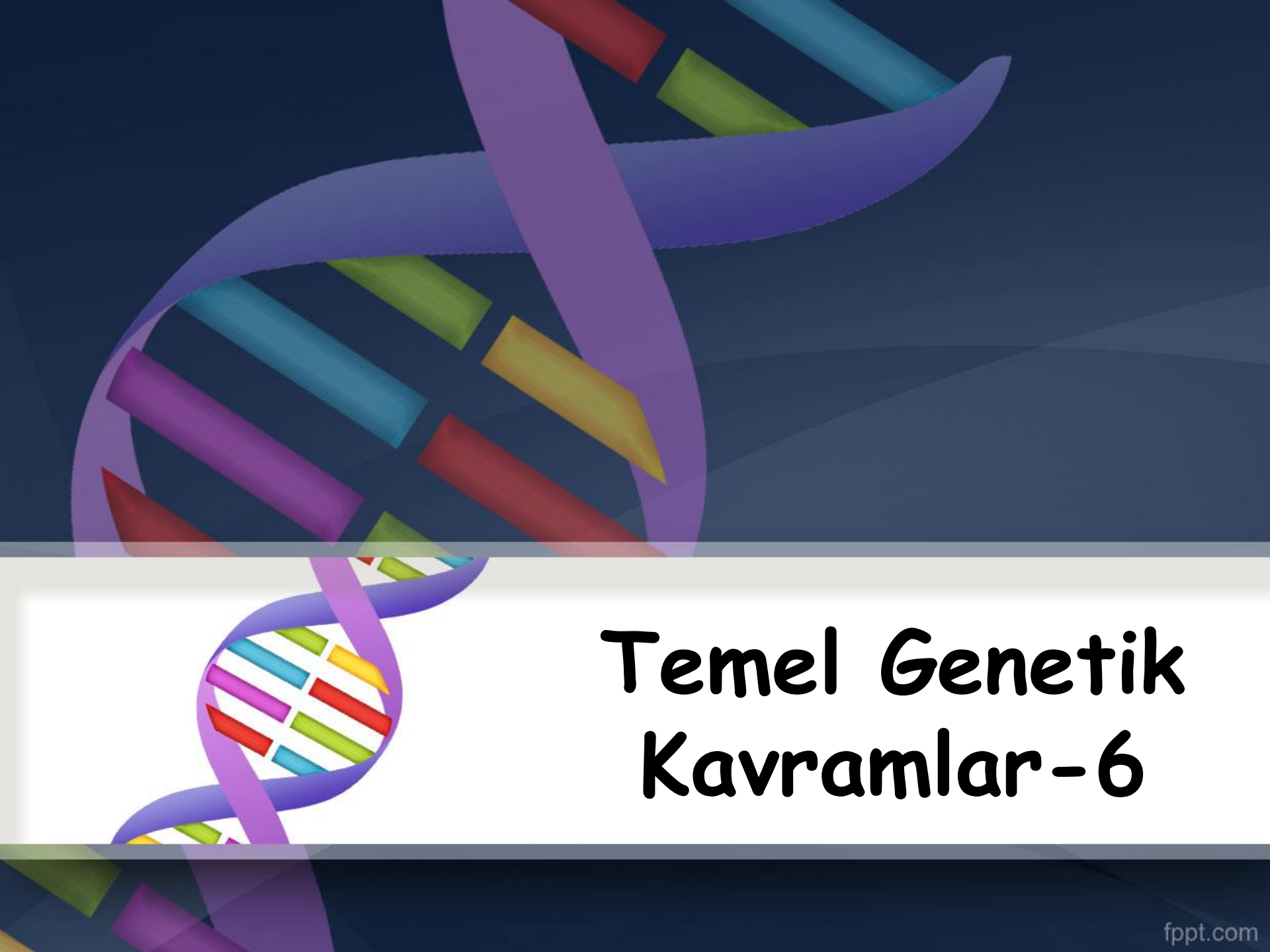

Temel Genetik Kavramlar-6

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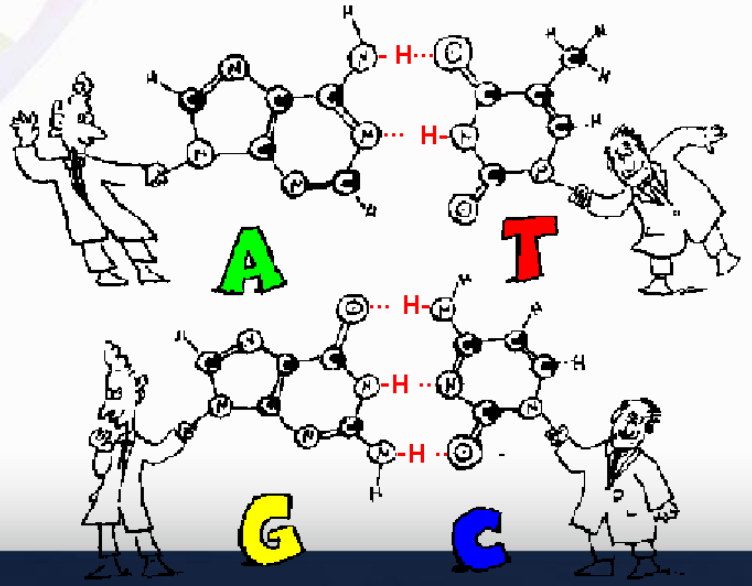
GENETİK MATERYALİN YAPISI VE ORGANİZASYONU



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- **1800'lü yılların ortalarında Mendel'in çalışmaları:**

*"karakterlerin aktarıldığı **birim faktörler** var ve tesadüfi olarak yavrulara geçiyorlar"*

- **1940'lara kadar kalıtım materyalinin protein veya amino asitler düşünülüyor:**

"DNA'da sadece 4 nükleotid var ama amino asitler 20 çeşit ve çok sayıda protein var!!!"

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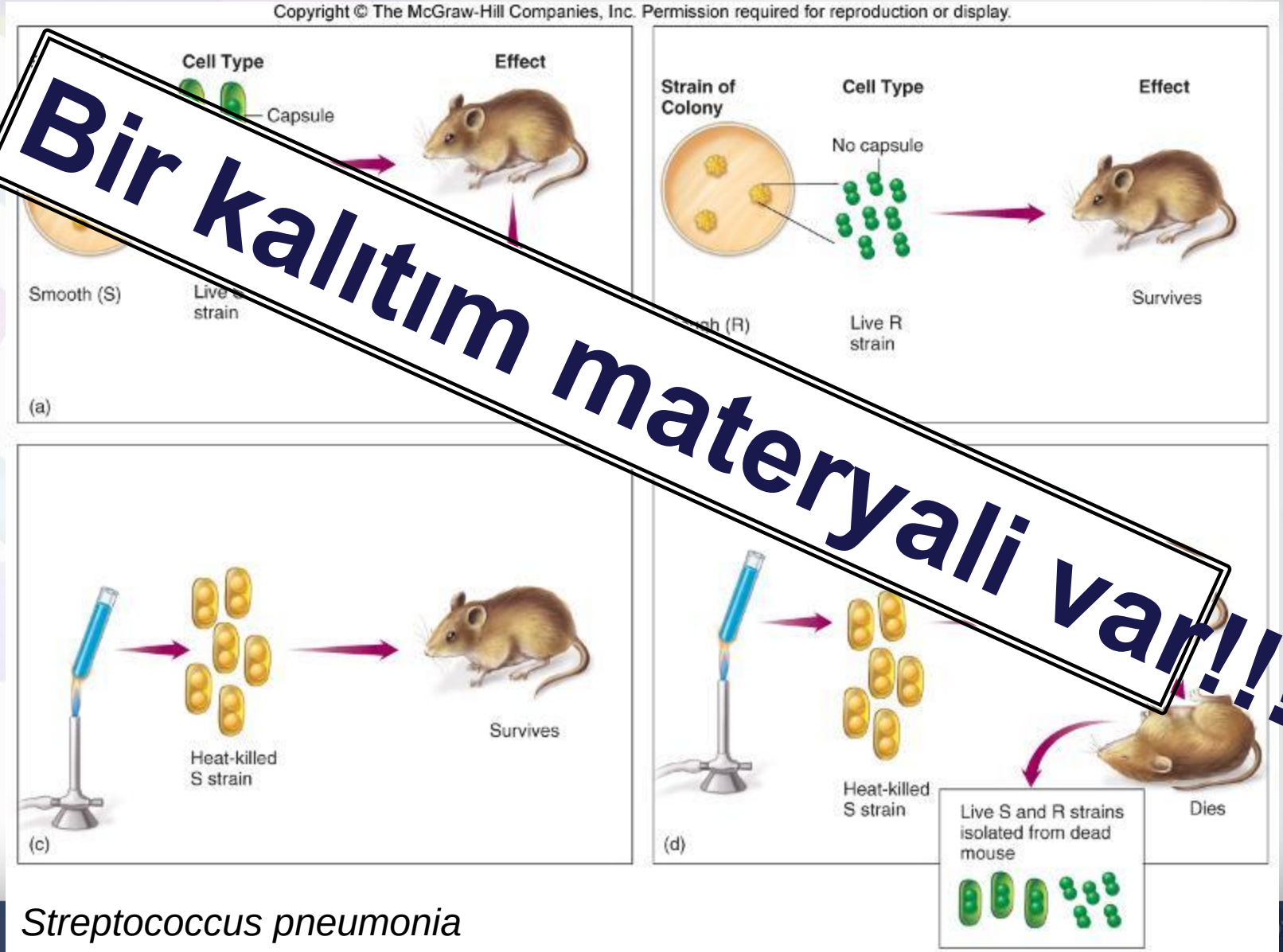
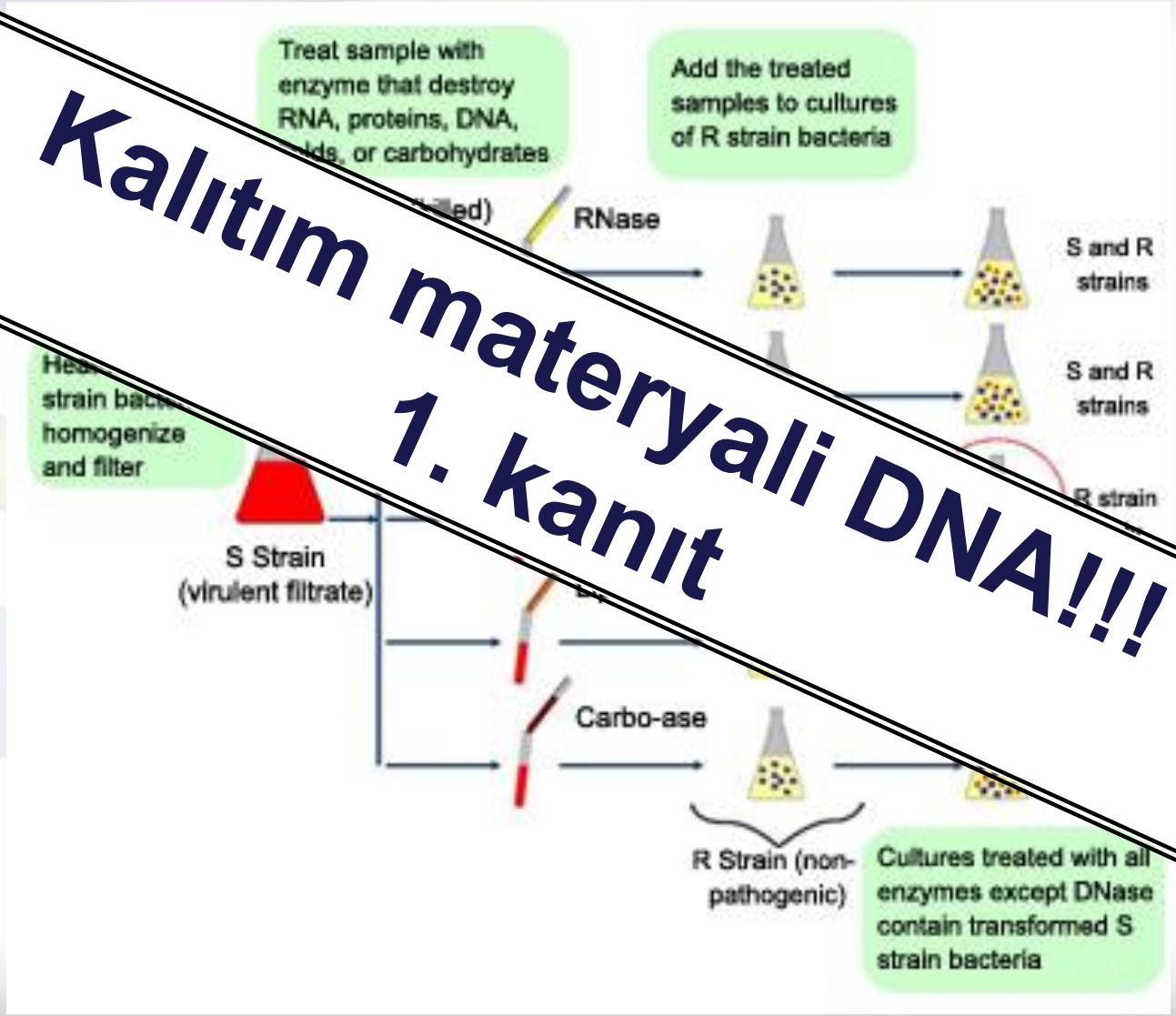
Griffith'in deneyi: Transformasyon prensibi (1928)



Bir kalıtım materyali var!!!

