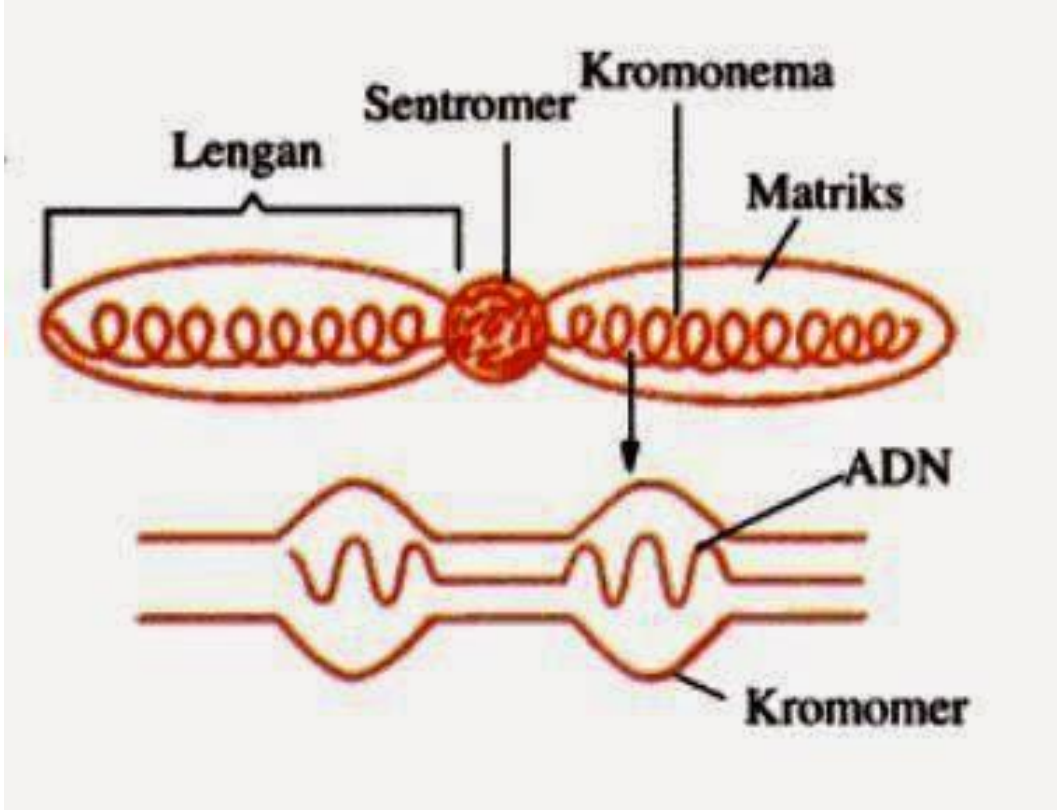
KROMOSOM
DNA
GEN

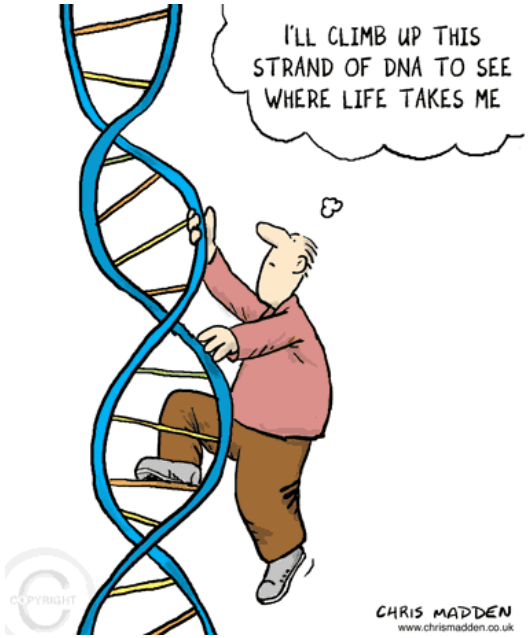


No. KD	KOMPETENSI DASAR
3.3	Menganalisis hubungan struktur dan fungsi gen, DNA, kromosom dalam penerapan prinsip pewarisan sifat pada makhluk hidup
4.3	Merumuskan urutan proses sintesis protein dalam kaitannya dengan penyampaian kode genetik (DNA-RNA-Protein)

IPK

PENGETAHUAN	KETERAMPILAN
1. Mengaitkan struktur kromosom dengan keberadaan gen 2. Membedakan struktur DNA dan struktur RNA 3. Mengaitkan peranan DNA dalam pewarisan sifat	1. Menguraikan proses sintesis protein dari sebuah DNA kodogen 2. Membuat diagram urutan sintesis protein 3. Menentukan urutan asam amino yang terbentuk dari kodogen (DNA)

SUBSTANSI GENETIK



1. KROMOSOM
2. GEN - DNA

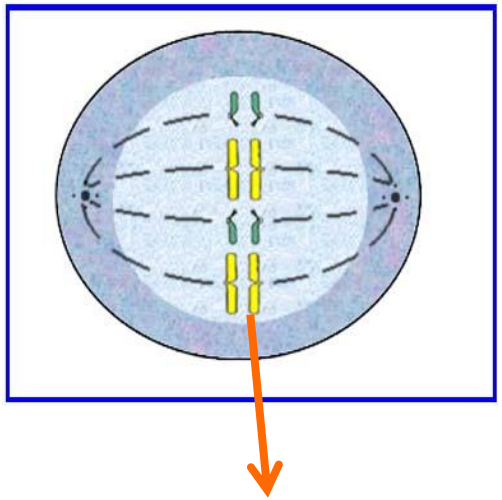
Menentukan sifat tubuh, dan diturunkan ke generasi berikutnya

Diturunkan melalui pembelahan sel

http://www.nlm.nih.gov/MEDLINEPLUS/ency/images/ency/fullsize/19095.jpg

KROMOSOM

- Tempat gen
- ploidi: haploid, diploid, poliploid
- lengan, sentromer
- Bentuk :
  - *metasentrik,*
  - *submetasentrik*
  - *akrosentrik,*
  - *telosentrik*



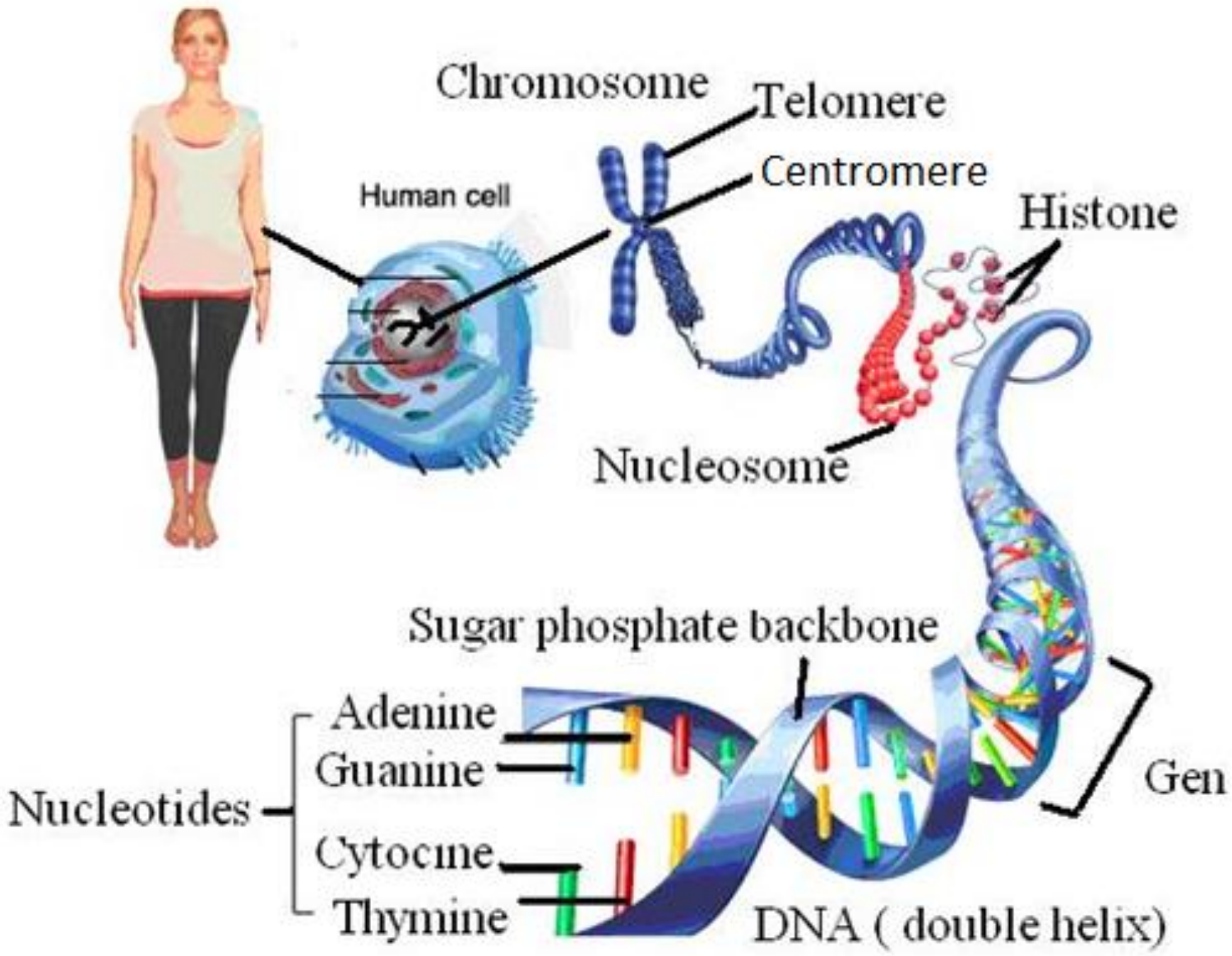
KROMOSOM : Terlihat saat sel sedang membelah

