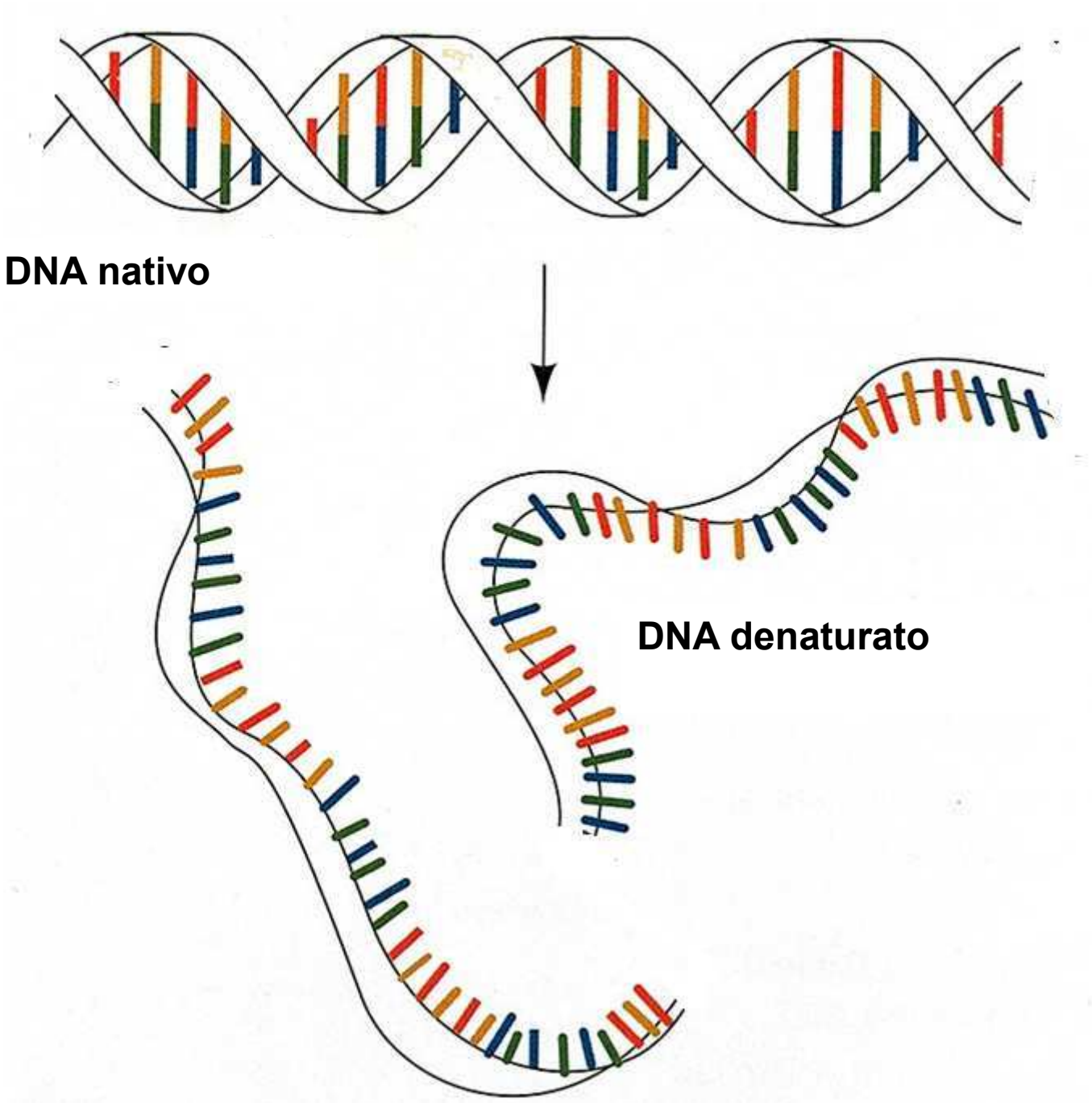
coda: estremità 3’