Streptococcus pneumonia

Avery, MacLeod ve McCarty deneyi: (1944)



Kalıtım materyali DNA!!!
1. kanıt

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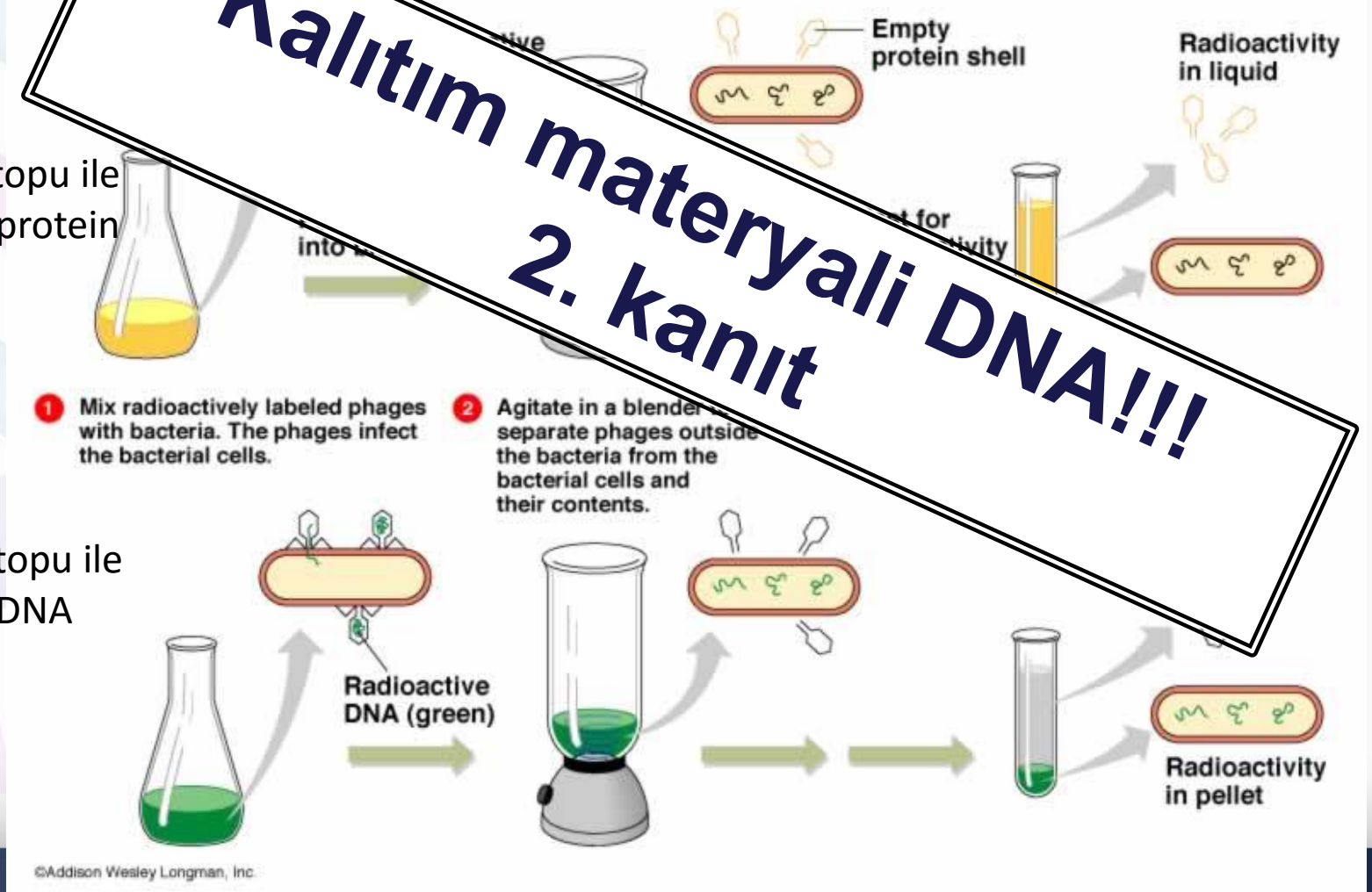
Hershey ve Chase deneyi: (1952)

Kalıtım materyali DNA!!!
2. kanıt

32S izotopu ile işaretli protein

32P izotopu ile işaretli DNA



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Chargaff kuralı

- Bir organizmadaki tüm hücreler aynı tip DNA içerirlerken, DNA'daki baz oranları tür içinde hemen hemen aynıdır ve bu oran türler arasında farklılık gösterir. **(A = T, C =G ve A + G = T + C)**

Meselson ve Stahl deneyi

- DNA **her hücre bölünmesi sırasında kopyalanır ve bu yarı korunumludur** (yarı korunumlu).

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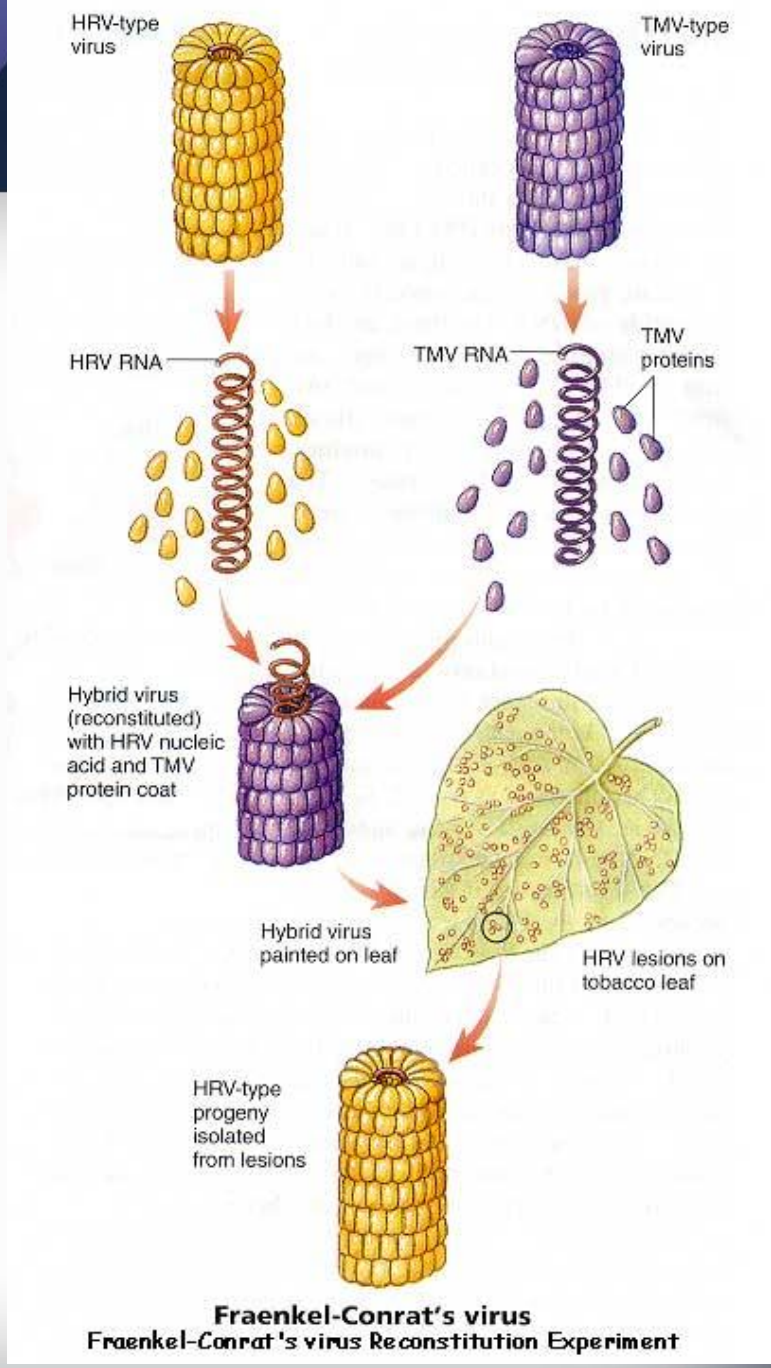
Genetik materyal her zaman DNA'mı?

- RNA içeren viruslar
- Retroviruslar…



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Genetik materyalin özellikleri

- Replikasyon
- Bilgi depolama
- Depolanmış bilgiyi ifade etme
- Mutasyonlar ile varyasyon sağlama

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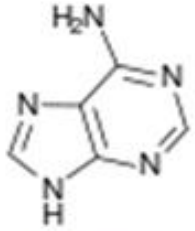
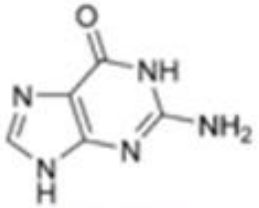
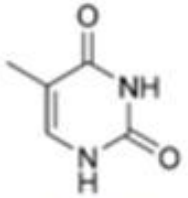
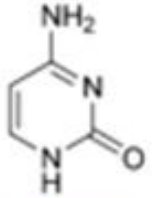
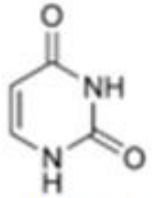
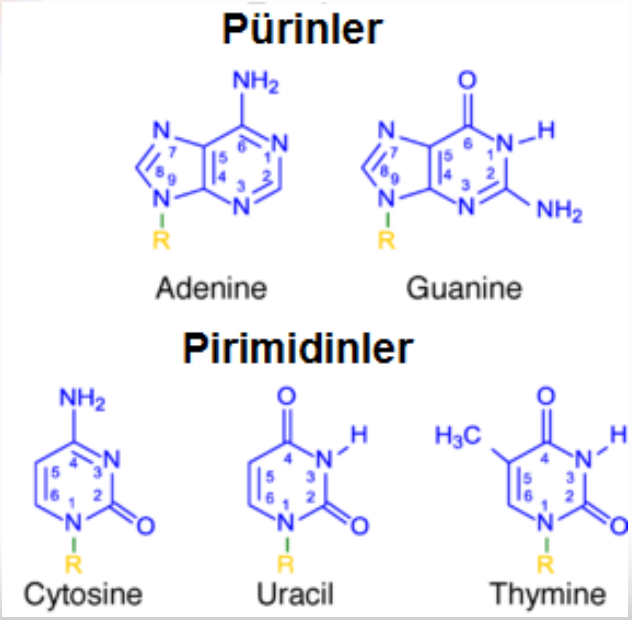
DNA'nın yapısı

- **Azotlu bazlar (nükleobazlar)**

Nükleobaz	Adenin	Guanin	Timin	Sitozin	Urasil
					



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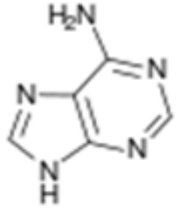
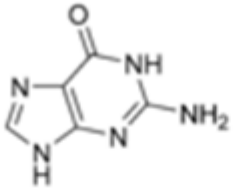
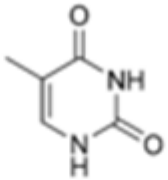
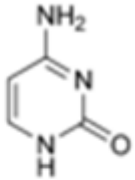
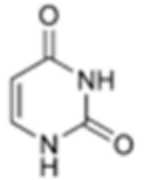
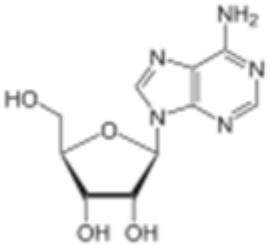
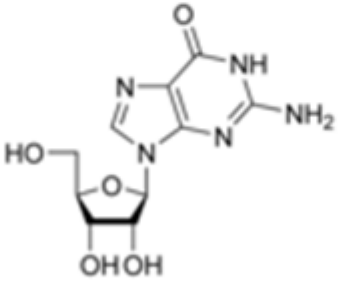
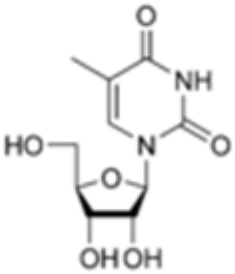
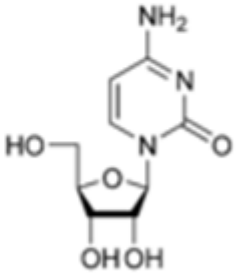
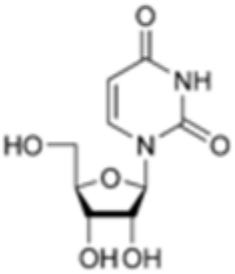
- **Nükleozit** beş karbonlu bir şeker ve bir azotlu organik bazdan oluşur.