BAHAN KROMOSOM

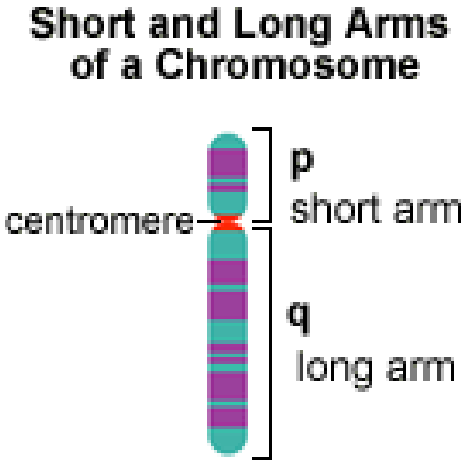
- PROTEIN
- DNA

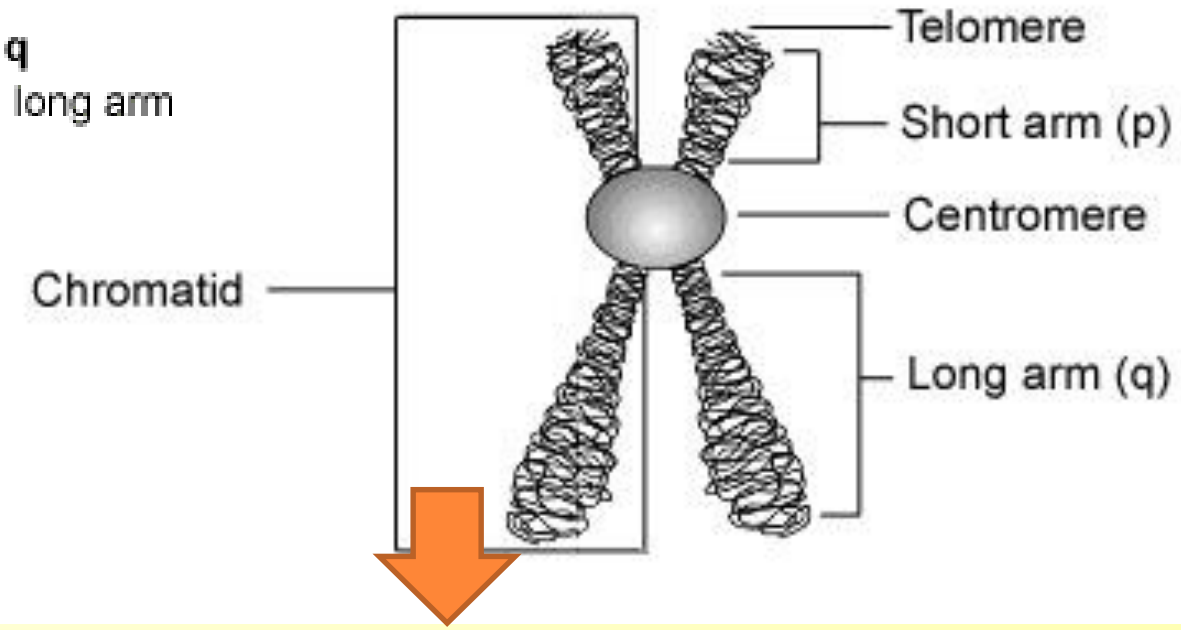
DNA + PROTEIN (HISTON) → NUKLEOSOM
NUKLEOSOM melipat → SOLENOID
SOLENOID padat → KROMATIN
KROMATIN menebal → KROMOSOM

Kromosom politen : DNA diperbanyak tanpa pembelahan sel (kromosom besar) → pada larva


Chromosome
Telomere
Centromere
Human cell
Histone
Nucleosome
Sugar phosphate backbone
Adenine
Guanine
Nucleotides
Cytocme
Thymine
Gen
DNA (double helix)