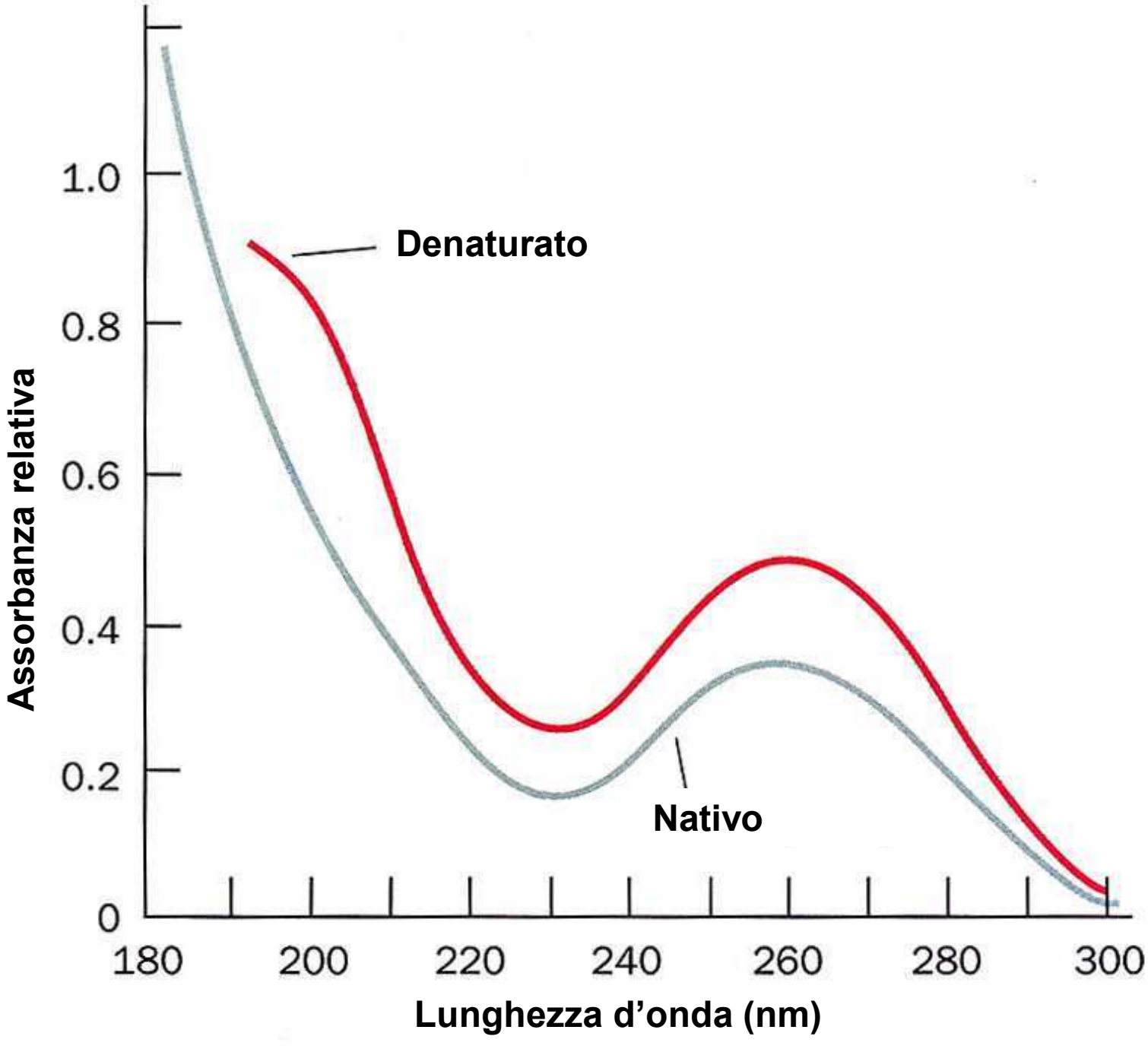

H
N
H
O
CH3
N
N
H
N
N
N
N
C1'
O
C1'
11.1 Å


H
H
N
O
N
N
H
N
N
C1'
N
O
C1'
N
H
H
10.8 Å

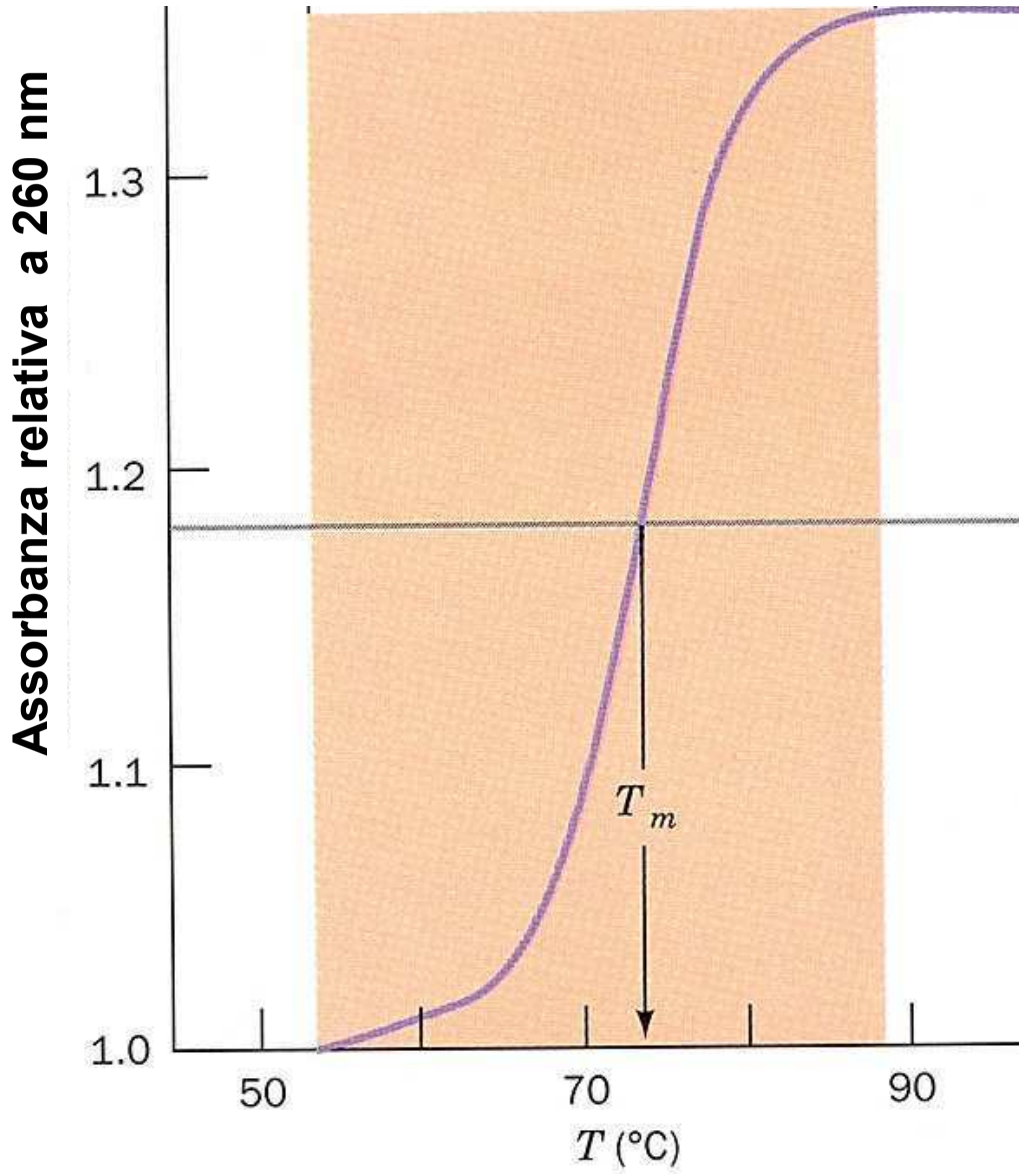

Jmol


Jmol