Nükleobaz	 Adenin	 Guanin	 Timin	 Sitozin	 Urasil
Nükleozit	 Adenozin A	 Guanozin G	 Timidin T	 Sitidin C	 Uridin U

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- **Nükleotit**, bir fosfat grubu, beş karbonlu bir şeker (deoksiriboz) ve bir azotlu organik bazdan oluşur. Nukleotitler, nukleozitlerin fosfat esterleridir (*nükleozit monofosfat*).

Baz + Şeker + P → Nükleotit

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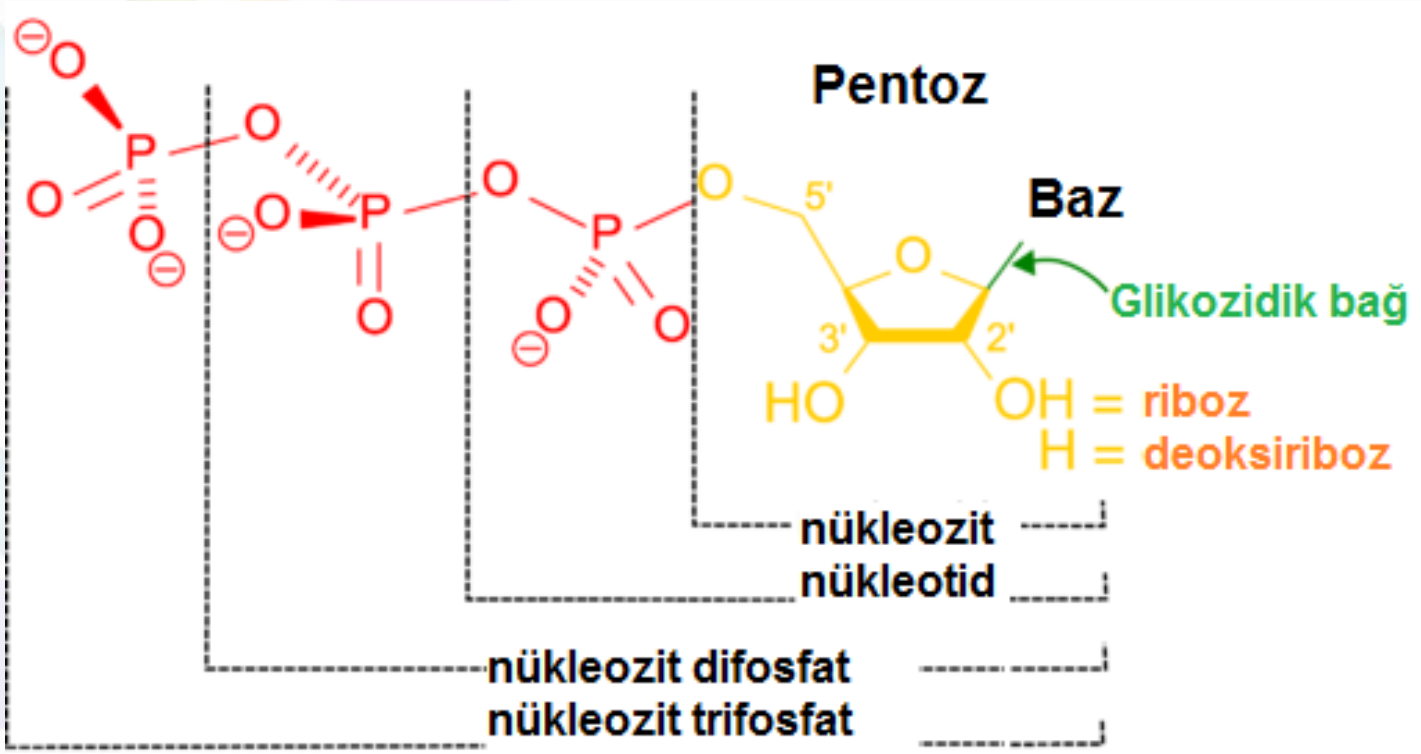
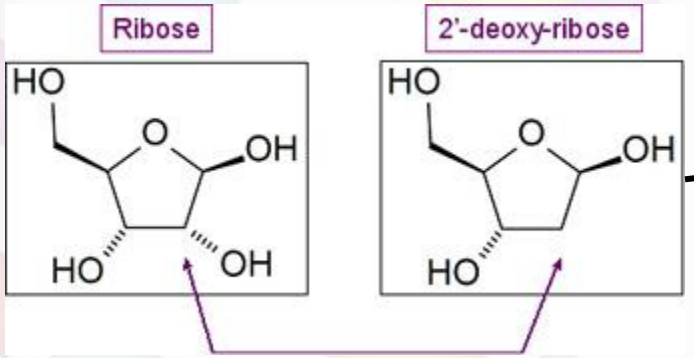
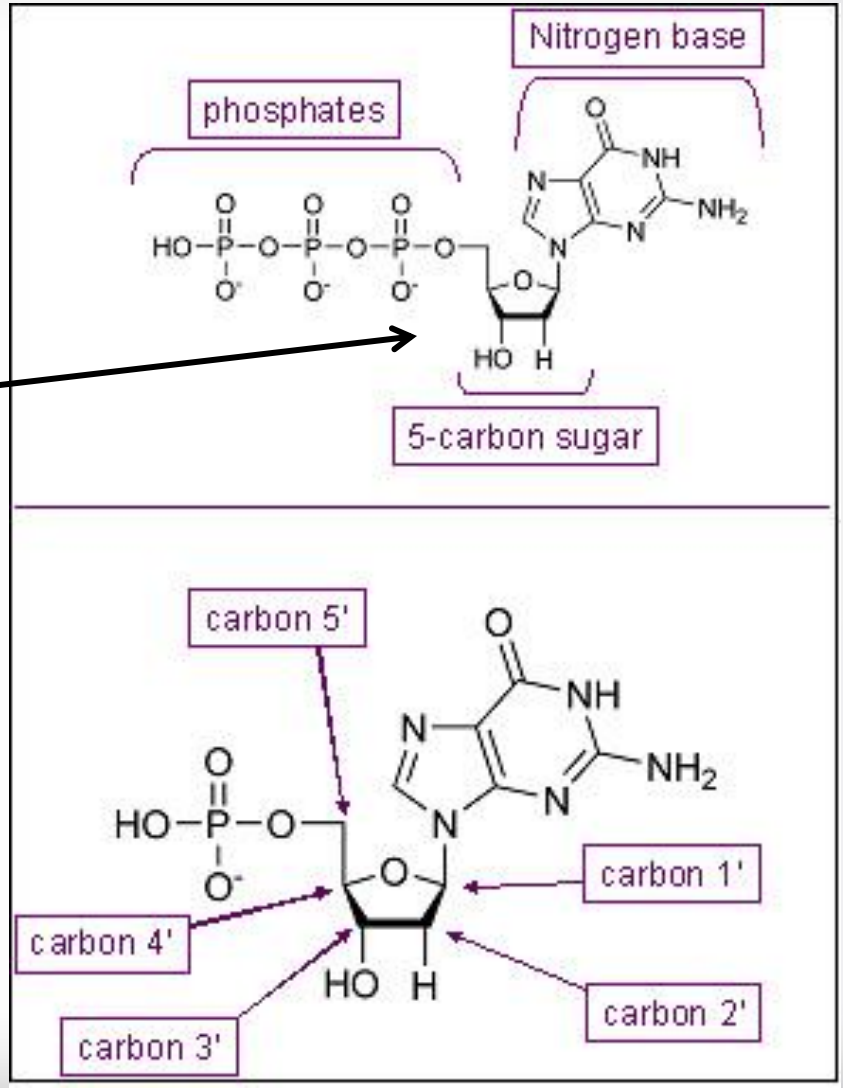

Pentoz
Baz
Glikozidik bağ
5'
3'
2'
HO
OH = riboz
H = deoksiriboz
nükleozit
nükleotid
nükleozit difosfat
nükleozit trifosfat

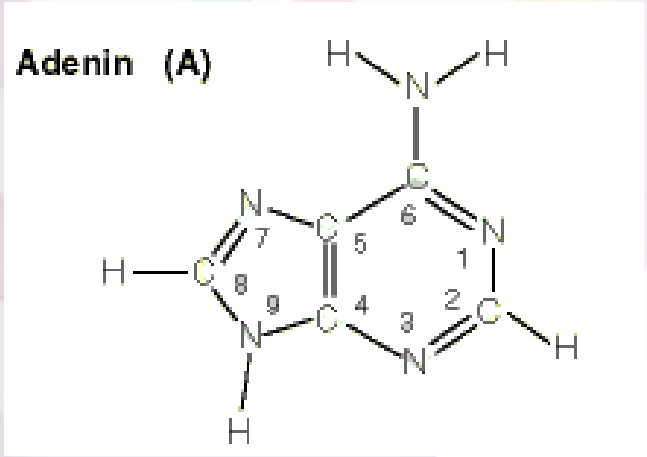
fppt.com

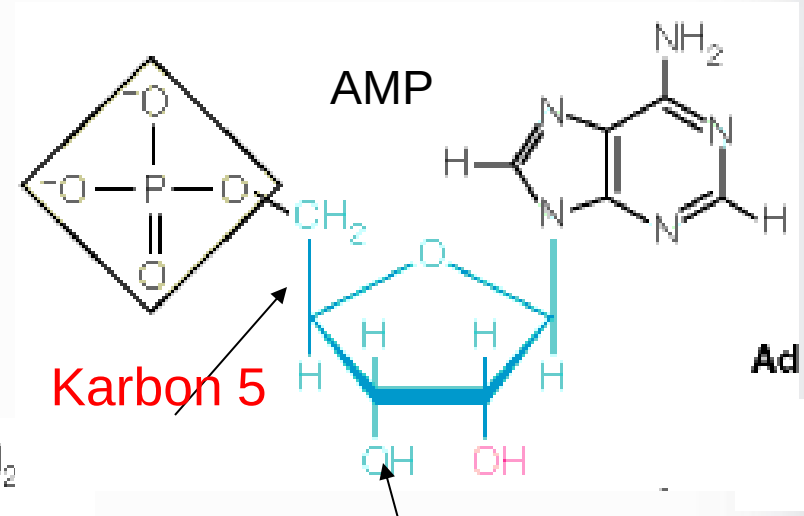

Ribose
2'-deoxy-ribose
HO
O
OH
HO
OH
HO
O
OH
HO

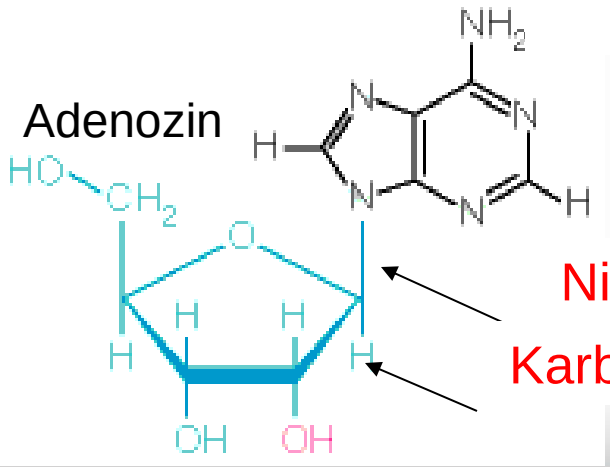

Nitrogen base
phosphates
5-carbon sugar
carbon 5'
carbon 1'
carbon 4'
carbon 2'
carbon 3'

fppt.com

- **Adenin — adenozin — adenozin monofosfat**







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DNA: Karşılıklı iki polinükleotit zincirinden oluşur ve Deoksiribonükleik asit'in kısaltmasıdır.