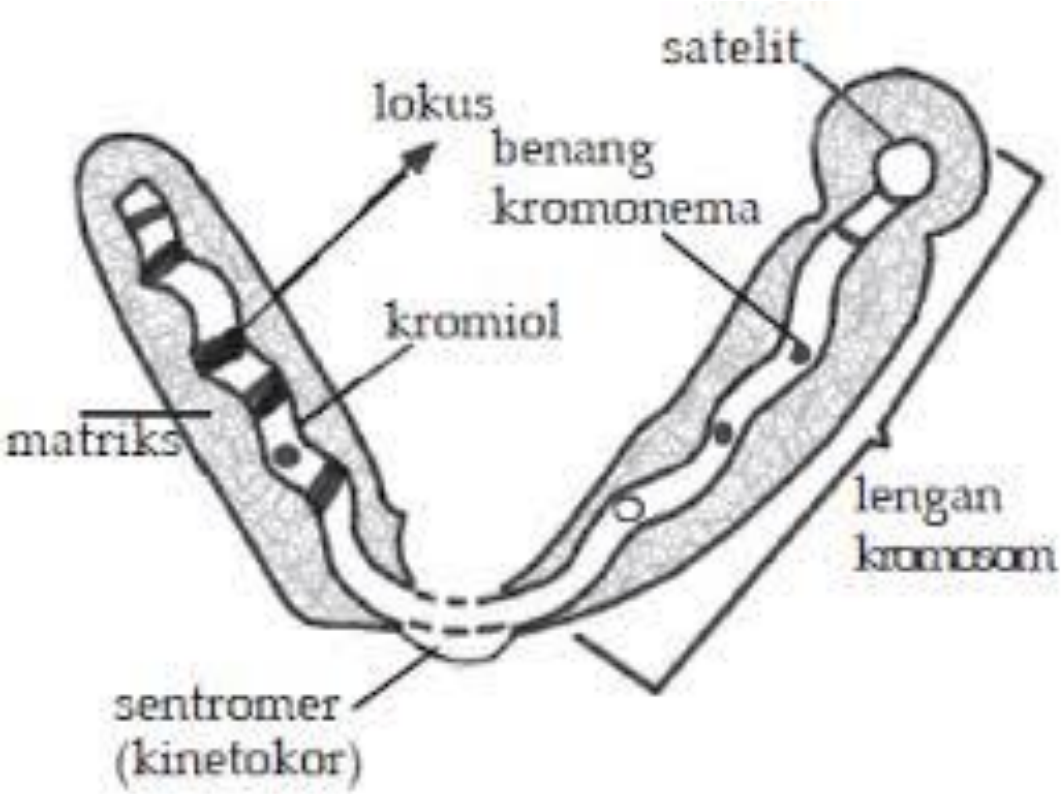
Gambar Kromosom





Duplikasi Kromosom→ 2 kromatida / kromonema

STRUKTUR KROMOSOM

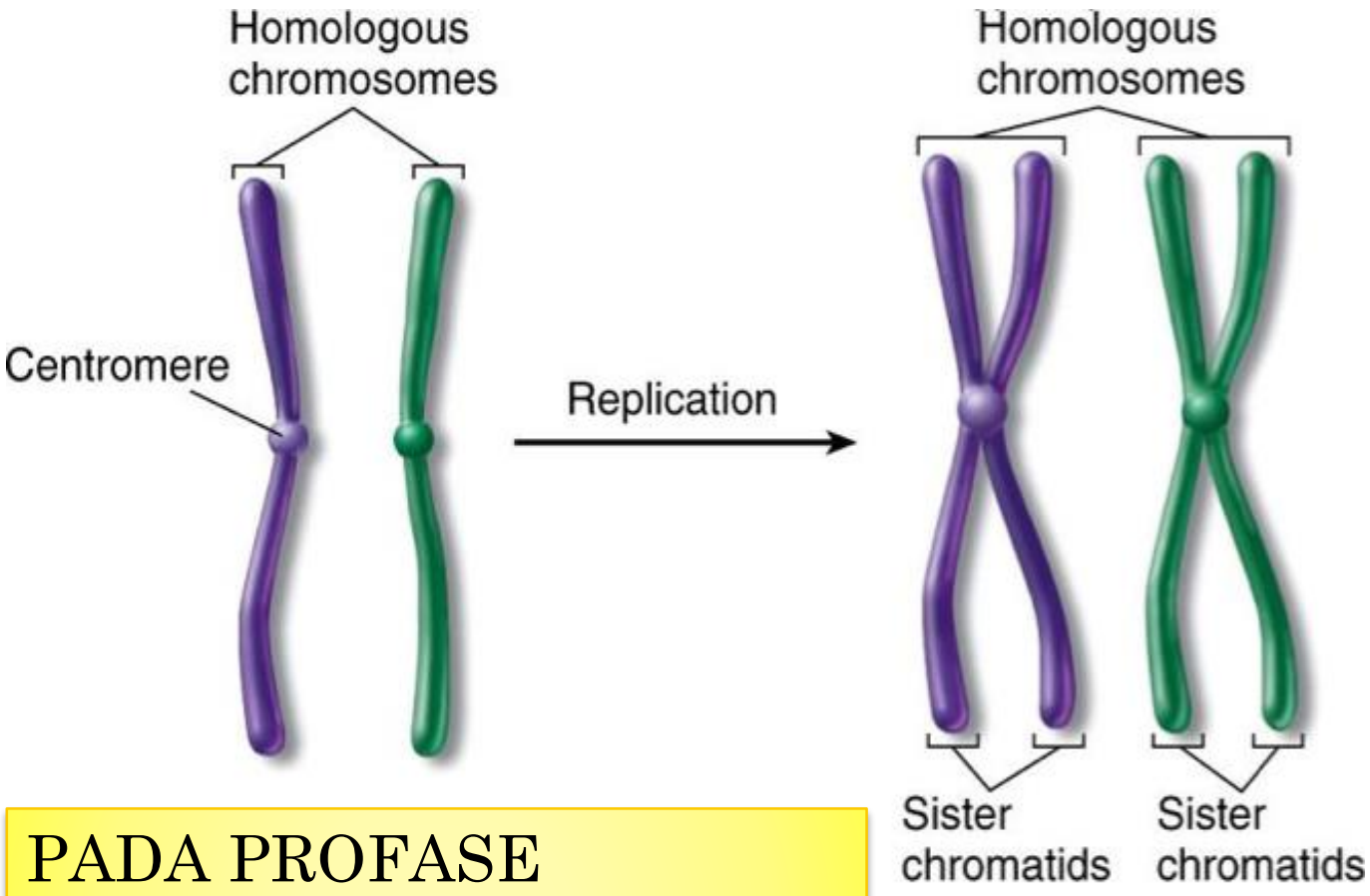


Kromonema: benang kromosom

Kromomer: Tempat gen/lokus

Kromiol: kromosom yang menebal, tidak ada gen

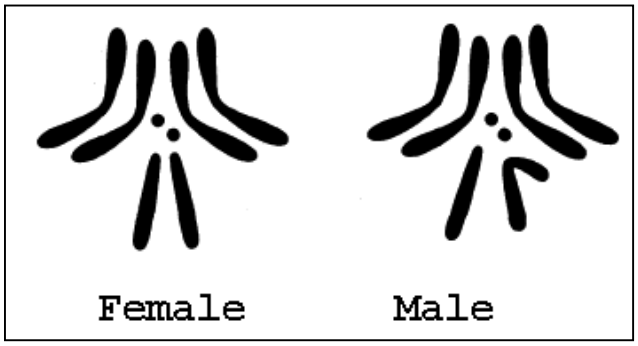
DUPLIKASI KROMOSOM



PADA PROFASE PEMBELAHAN SEL (MITOSIS)

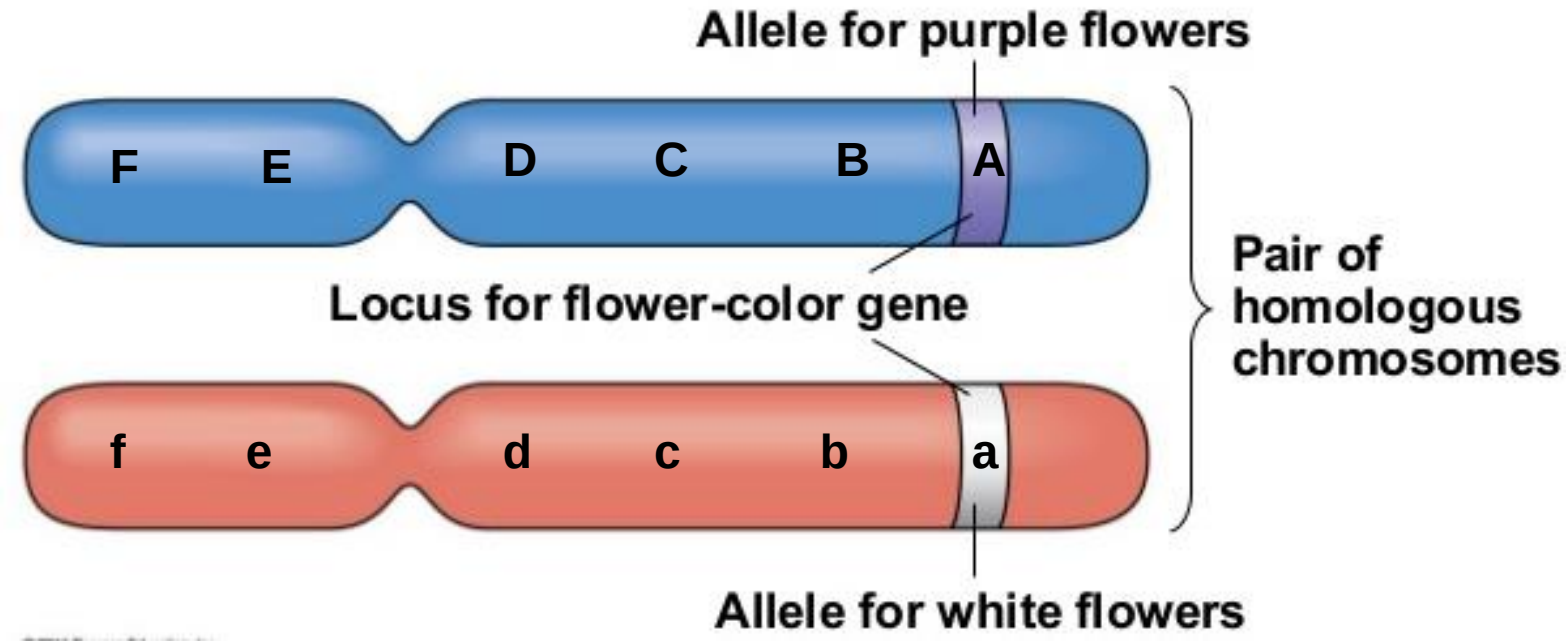
KROMOSOM HOMOLOG

- Macam kromosom
  - kromosom seks (gonosom)
  - kromosom tubuh (autosom)

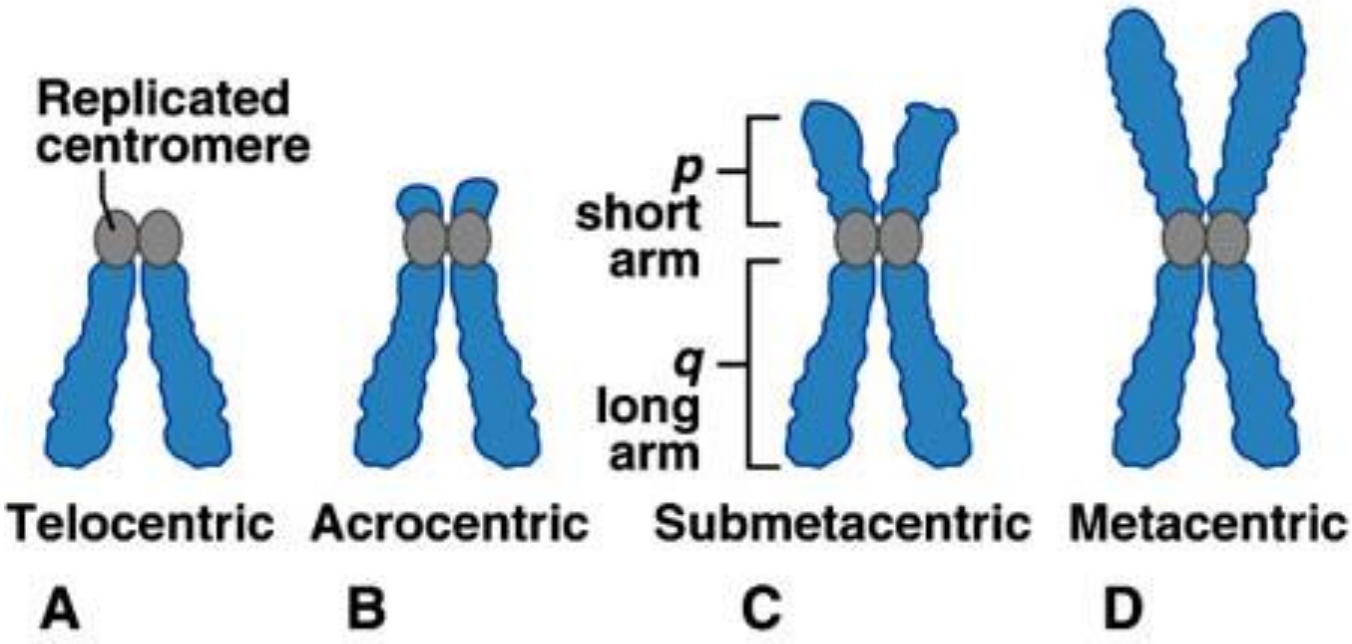


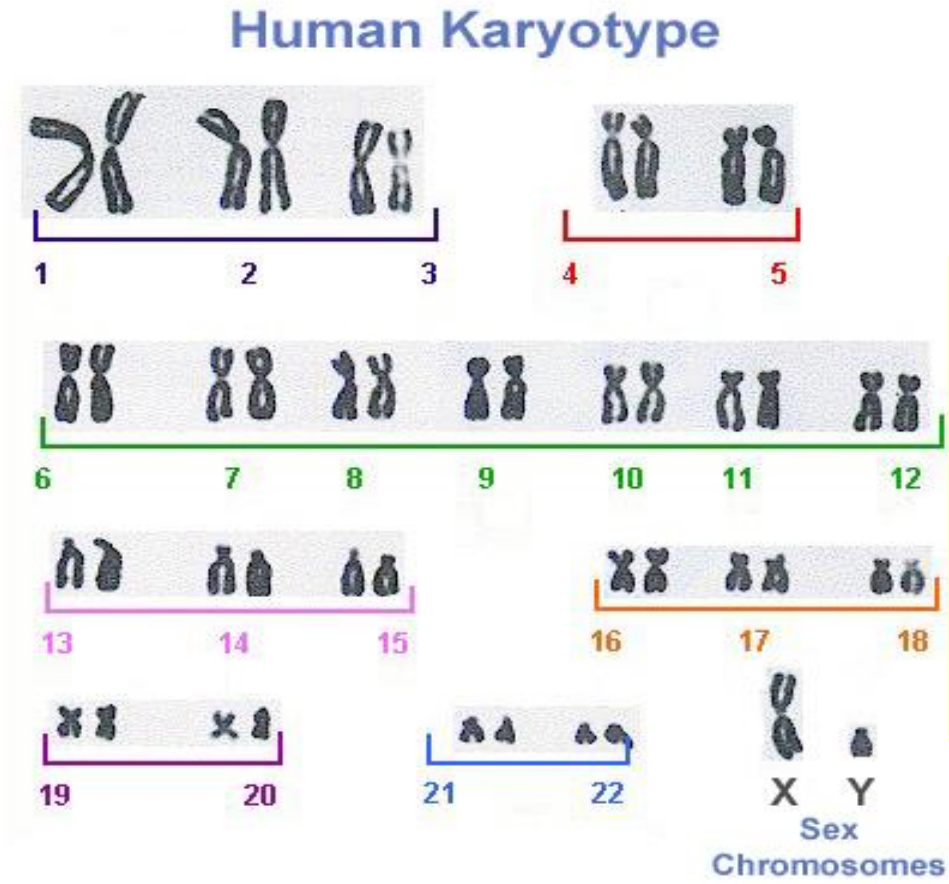
- Setiap sel diploid kromosom berpasangan
- Disebut kromosom homolog
- Lokus gen dan gen bersesuaian (sama)