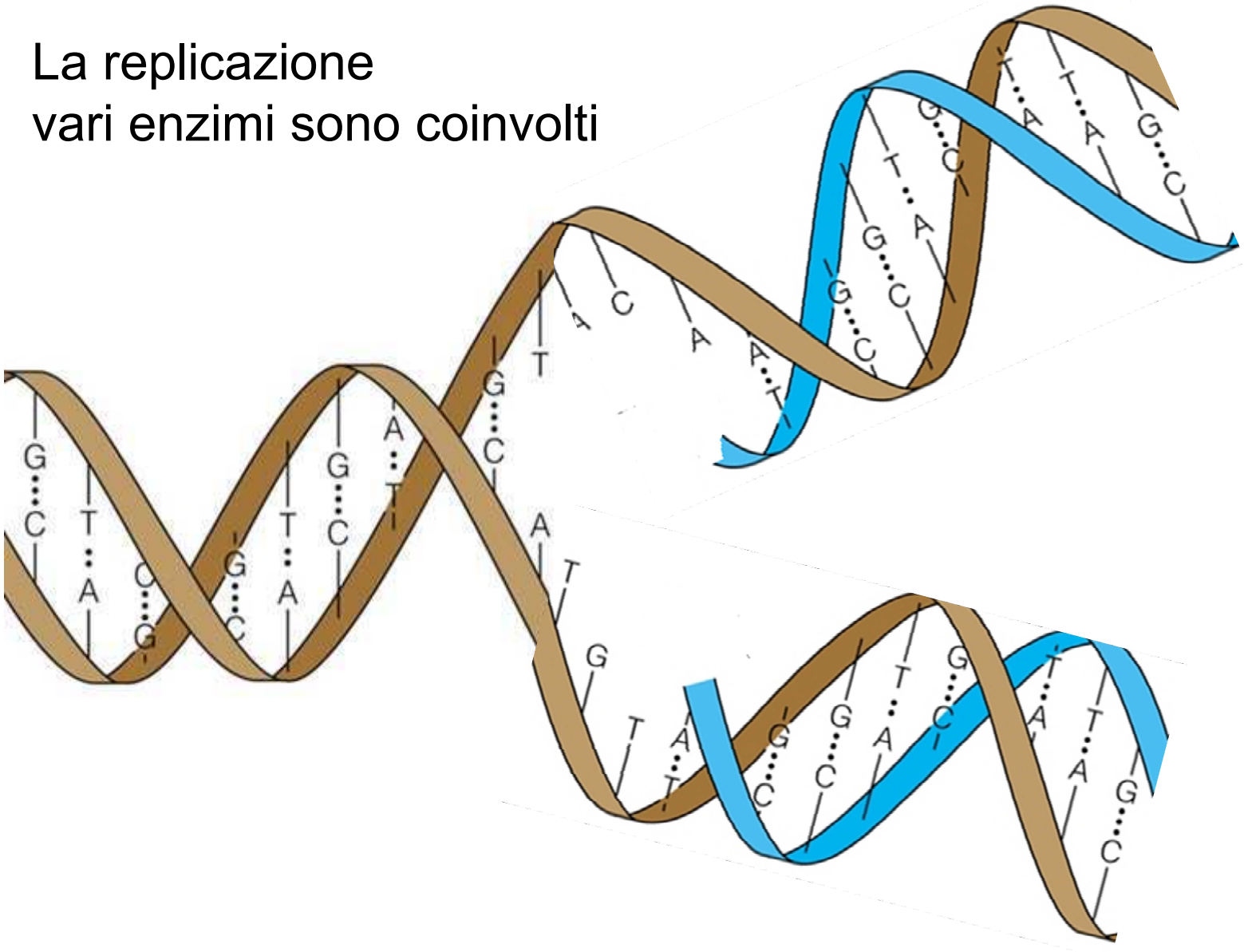

DNA nativo
DNA denaturato

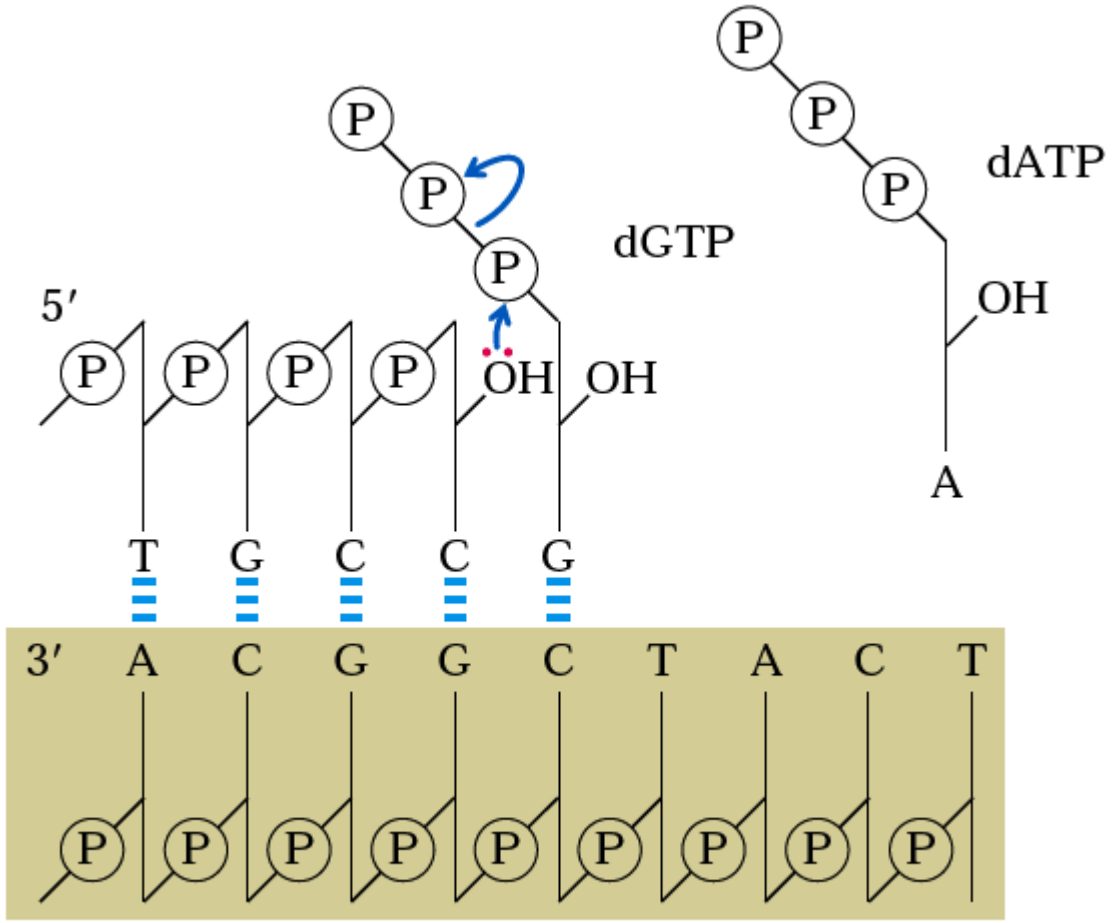

Assorbanza relativa
1.0
0.8
0.6
0.4
0.2
0
Denaturato
Nativo
180
200
220
240
260
280
300
Lunghezza d'onda (nm)