Fosfodiester bağları

Hidrojen bağları

Polinükleotit zincir

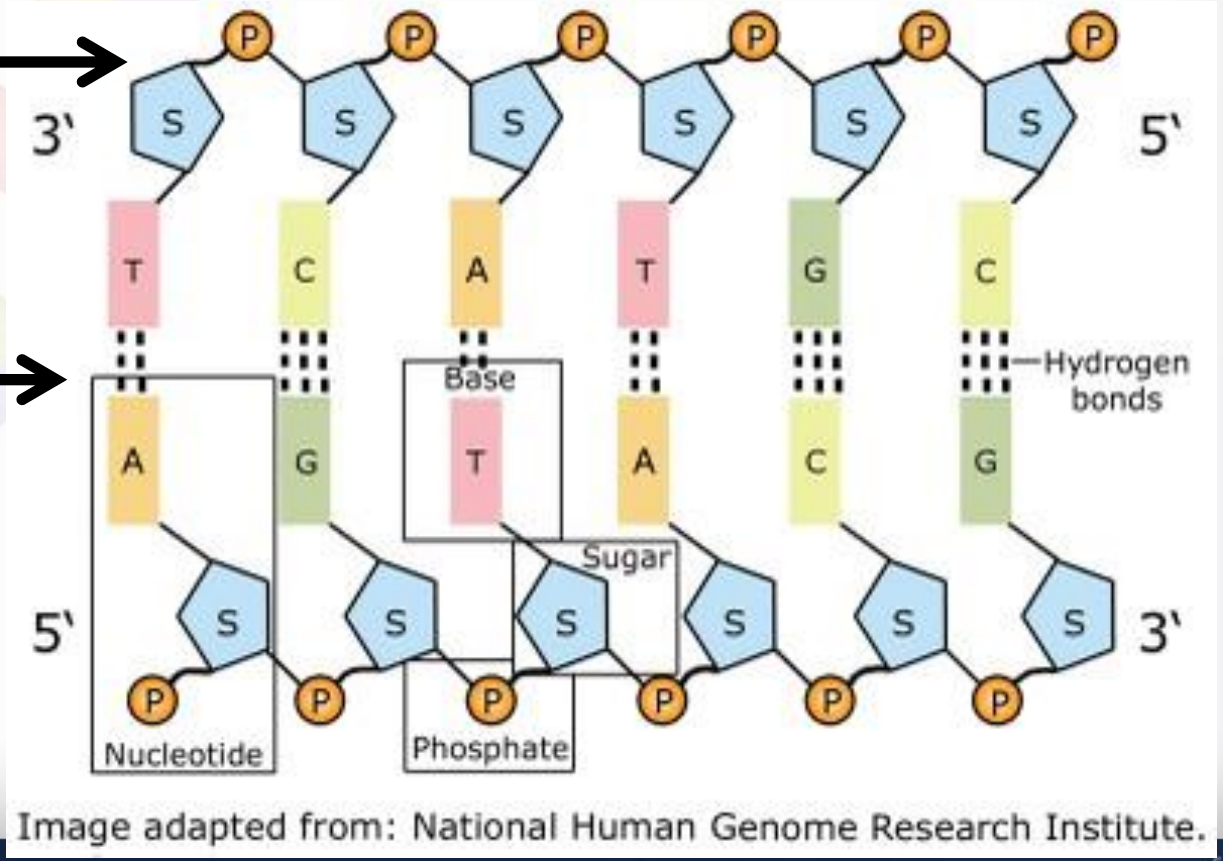

Image adapted from: National Human Genome Research Institute.

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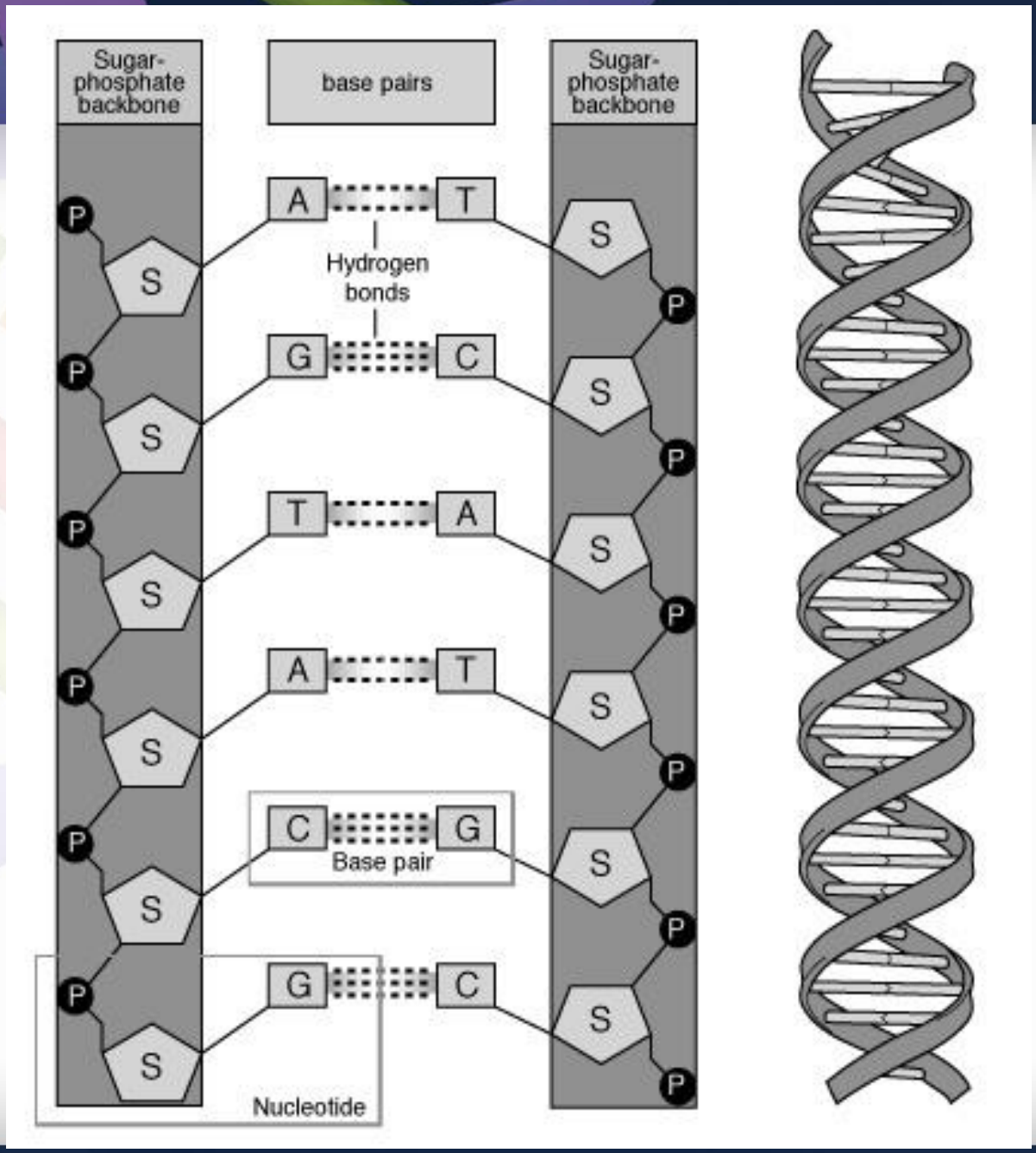
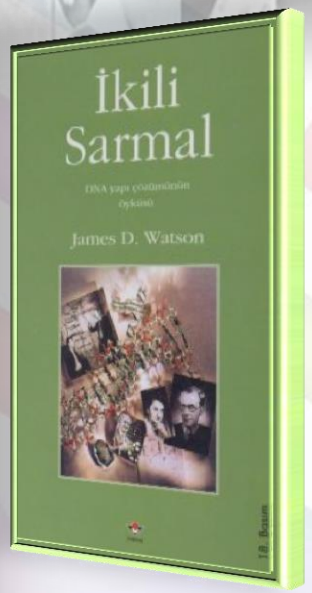
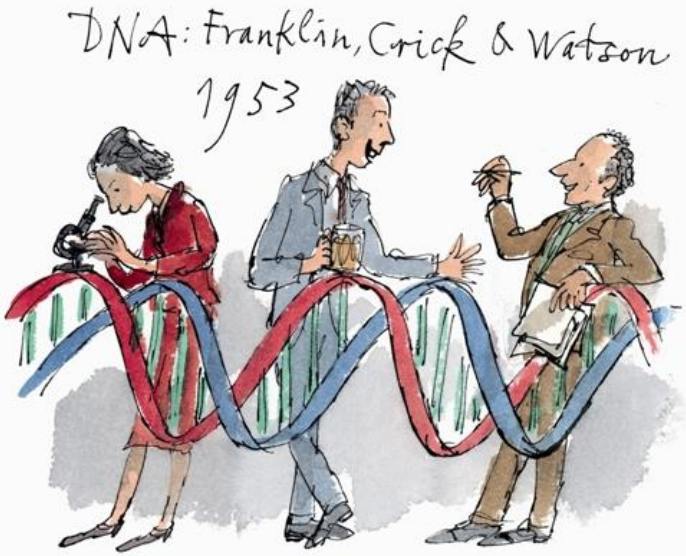
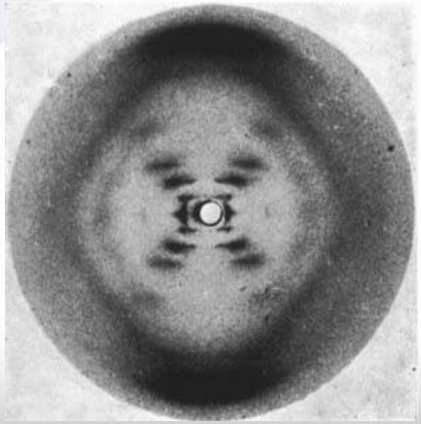