LOKUS GEN


Allele for purple flowers
F
E
D
C
B
A
Locus for flower-color gene
Pair of homologous chromosomes
f
e
d
c
b
a
Allele for white flowers

TIPE KROMOSOM





MANUSIA:

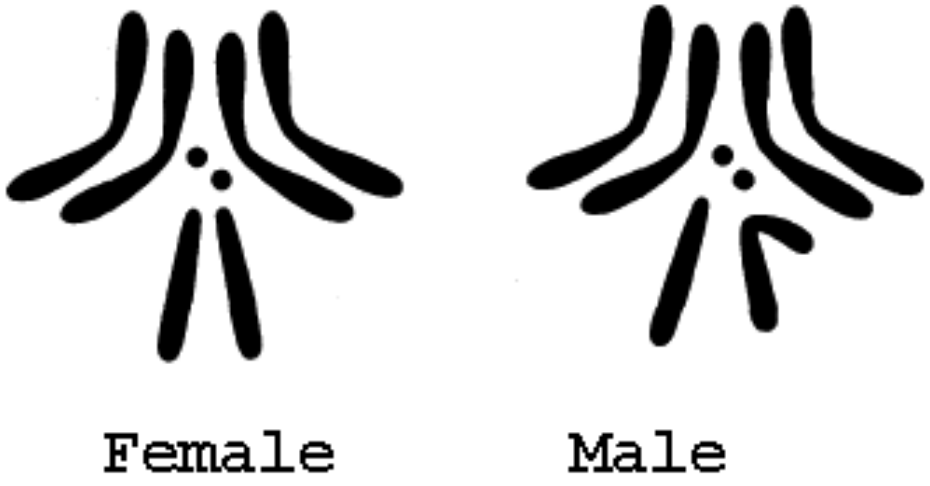
- 46 Kromosom:
- 22 AA
- 1 XY→ Laki-laki
- 1 XX
  →Perempuan

AUTOSOM → sifat tubuh
KROMOSOM SEKS → Jenis kelamin

KROMOSOM LALAT BUAH (DROSOPHILA MELANOGASTER)

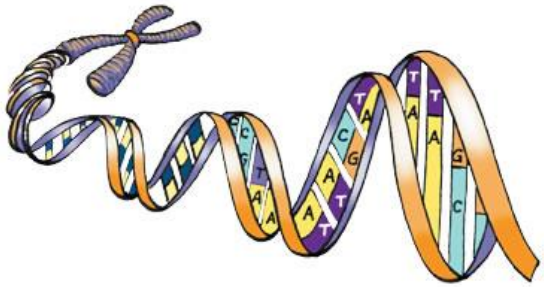
MEMILIKI 8 KROMOSOM

1. 3 Pasang AUTOSOM
2. 1 pasang GONOSOM

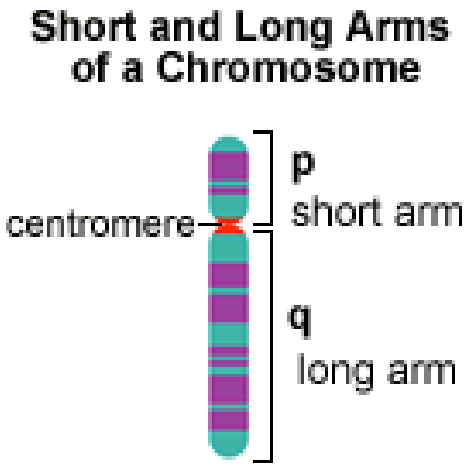


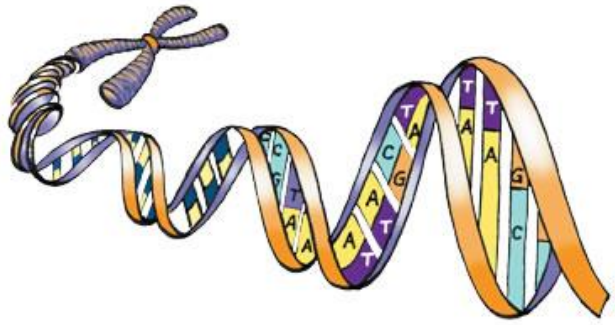
LALAT BUAH SERING MENJADI OBJEK PENELITIAN GENETIKA

LETAK DNA & FUNGSI DNA



- LETAK DNA
  - SEL EUKARIOTIK : NUKLEUS
  - TUMBUHAN : Nukleus, Mitokondria, Kloroplas
  - BAKTERI : NUKLEOID & PLASMID



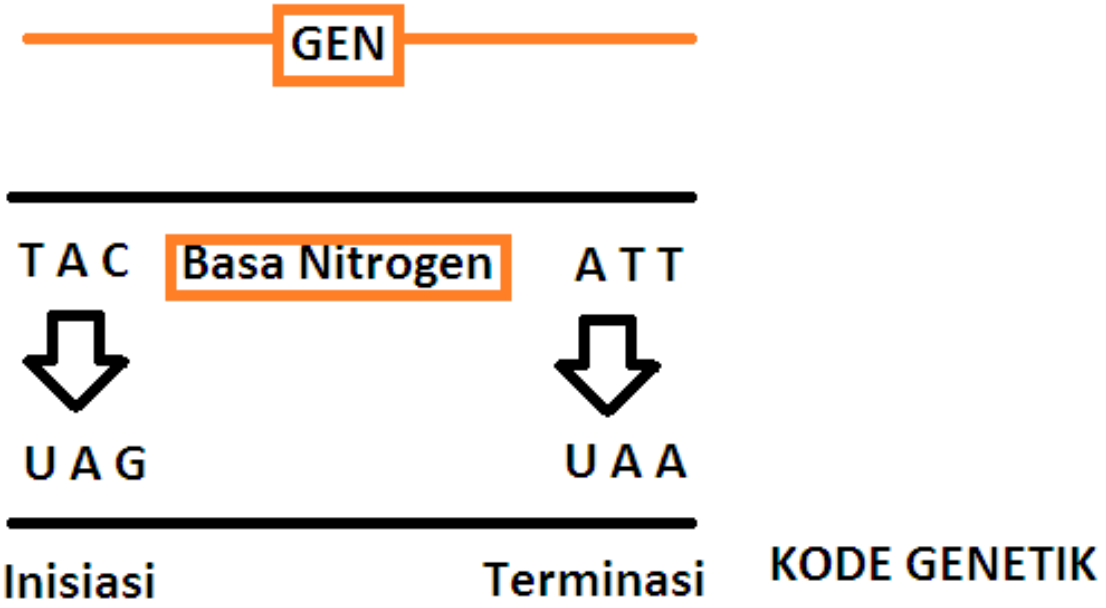


FUNGSI DNA

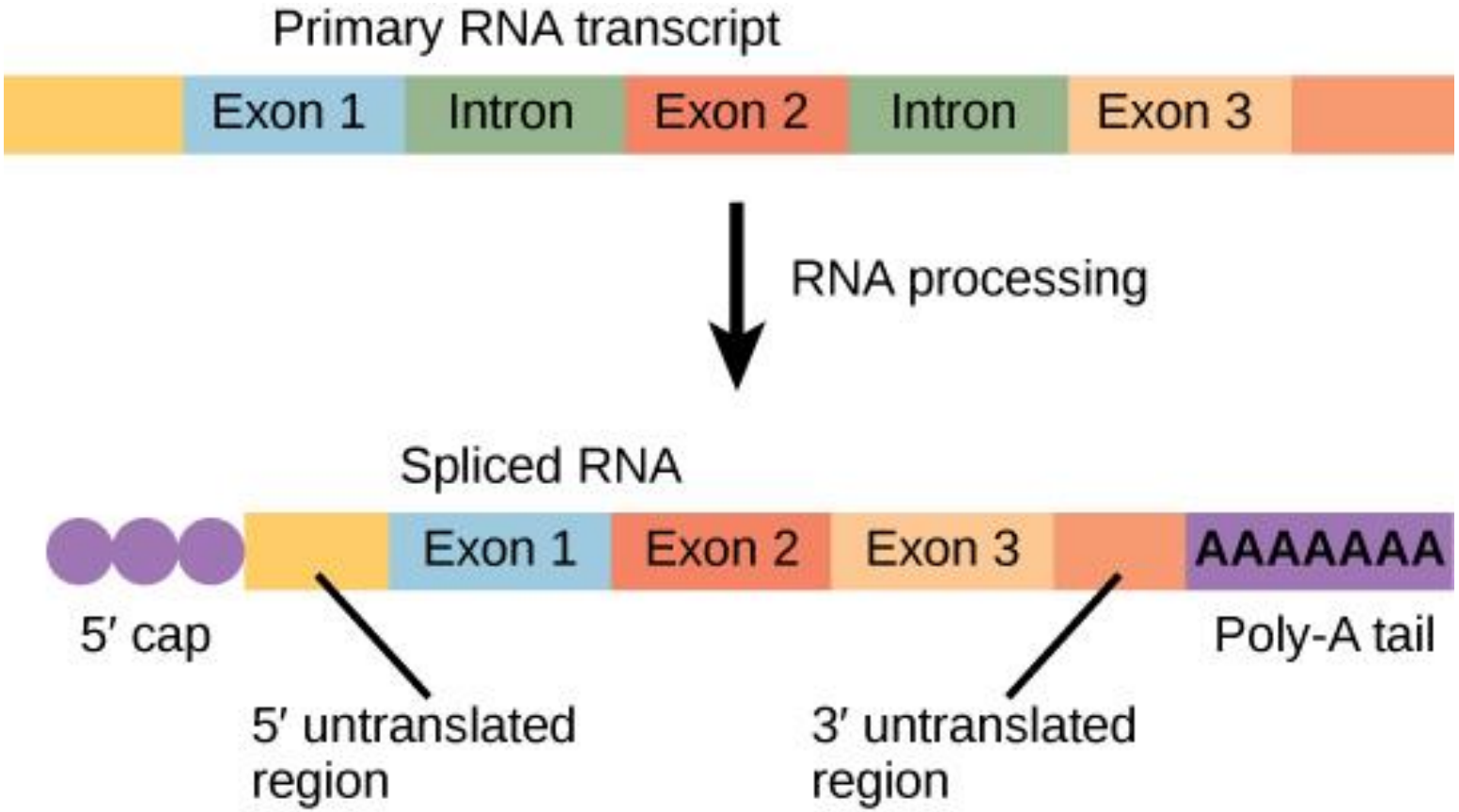
- SUBSTANSI GENETIK
- *Penentu sifat hereditas , DNA pada NUKLEUS dan NUKLEOID*
- *PLASMID : Sifat khusus, misal kebal thd Antibotik*