Effetto ipercromico



La replicazione
vari enzimi sono coinvolti

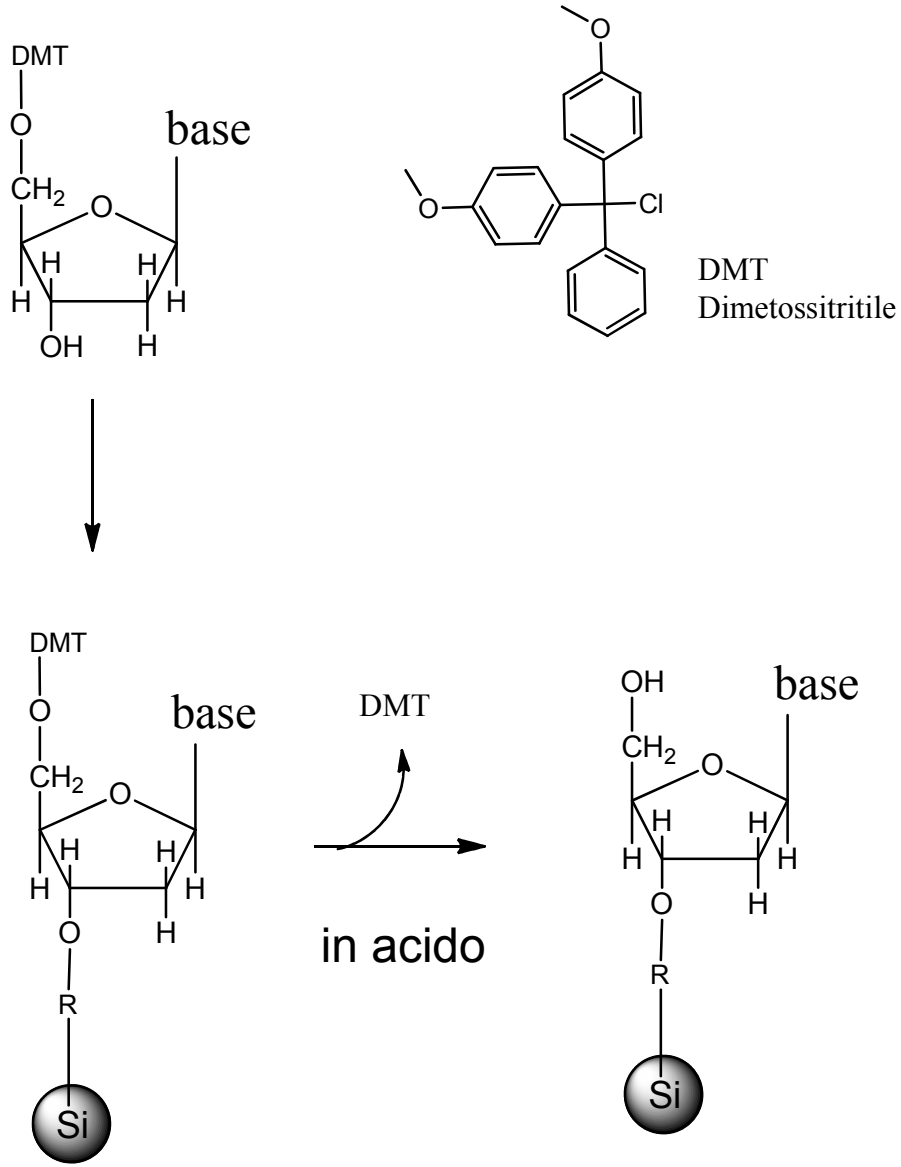




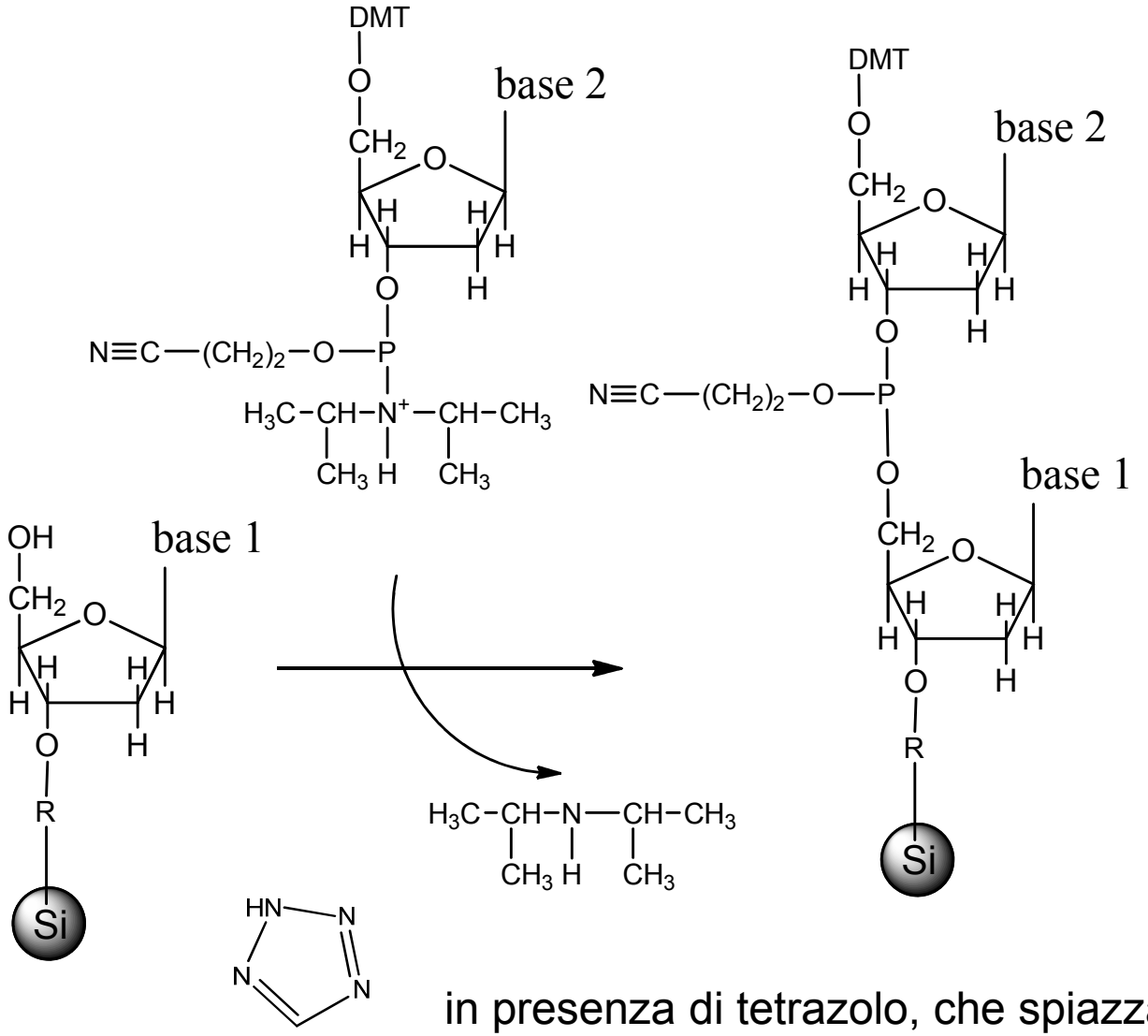
STAMPO

Enzima: DNA polimerasi

Sintesi chimica di oligonucleotidi

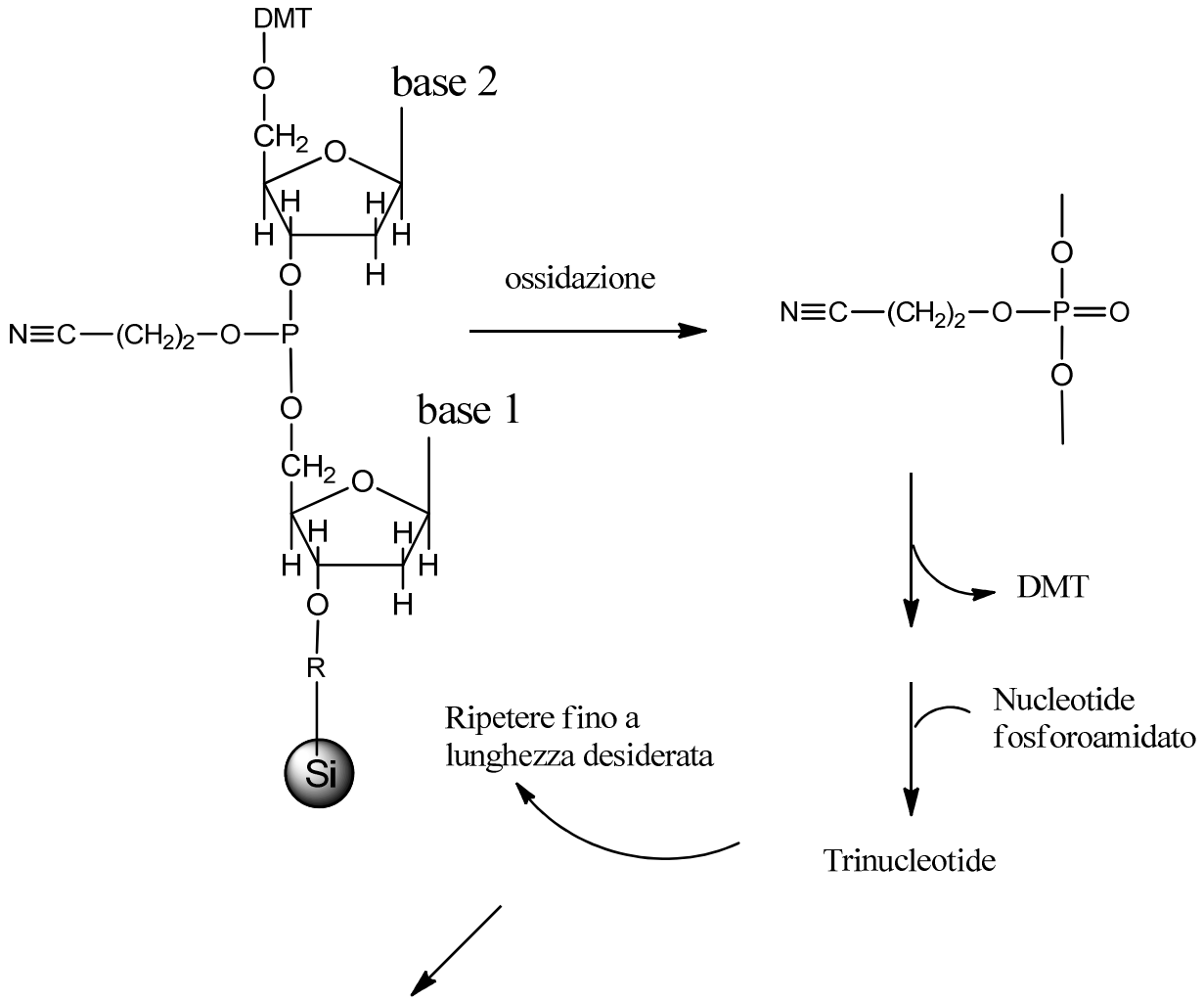