Sugar-phosphate backbone
base pairs
Sugar-phosphate backbone
A
T
Hydrogen bonds
G
C
T
A
A
T
C
G
Base pair
G
C
Nucleotide
P
S

fppt.com

James Watson, **F*rancis Crick*, *Maurice Wilkins***



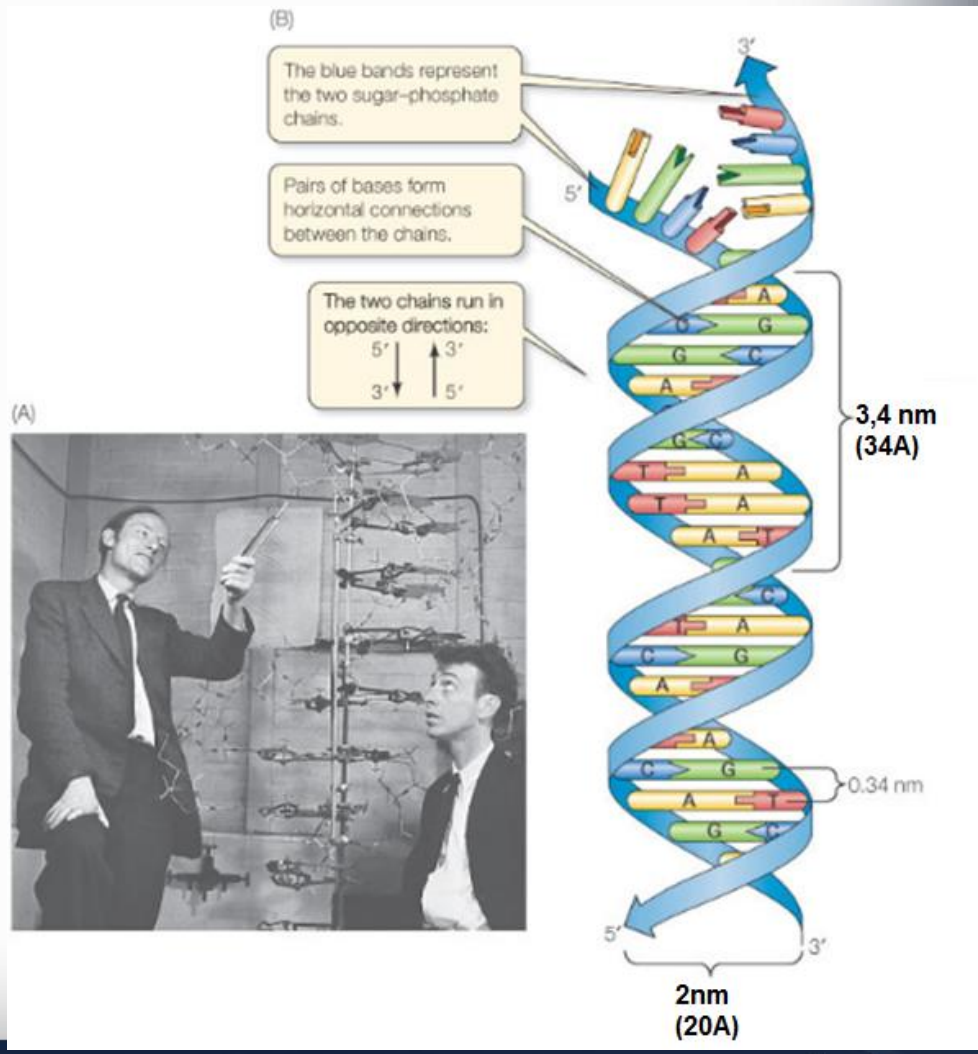





Courtesy of Cold Spring Harbor Laboratory Archives and Svenskt Press Photo, Stockholm, Sweden.
Noncommercial, educational use only.

Watson-Crick modeli=B-DNA

- *anti-parallel*
- *Sağ el dönüş yönünde*
- *Düzlemsel ve eksene dik*
- *Tam bir dönüş 3,4nm*
- *Her dönüşte 10 baz*
- *Çap 2 nm*
- *Majör ve minör oluklar*



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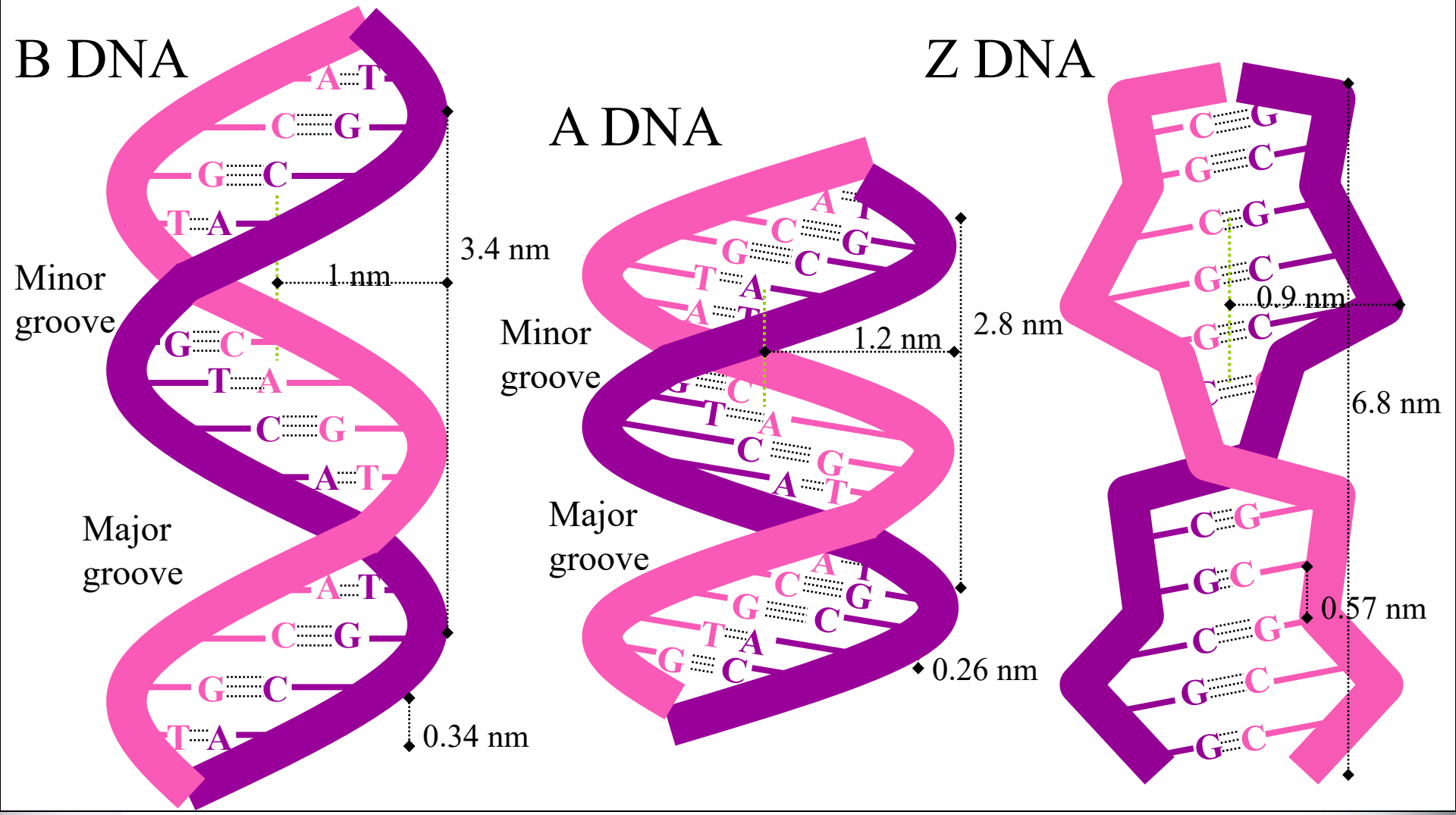
DNA'nın Değişik Formları



10.4 Bp/dönüş	11 Bp/dönüş	12 Bp/dönüş
+34.6° Rotasyon/Bp	+34.7° Rotasyon/Bp	-30.0° Rotasyon/Bp

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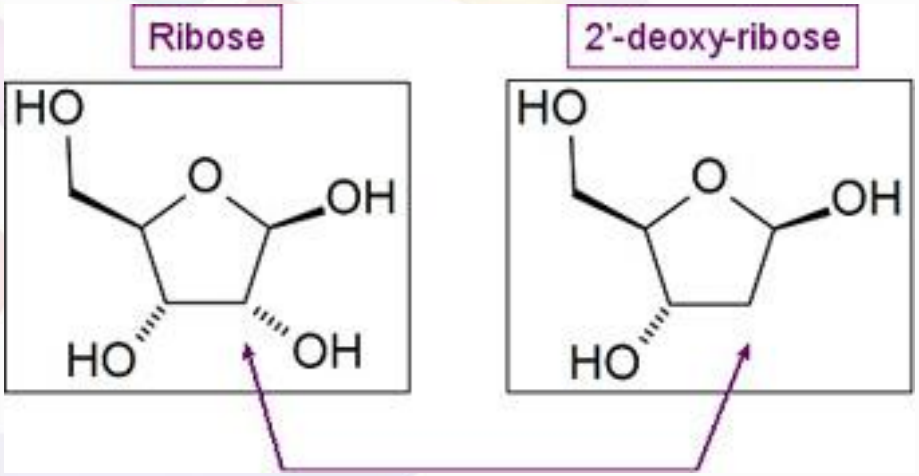
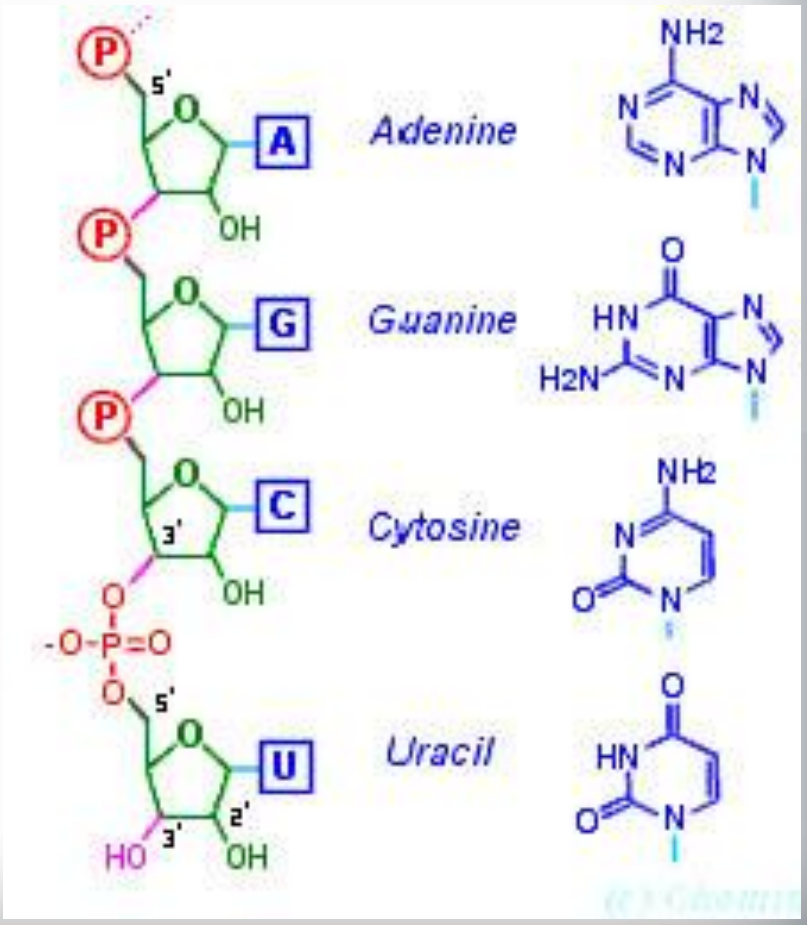
RNA'nın yapısı