GEN DALAM DNA

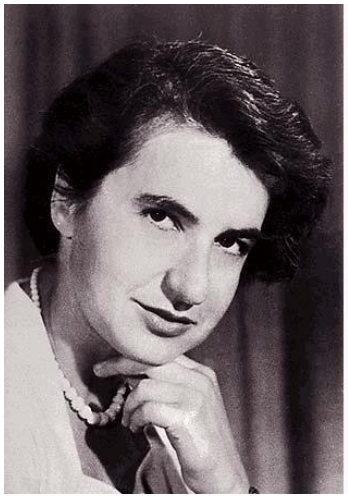
- Segmen DNA sebagai gen
- Pencetak kode genetik
- Kode inisiasi
- Kode terminasi

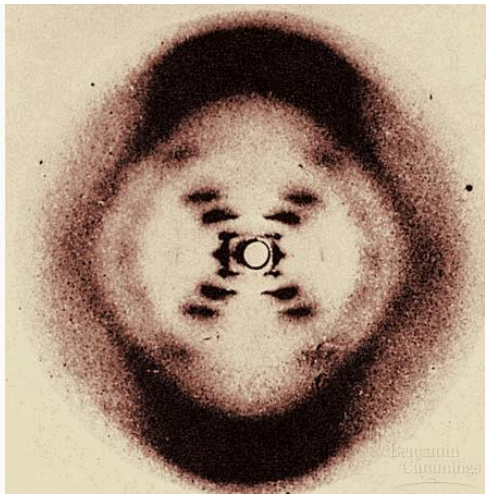


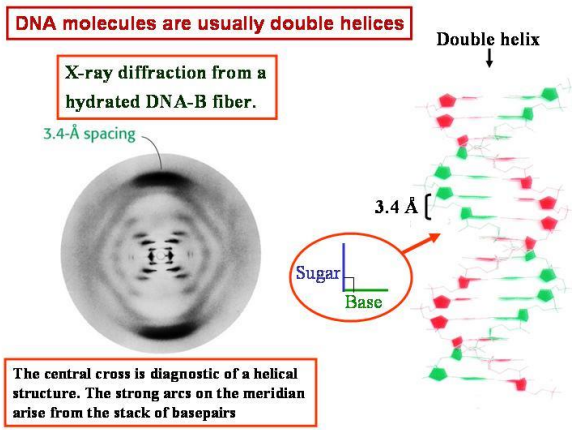
TRANSKRIPSI DNA GEN



PENELITIAN DNA





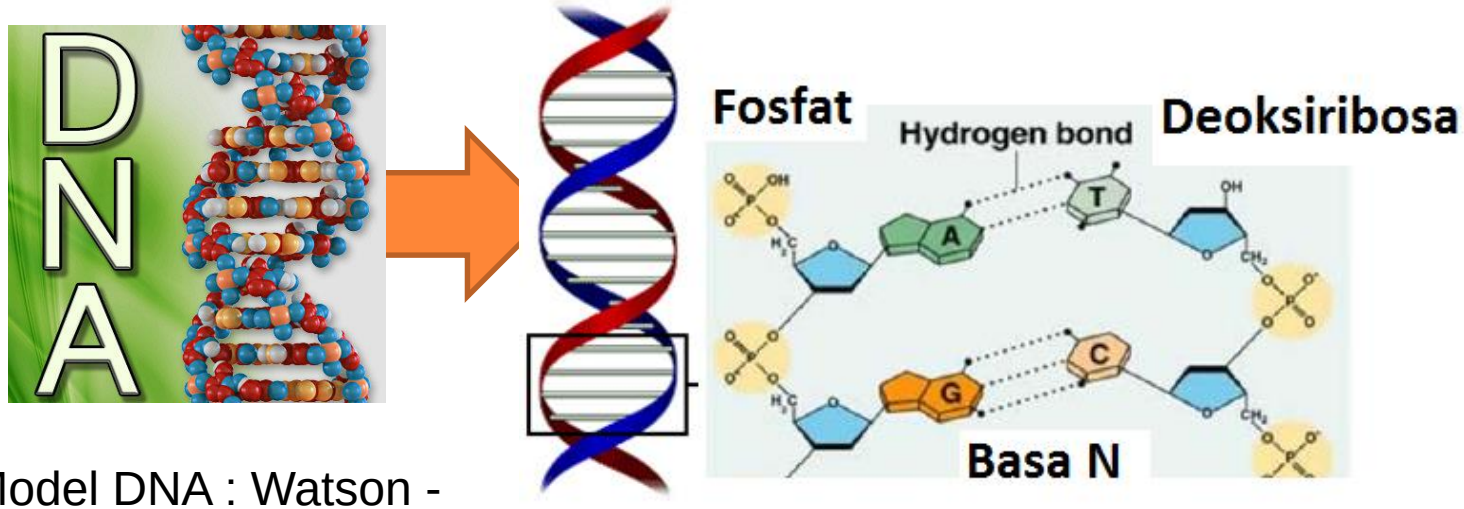


Rosalin Fraklin dan difraksi X-ray DNA

http://www.biochem.arizona.edu/classes/bioc461/GRAPHICS/Chapter5-1/Slide22.JPG

MODEL DNA

Francis Crick James Watson Maurice Wilkins Rosalind Franklin



Model DNA : Watson - Crick

STRUKTUR DNA

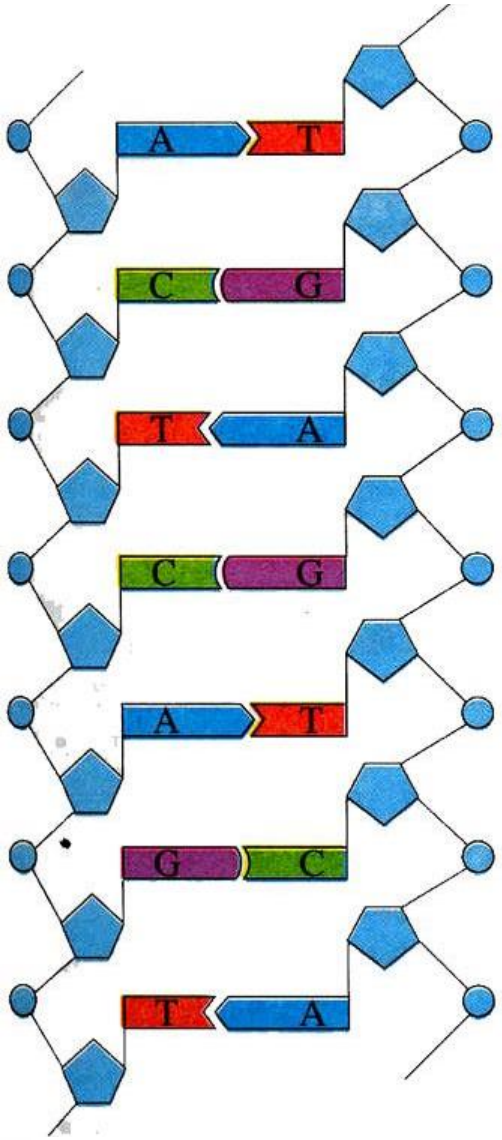
- 2 rantai polinukleotida berpilin (double helix)….rantai SENSE-ANTISENSE
- 1 mononukleotida terdiri : Deoksiribosa, gugus fosfat, basa nitrogen
- Pasangan basa N selalu tetap,
  - Adenin (A) – Timin(T) ,
  - Sitosin (C) – Guanin (G)

GOLONGAN BASA NITROGEN:

1. PURIN : A, G
2. PIRIMIDIN : C, T

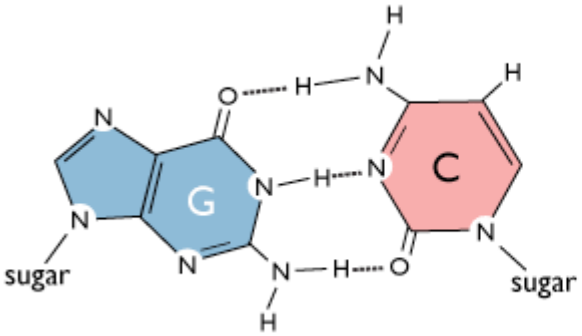
MODEL DNA

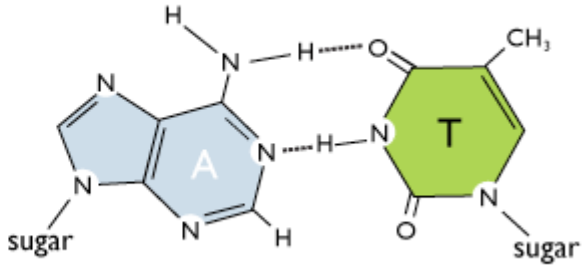

Pasangan
Basa
adenin timin
guanin sitosin
Tulang punggung
gula phosfat


A
T
C
G
T
A
C
G
A
T
G
C
T
A

IKATAN DNA

- Ikatan hidrogen antar basa nitrogen
- Ikatan P dan Deoksi-ribosa dengan arah 5’ →3’

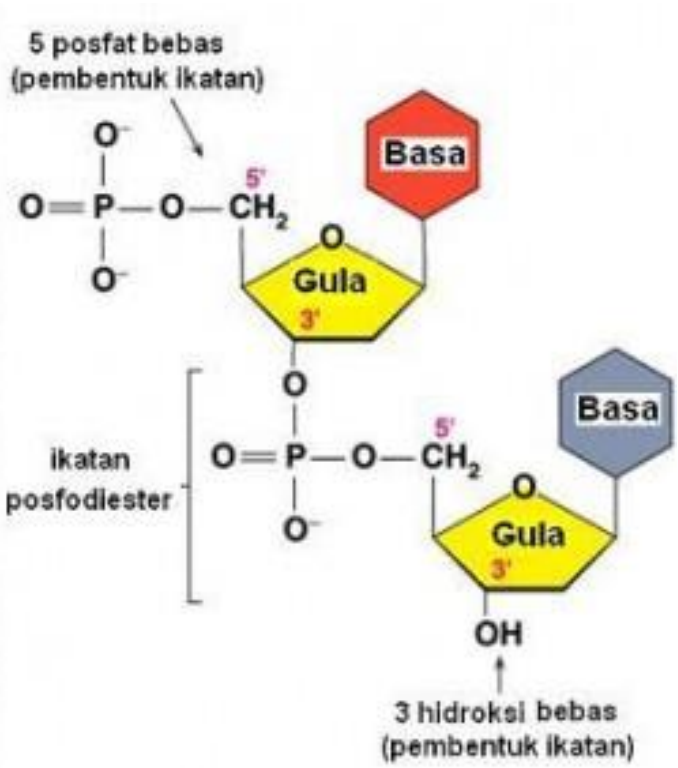




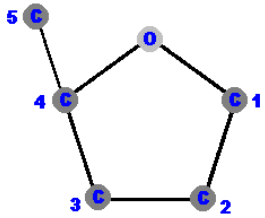
- A dan T, 2 lengan ikatan
- G dan C, 3 lengan ikatan

MONONUKLEOTIDA

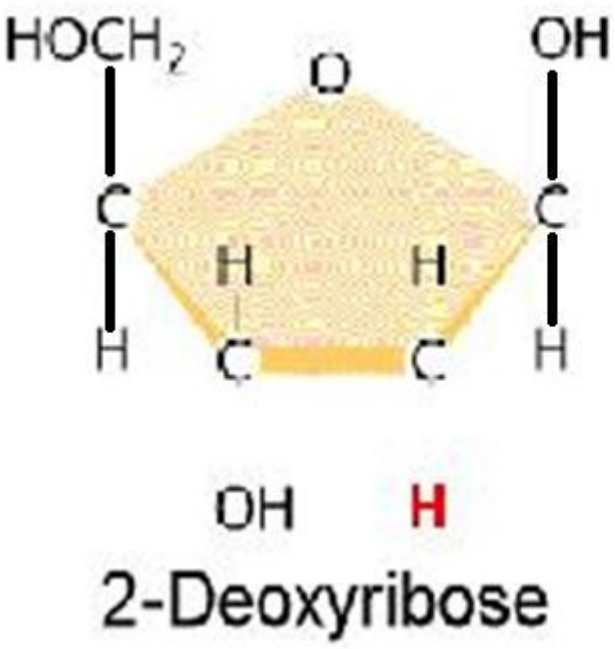
- Gula pentosa (5 C)
- Gugus Fosfat (P)→ -PO4
- Senyawa Nitrogen (Basa N)

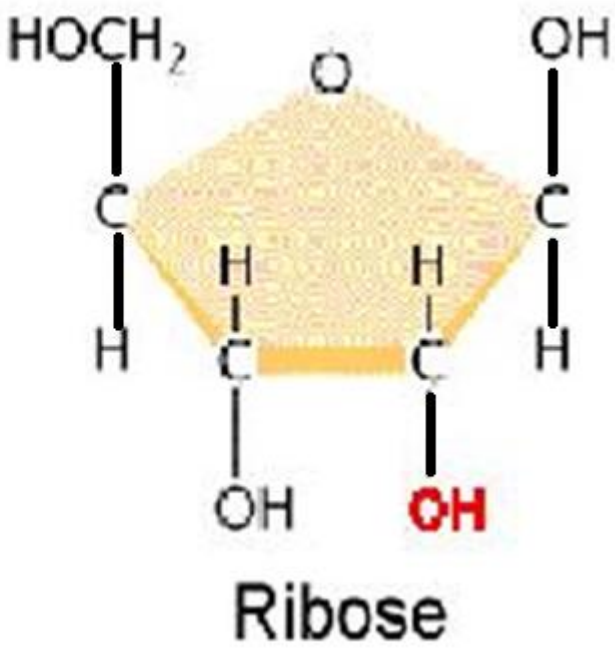


Molekul Gula dalam Asam Nukleat



PENTOSA





ASAM NUKLEAT

- DNA adalah asam nukleat
- Dalam sel terdapat asam nukleat selain DNA yaitu RNA
- RNA berbeda dari DNA dalam hal:
  - *Basa Nitrogen*
  - *Gula pentosa*
  - *Rantai nukleotida*
  - *Kadar*
  - *Fungsi*

CIRI BEDA

DNA	CIRI	RNA
Double Helix	Rantai Polinukleotida	Tunggal
Deoksi-ribosa	Gula (Pentosa)	Ribosa
Timin (T)	Basa Pirimidin	Urasil (U)
DNA	Replikasi	OlehDNA
Tetap	Kadar	Berubah-ubah
Sifat/Gen	Fungsi	Sintesis Protein

DUPLIKASI DNA

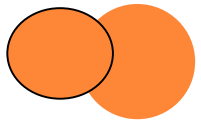
- 3 HIPOTESIS
  - ✓ KONSERVATIF
  - ✓ SEMIKONSERVATIF
  - ✓ DISPERSIF

http://www.fotosearch.com/comp/DGV/DGV055/men-tearing-apart_~sb10067378bg-001.jpg

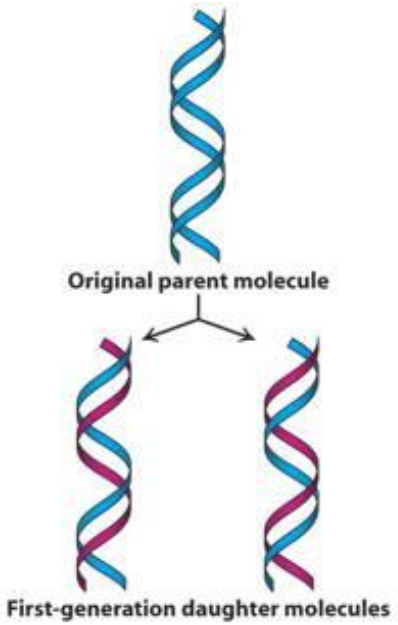
SEMIKONSERVATIF

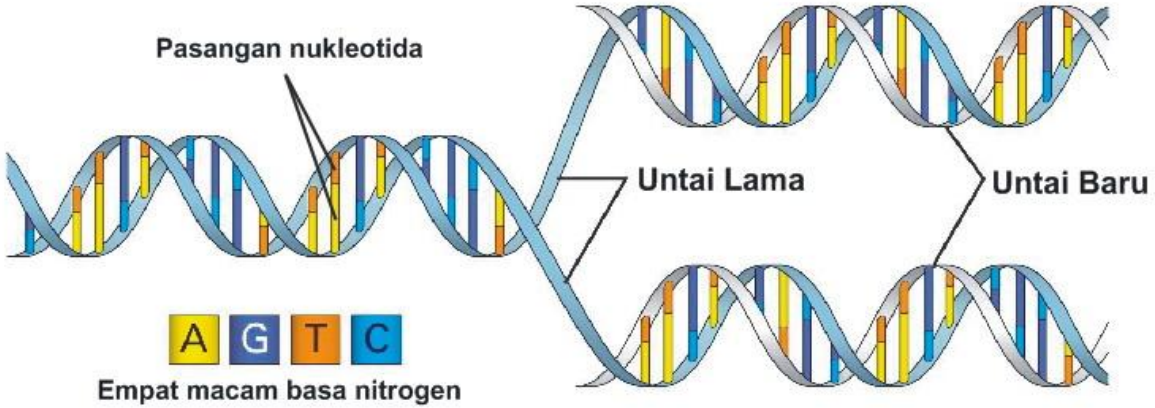
- Rantai polinukleotida terpisah
- Terbentuk pasangan rantai yang baru
- Hasil : 2 DNA