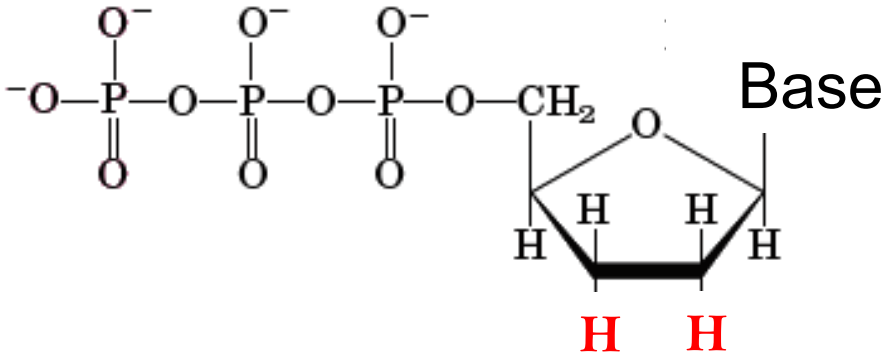
Sintesi chimica di oligonucleotidi. Fase 3



in presenza di tetrazolo, che spiazza il gruppo diisopropilaminico ed è poi spiazzato dall'OH del ribosio in 5'

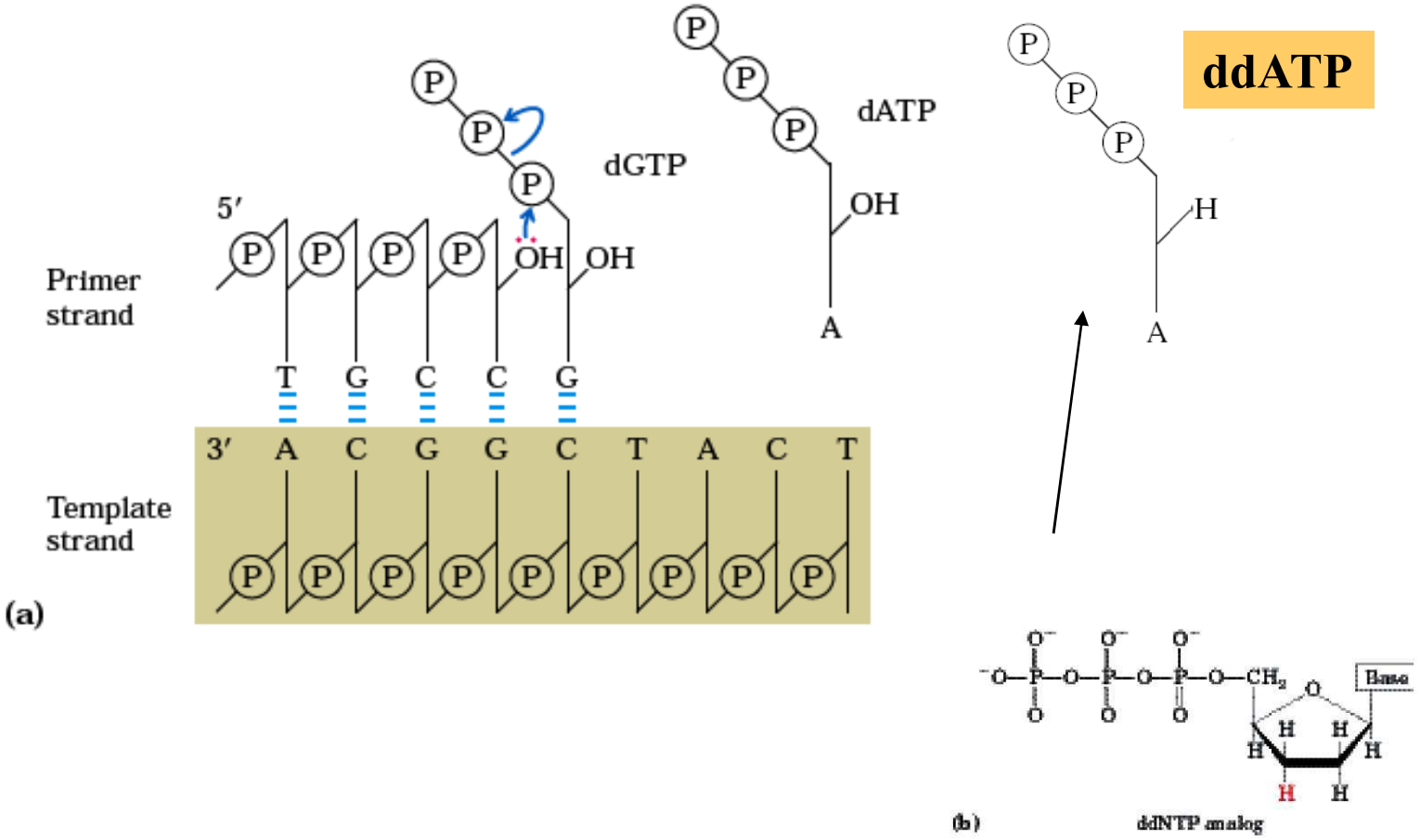
Sintesi chimica di oligonucleotidi. Fase 4