- Riboz şeker (C2 pozisyonunda hidroksil grubu) içerir.
- **Ribonükleik asit**





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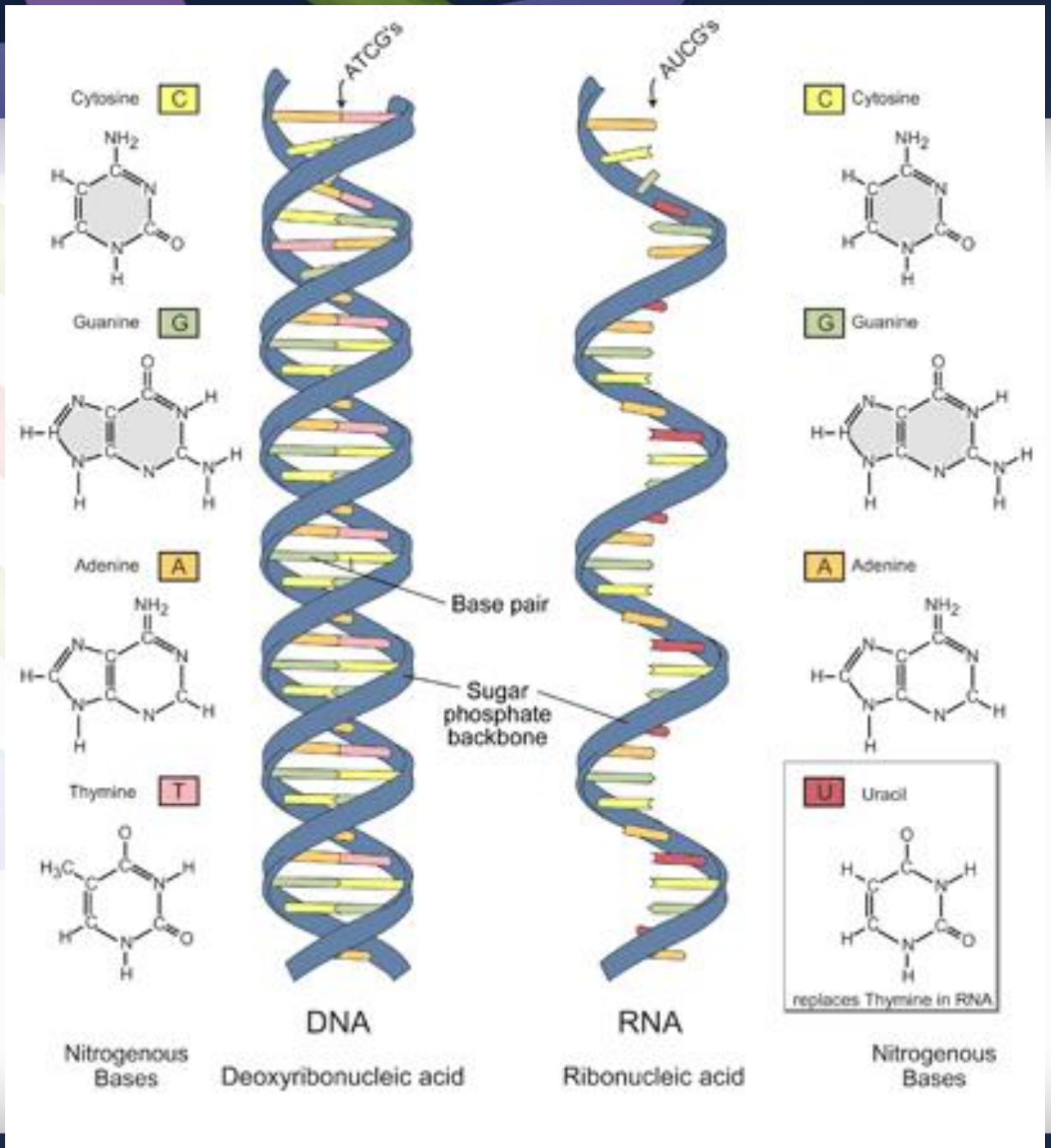

Image adapted from: National Human Genome Research Institute.

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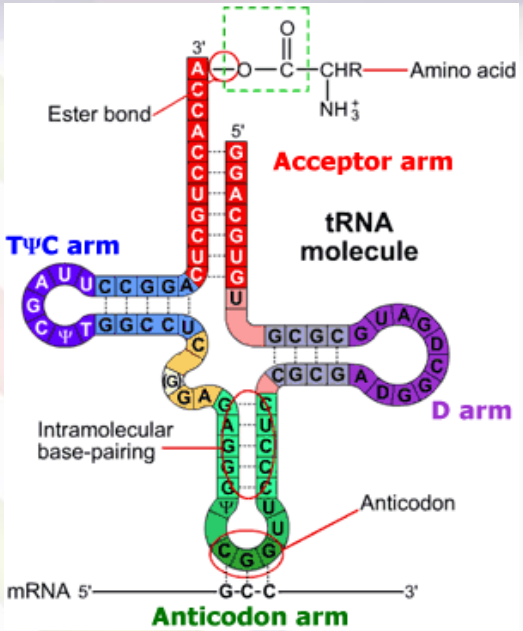
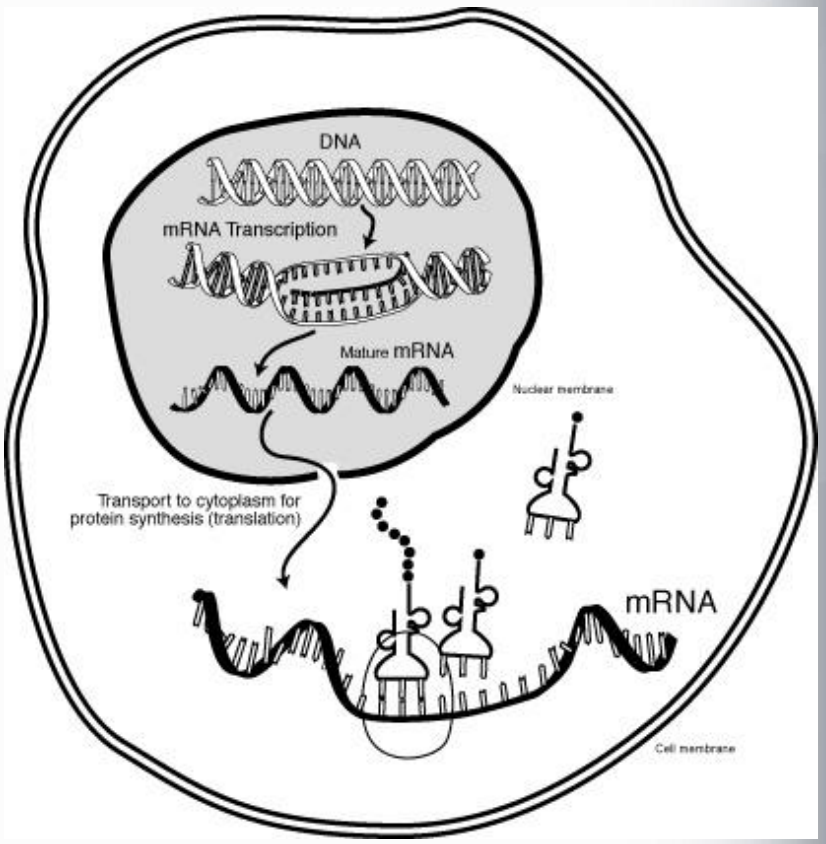
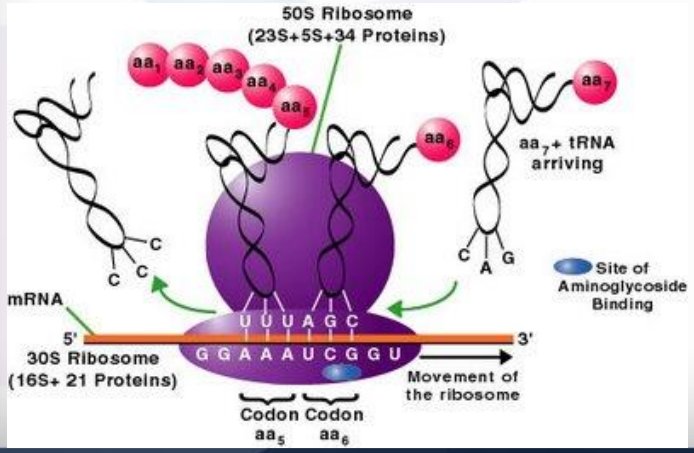
Bazı RNA tipleri

- tRNA



- mRNA





- rRNA

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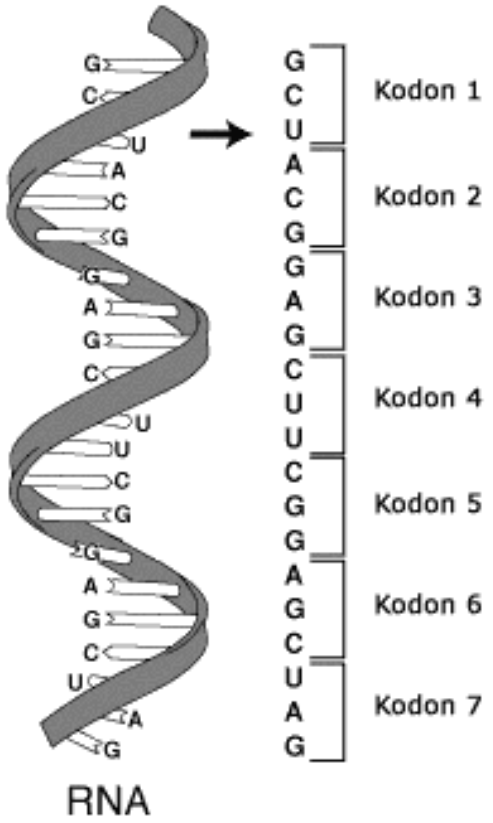
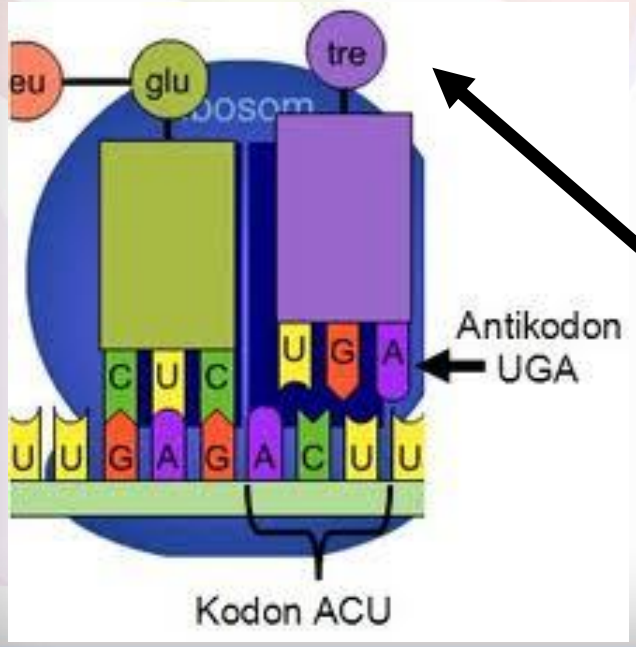
- **Kodon** –Tek bir amino asidi belirleyen ya da bilgisini kodlayan ve mRNA üzerindeki nükleotid üçlüsü.





- **Amino asit** – Protein oluşturmak üzere birbirlerine bağlanan protein yapıtaşlarından her biri.

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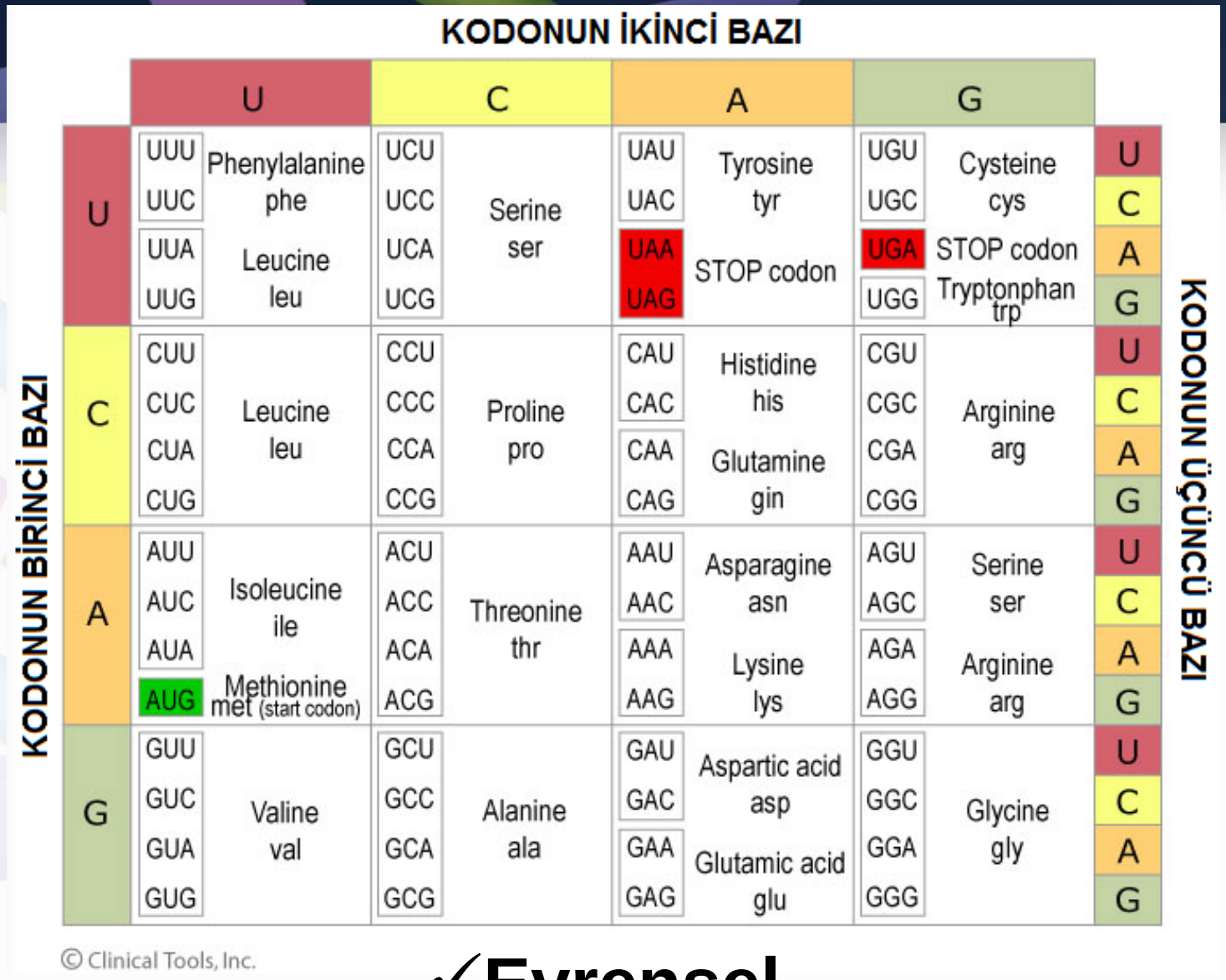