Masing-masing DNA hasil reproduksi (DUPLIKASI) mengandung 1 rantai polinukleotida lama dan baru



SEMI KONSERVATIF



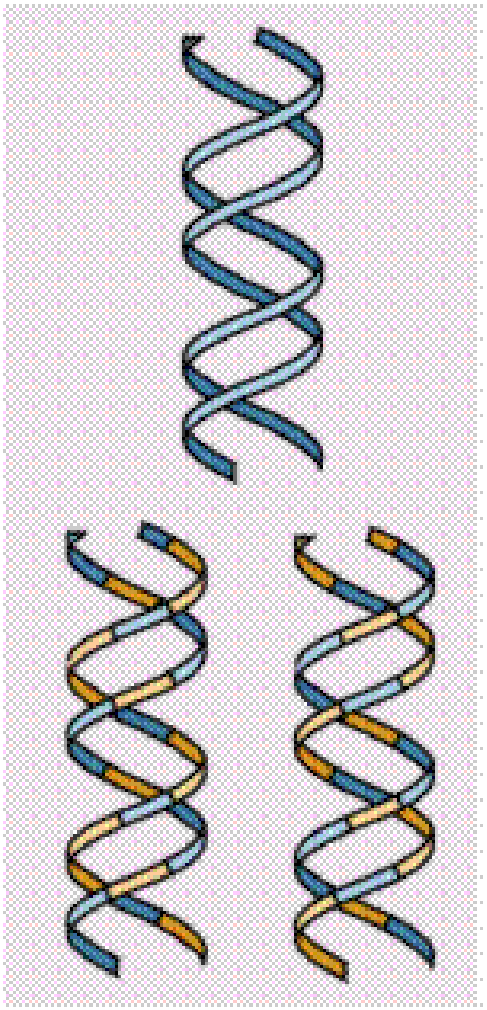


http://www.genome.ou.edu/3653/Lecture24-10_20_06_files/image002.jpg

Dispersive replication

Original DNA double helix

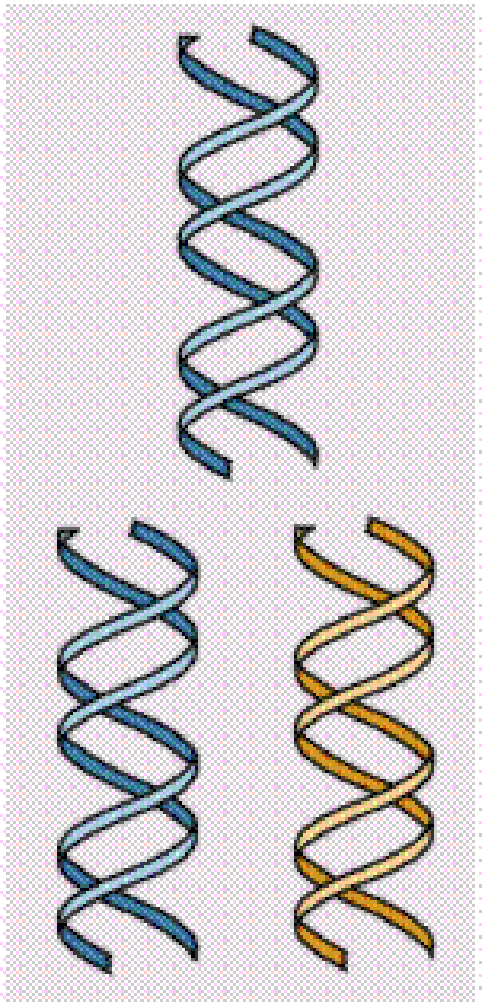
DNA molecules after one round of replication



Conservative replication

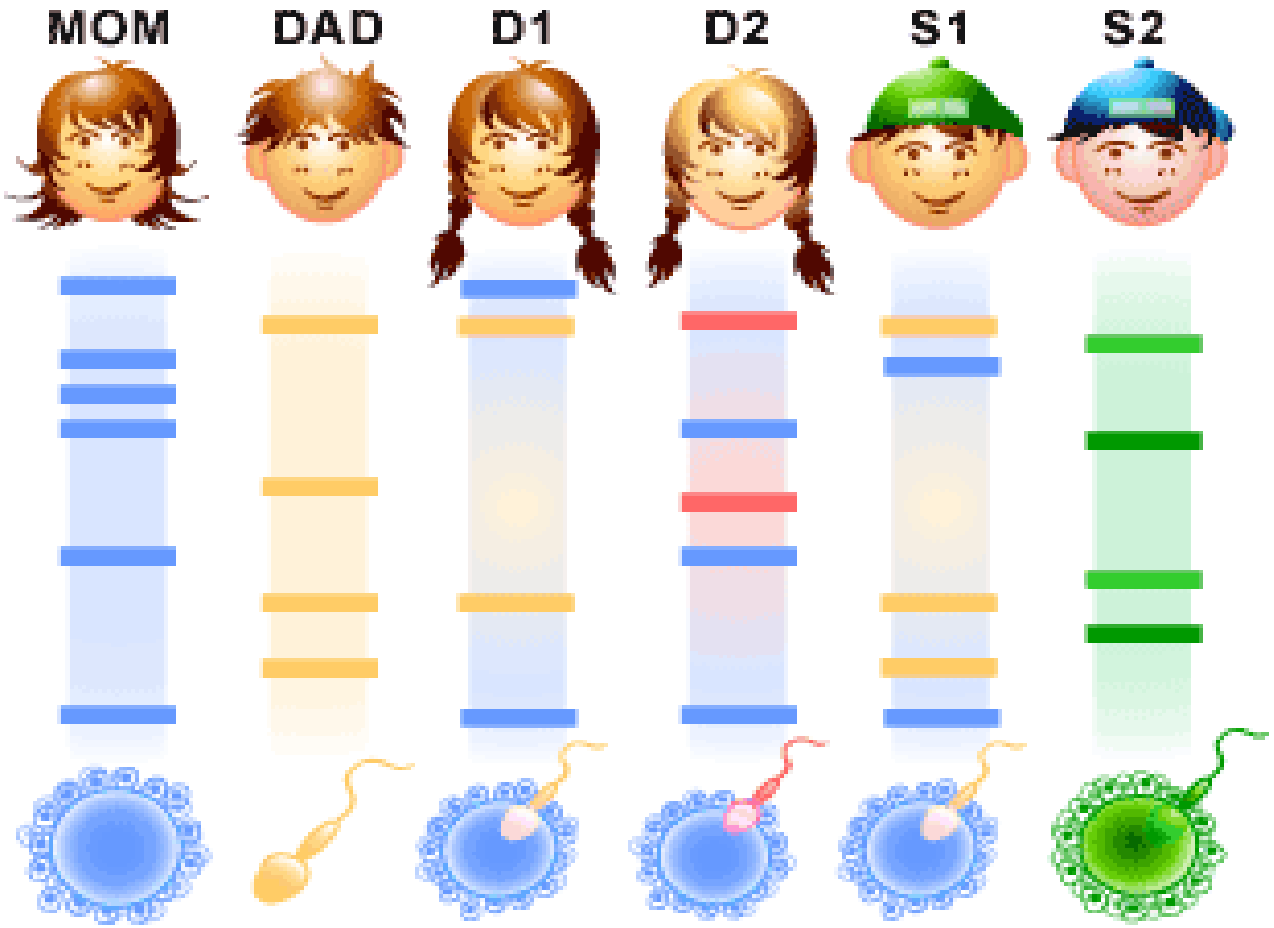
Original DNA double helix

DNA molecules after one round of replication



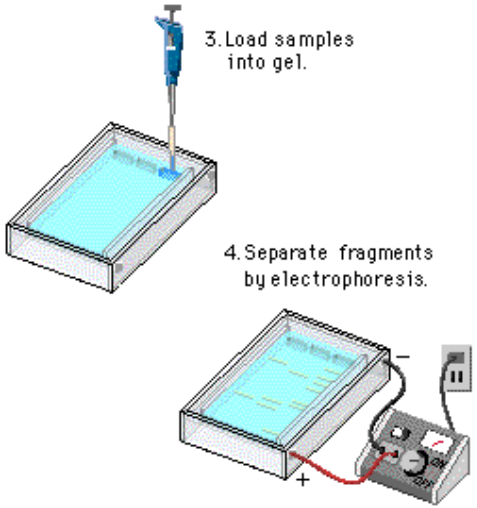
- STRUKTUR DNA
- REPLIKASI
- RNA-SINETSIS PROTEIN
- PCR