dideossiribonucleotide trifosfato

Sequenziamento del DNA



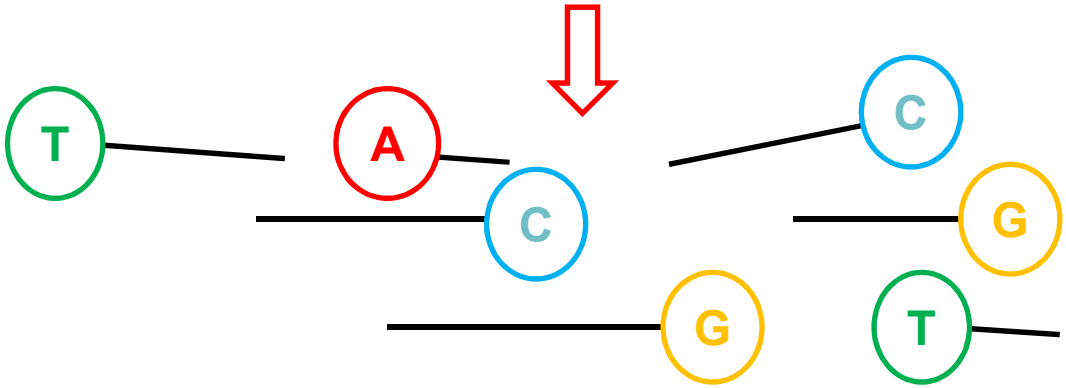
Primer

Stampo

+ DNA POLIMERSI + dCTP, dATP, dTTP, dGTP

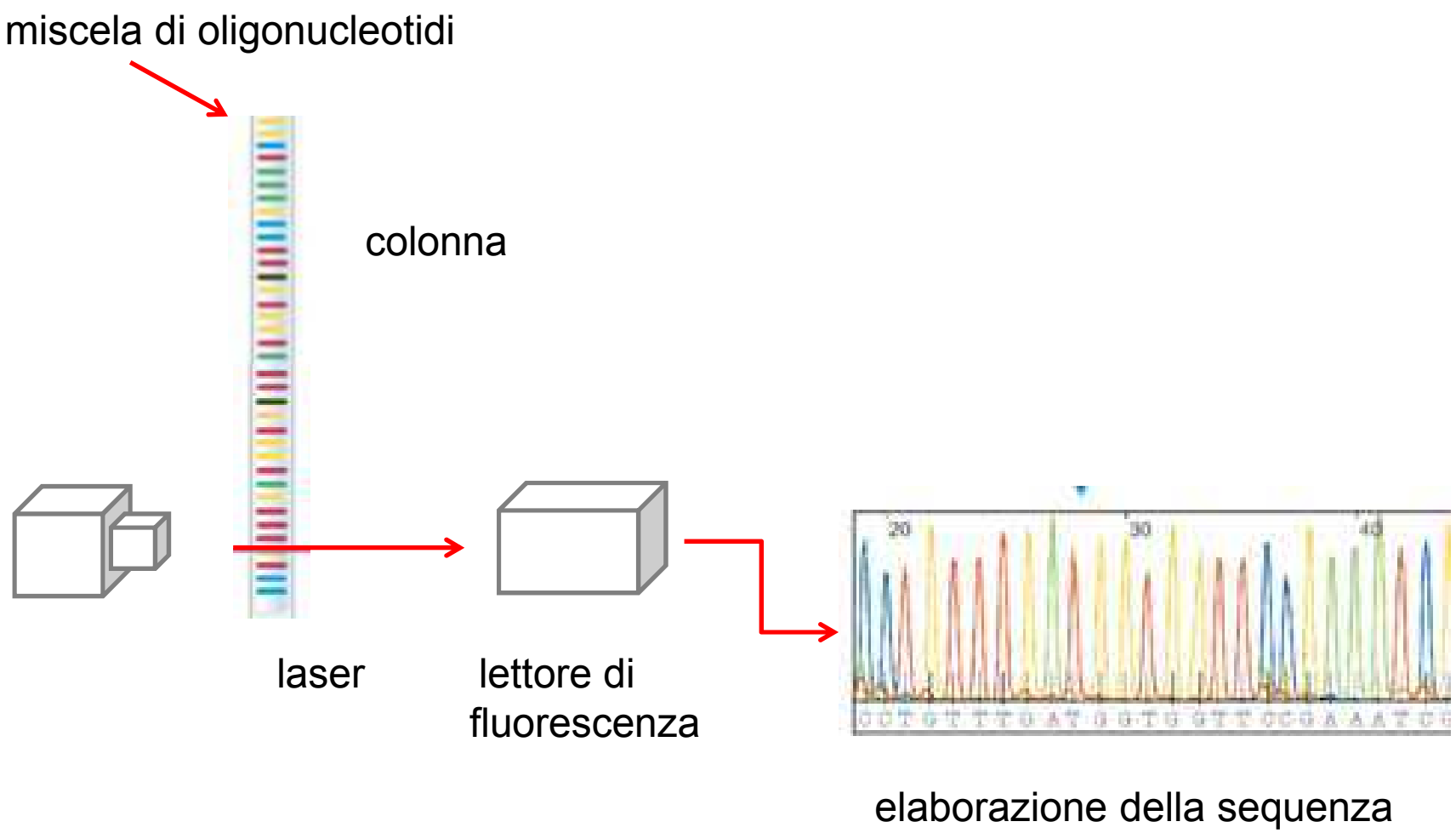
+ ddATP, ddCTP ddGTP ddTTP

marcati ognuno con una sonda fluorescente diversa

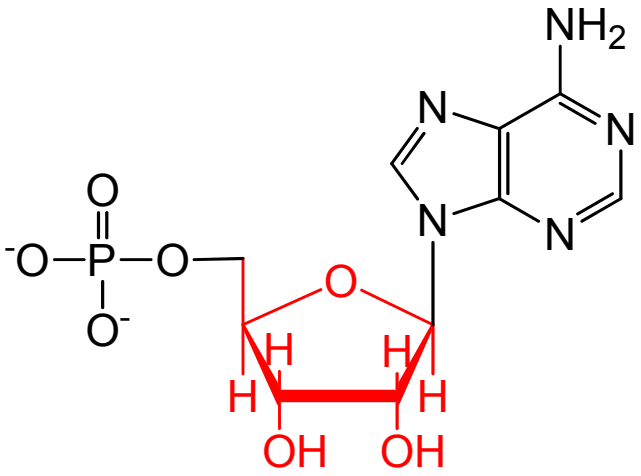


Separazione elettroforetica ed elaborazione computerizzata

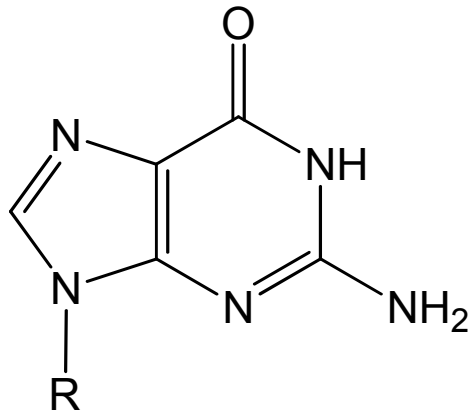
Sequenziamento del DNA