Genetik kod

- ✓Evrensel
- ✓Dejenere

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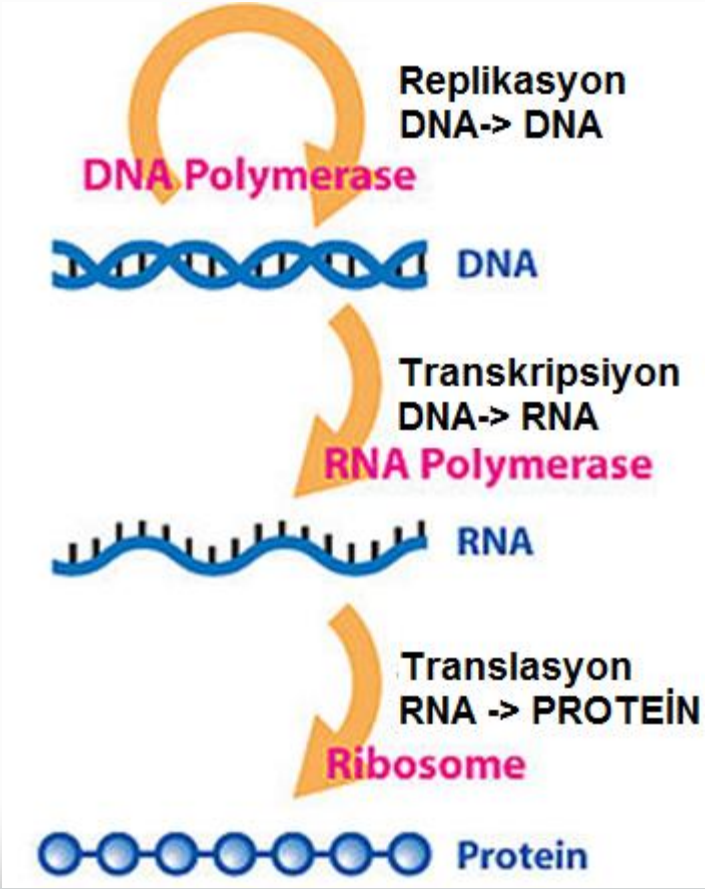
SANTRAL DOGMA

- Hücredeki bilgi aktarım reaksiyonlarının tamamına **santral dogma** denir.



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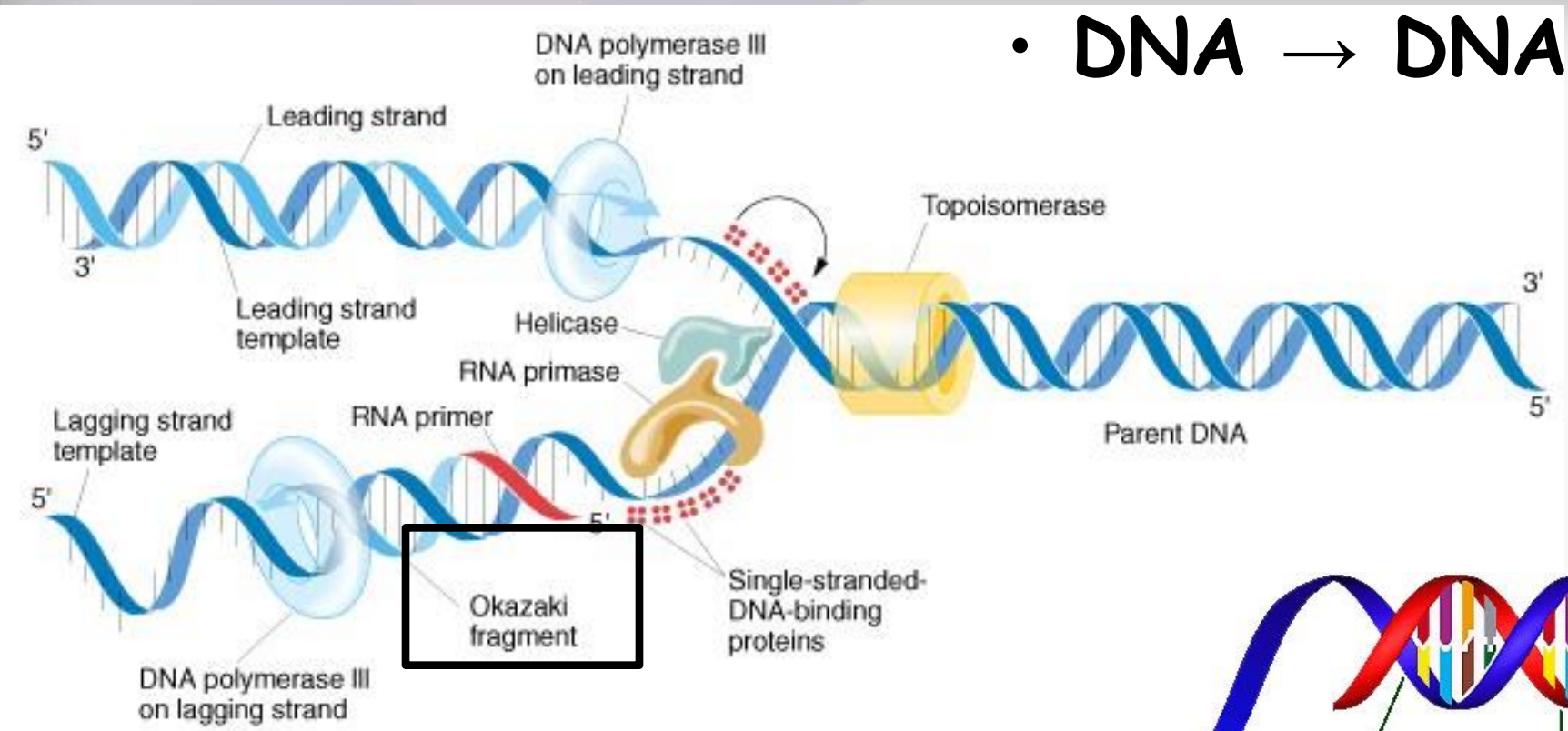
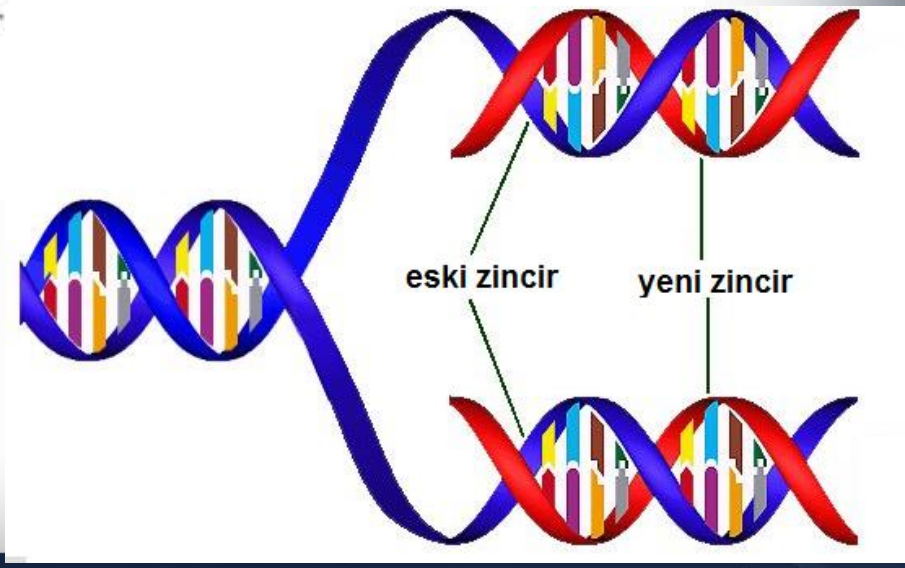
Replikasyon

- **DNA → DNA**





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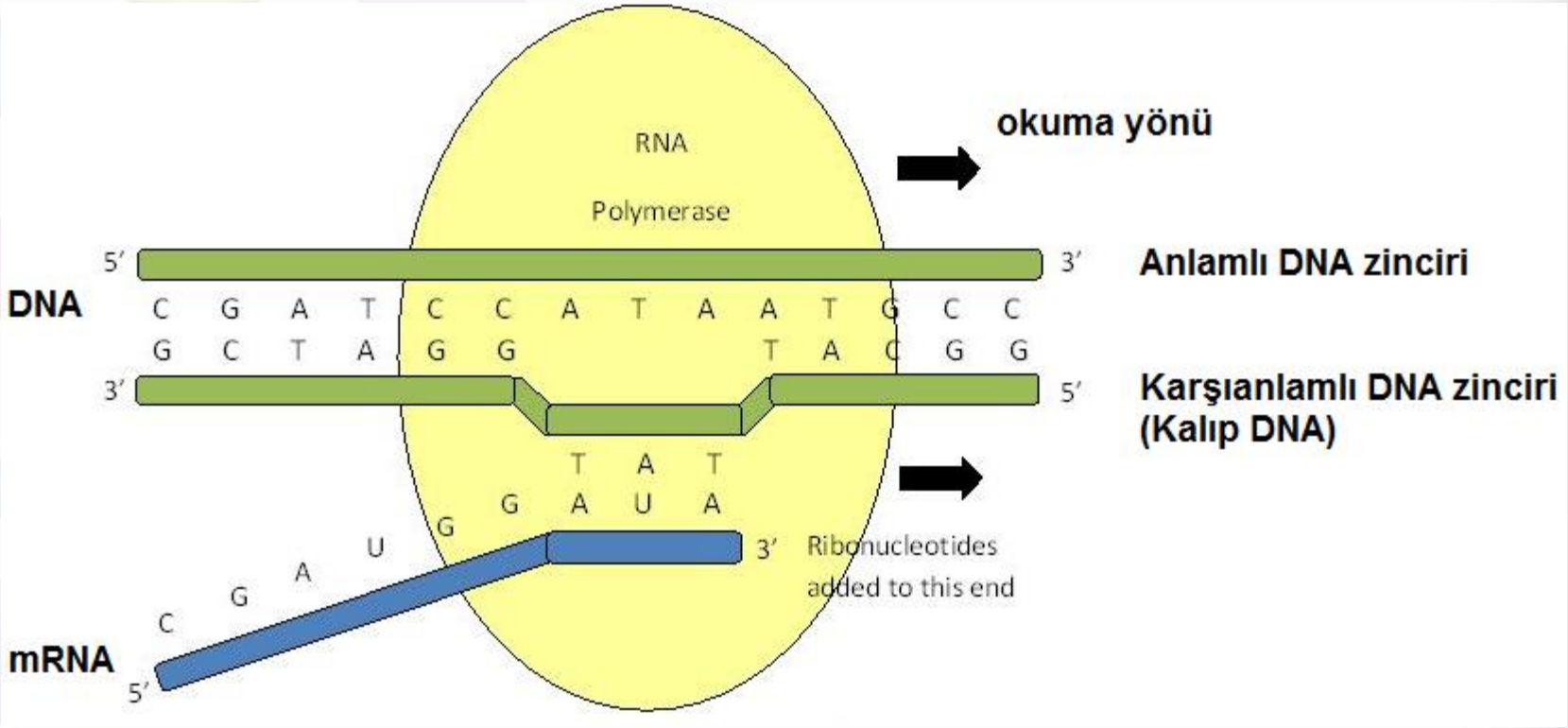
Transkripsiyon

- **DNA → RNA**



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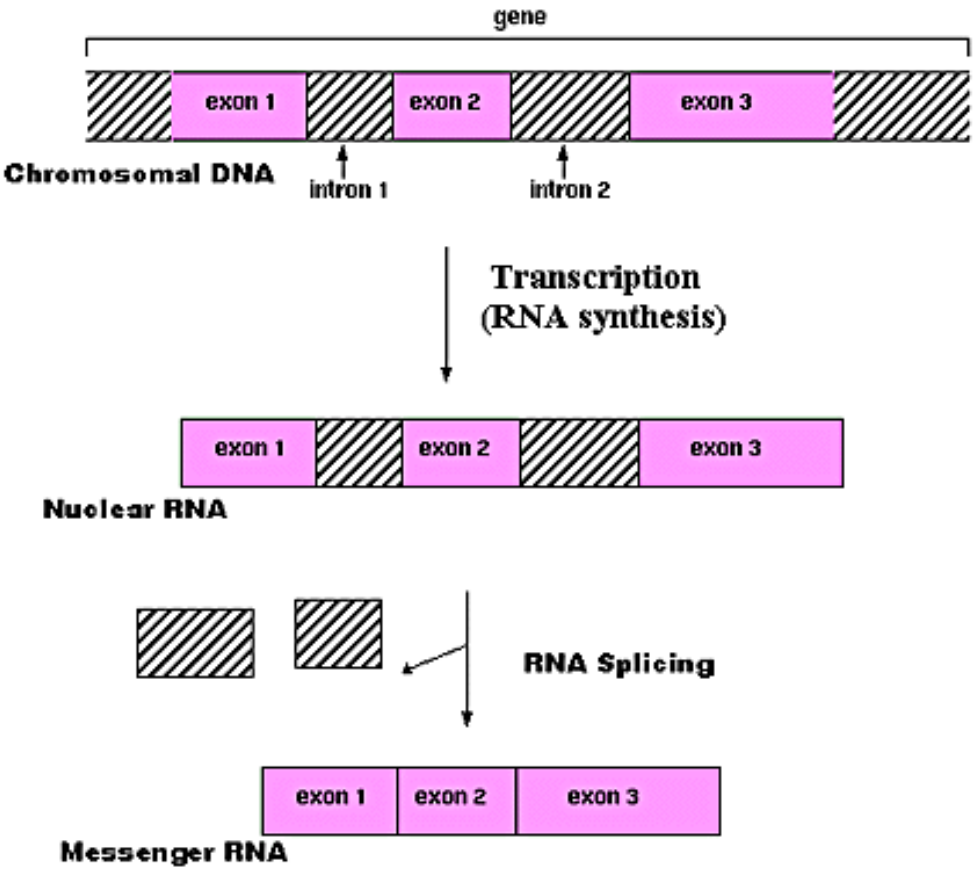

RNA synthesis and processing

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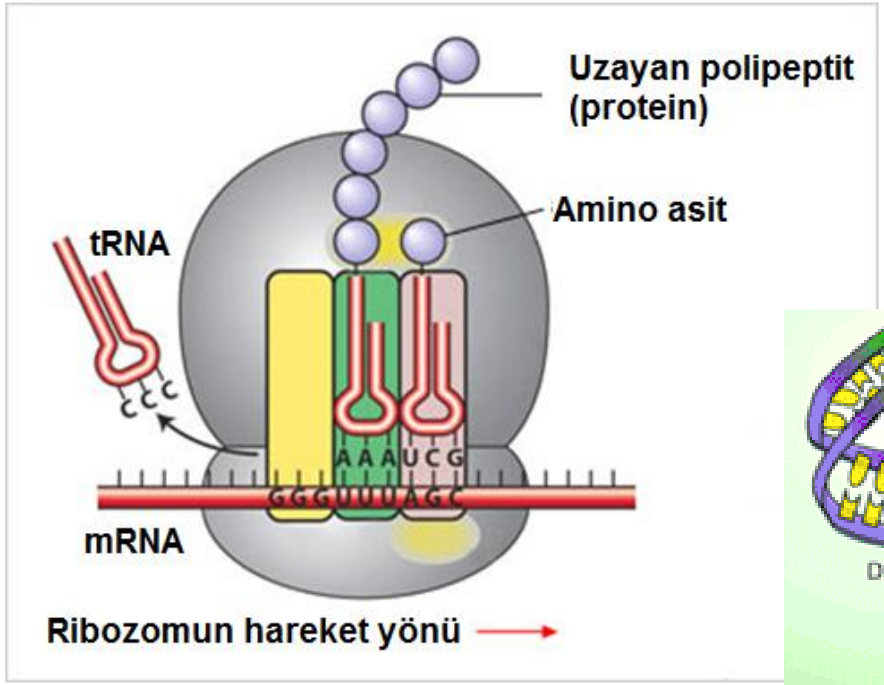
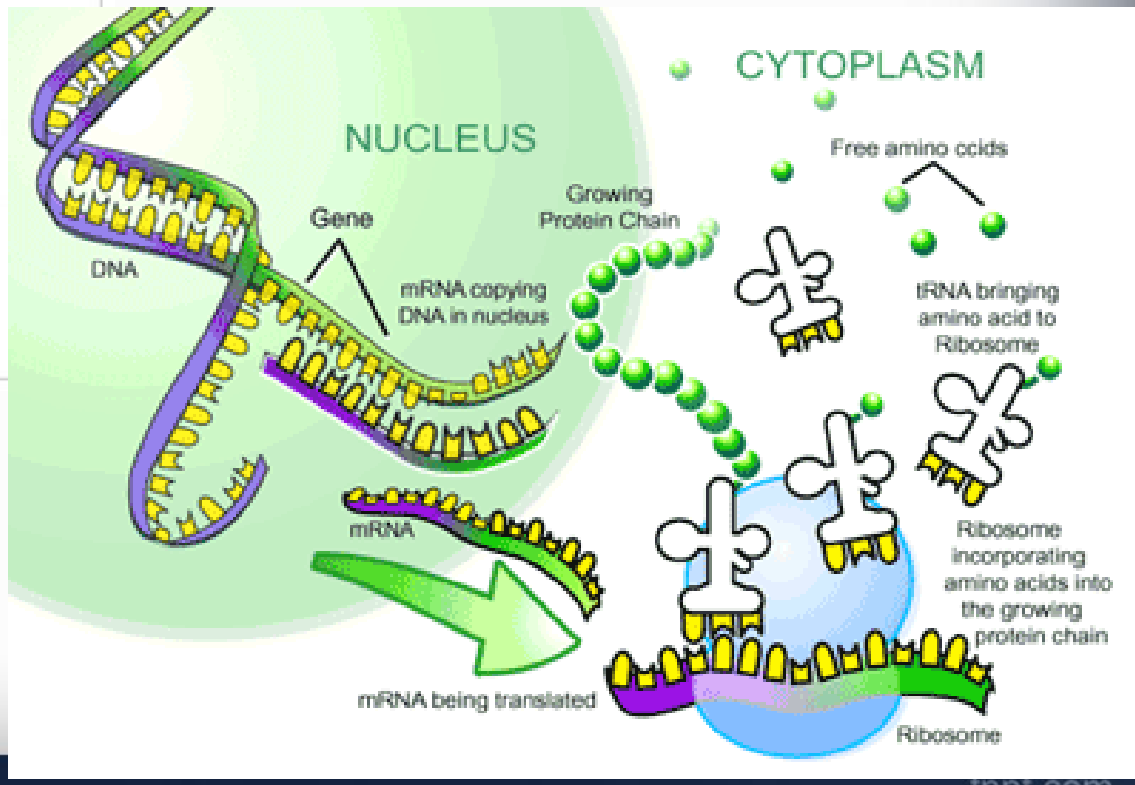
Translasyon

- **RNA → PROTEİN**





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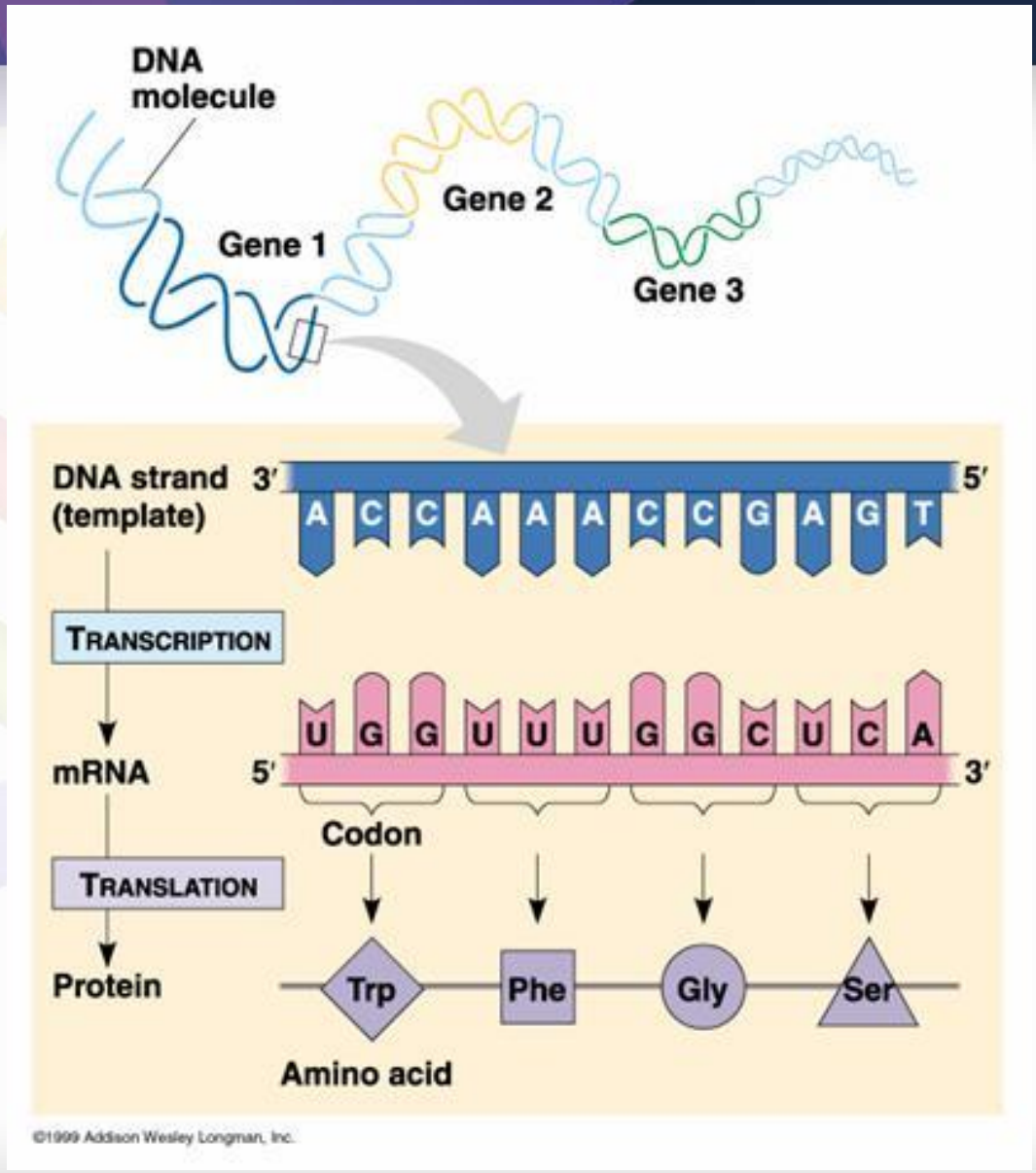

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