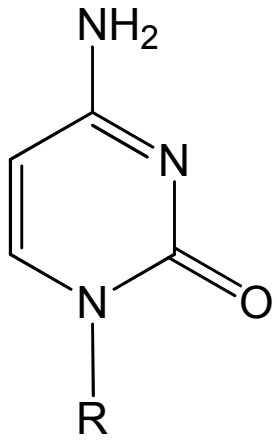


Acido ribonucleico: nucleotidi



Ribosio

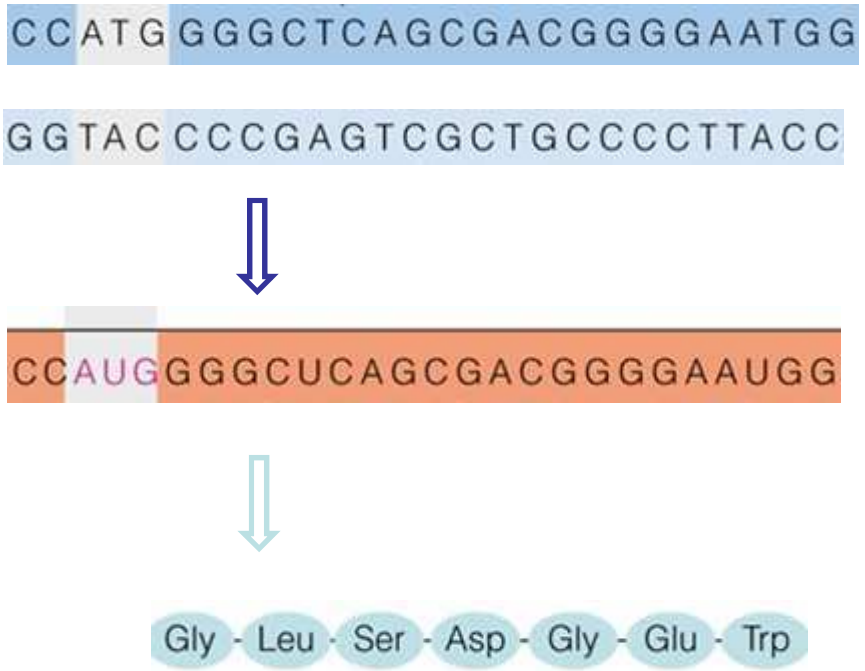




Uracile

L’RNA si presenta in varie forme

RNA messaggero
RNA ribosomale
RNA transfer

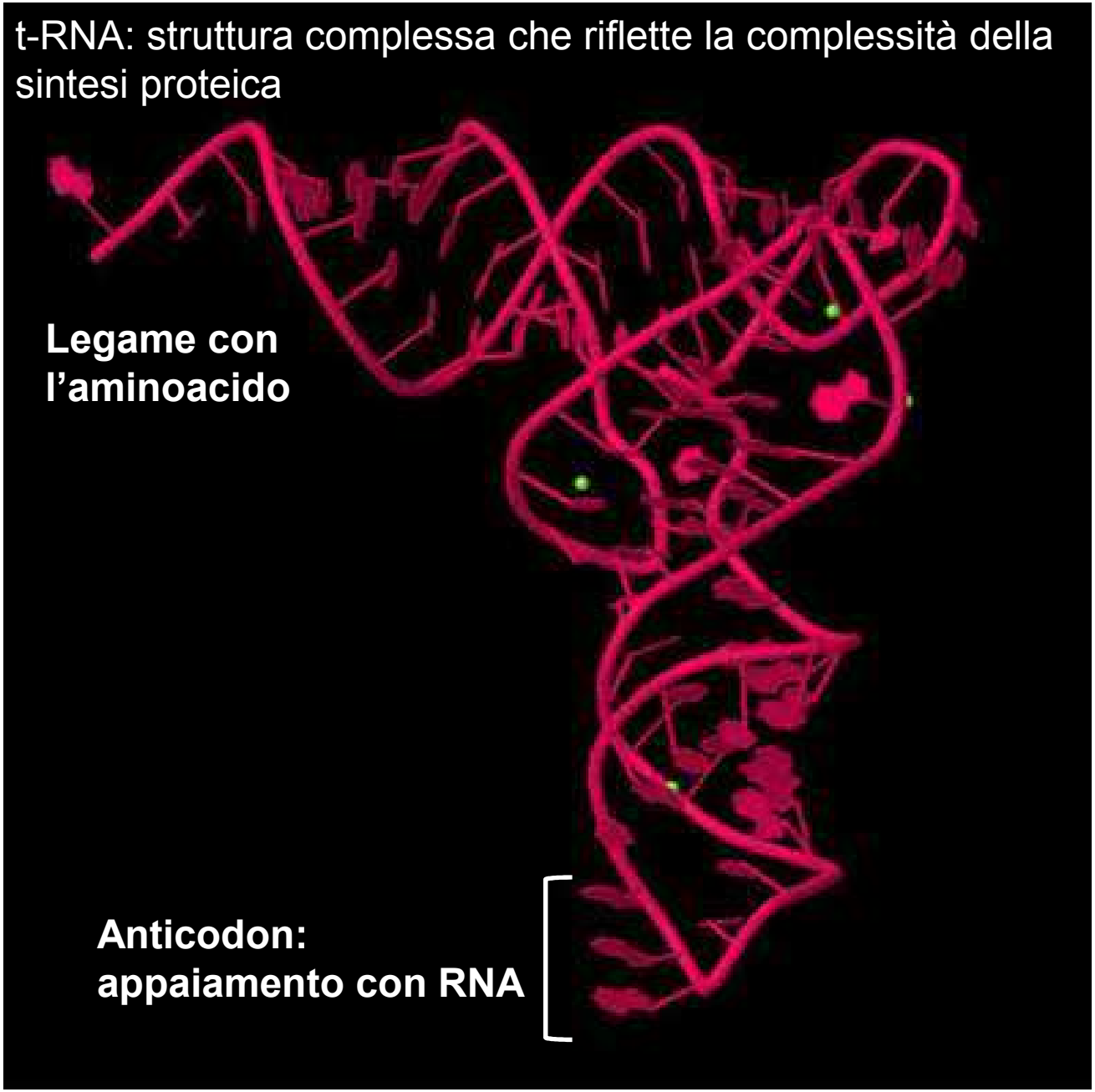


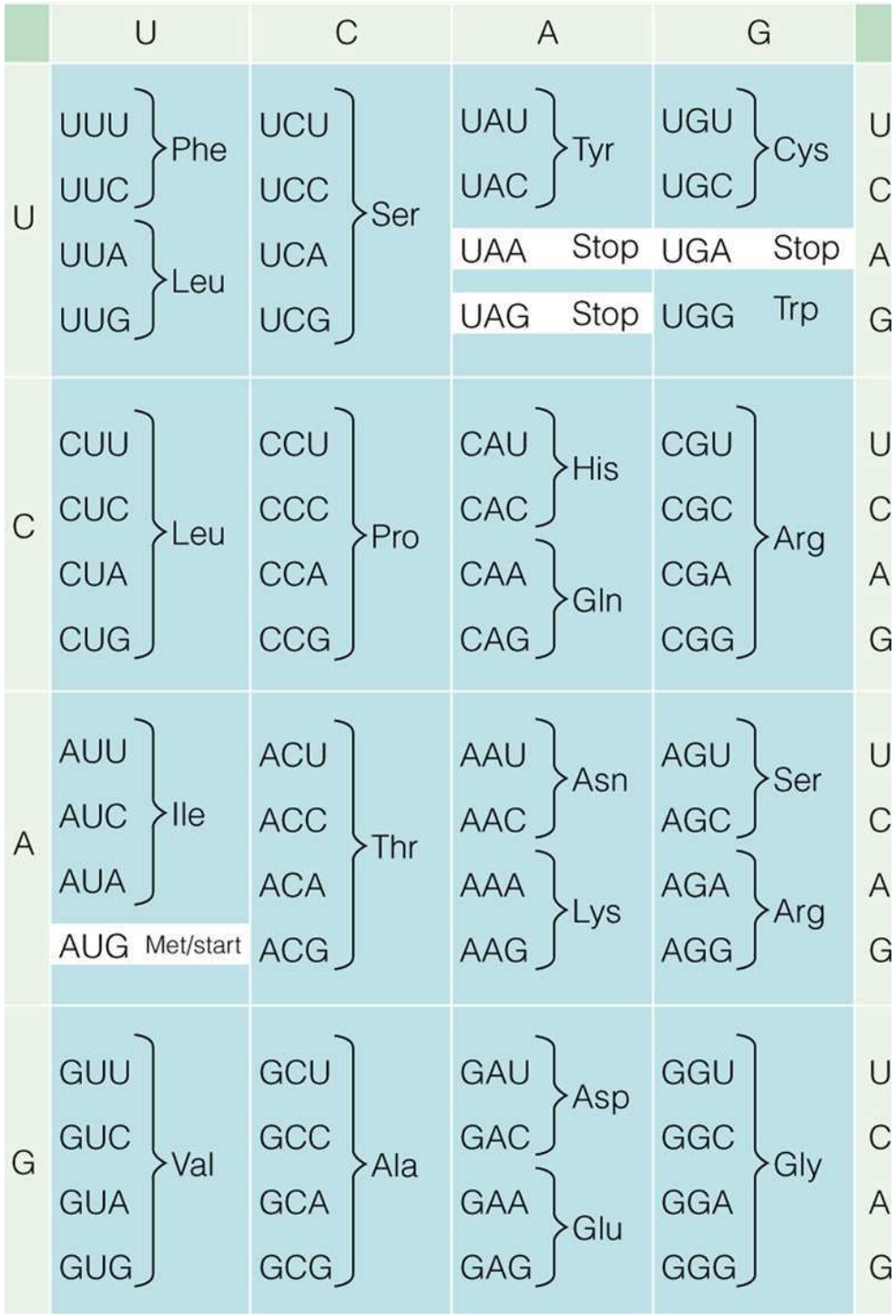
DNA:
un'elica è trascritta in

RNA

la sequenza di nucleotidi
è tradotta in sequenza
di aminoacidi in base
a un codice

t-RNA: struttura complessa che riflette la complessità della sintesi proteica




U
C
A
G
U
UUU Phe
UUC
UUA Leu
UUG
UCU Ser
UCC
UCA
UCG
UAU Tyr
UAC
UAA Stop
UAG Stop
UGU Cys
UGC
UGA Stop
UGG Trp
C
CUU Leu
CUC
CUA
CUG
CCU Pro
CCC
CCA
CCG
CAU His
CAC
CAA Gln
CAG
CGU Arg
CGC
CGA
CGG
A
AUU Ile
AUC
AUA
AUG Met/start
ACU Thr
ACC
ACA
ACG
AAU Asn
AAC
AAA Lys
AAG
AGU Ser
AGC
AGA Arg
AGG
G
GUU Val
GUC
GUA
GUG
GCU Ala
GCC
GCA
GCG
GAU Asp
GAC
GAA Glu
GAG
GGU Gly
GGC
GGA
GGG

Mutagenesi sito-specifica