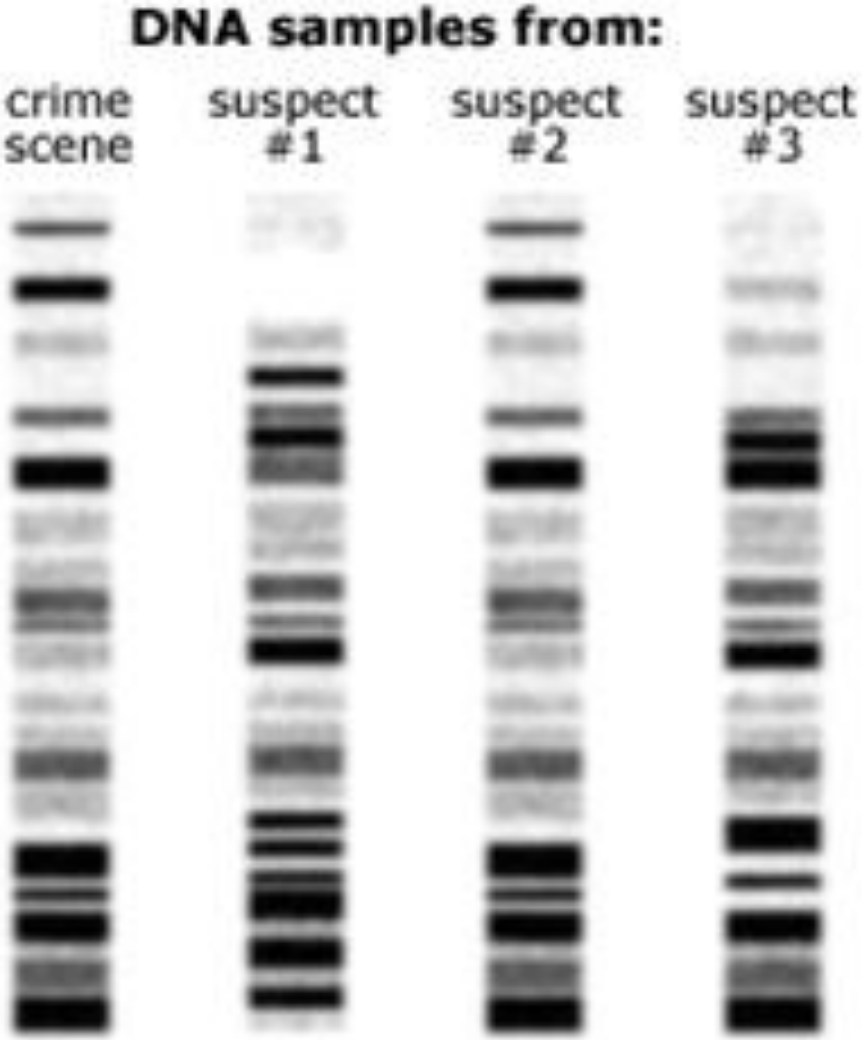
KEMIRIPAN DNA KELUARGA



TES DNA

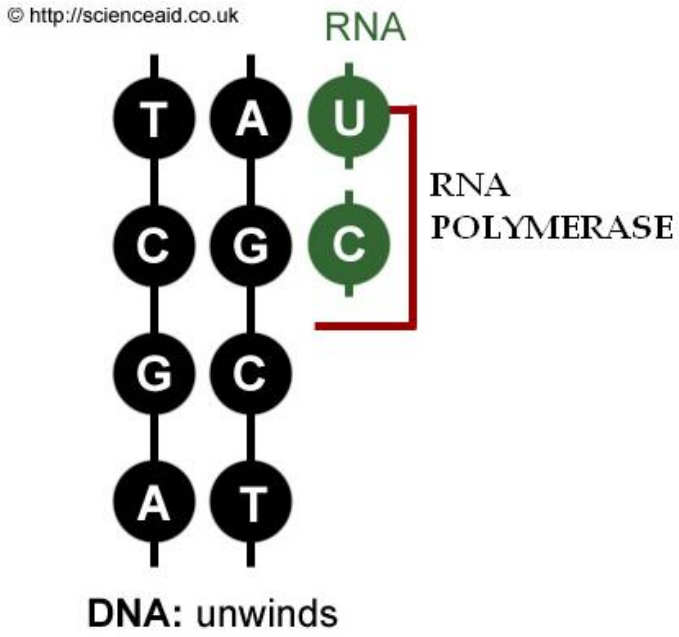
- Sample DNA
- Teknik PCR
- Elektroforesis DNA
- Fotografi x-ray





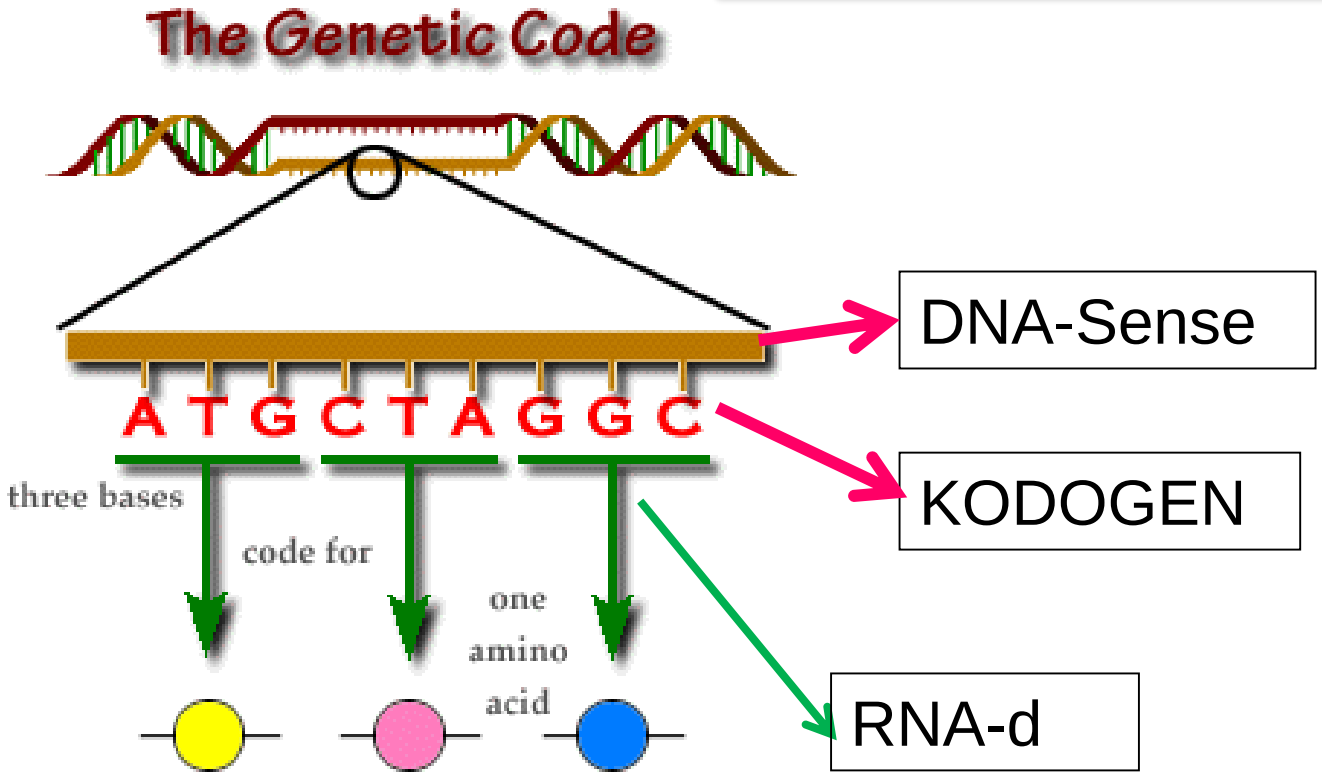
RNA (ARN)

- rantai tunggal
- RIBOSA
- Basa Nitrogen : A, G, U, C
  - ***Adenin***
  - ***Guanin***
  - ***Urasil***
  - ***Sitosin (Cytosin)***
- Tidak dapat berduplikasi sendiri
- Dibentuk oleh DNA



FUNGSI RNA

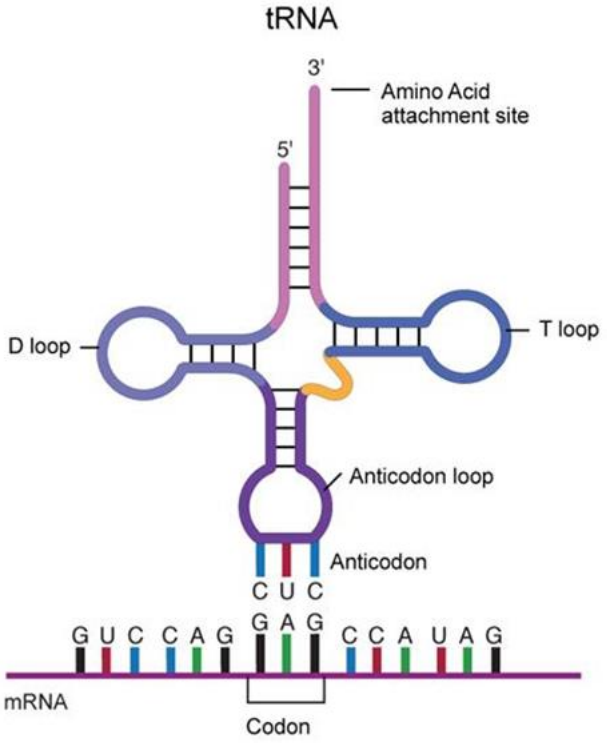
TERLIBAT PROSES SINTESIS PROTEIN



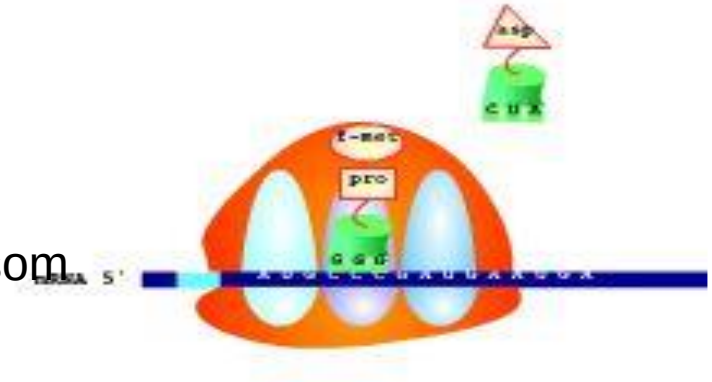
http://www.brooklyn.cuny.edu/bc/ahp/BioInfo/graphics/GP.GeneticCode.GIF

JENIS RNA

- ARN- duta (m-RNA)
- ARN ribosom (r-RNA)
- ARN pembawa (t-RNA)



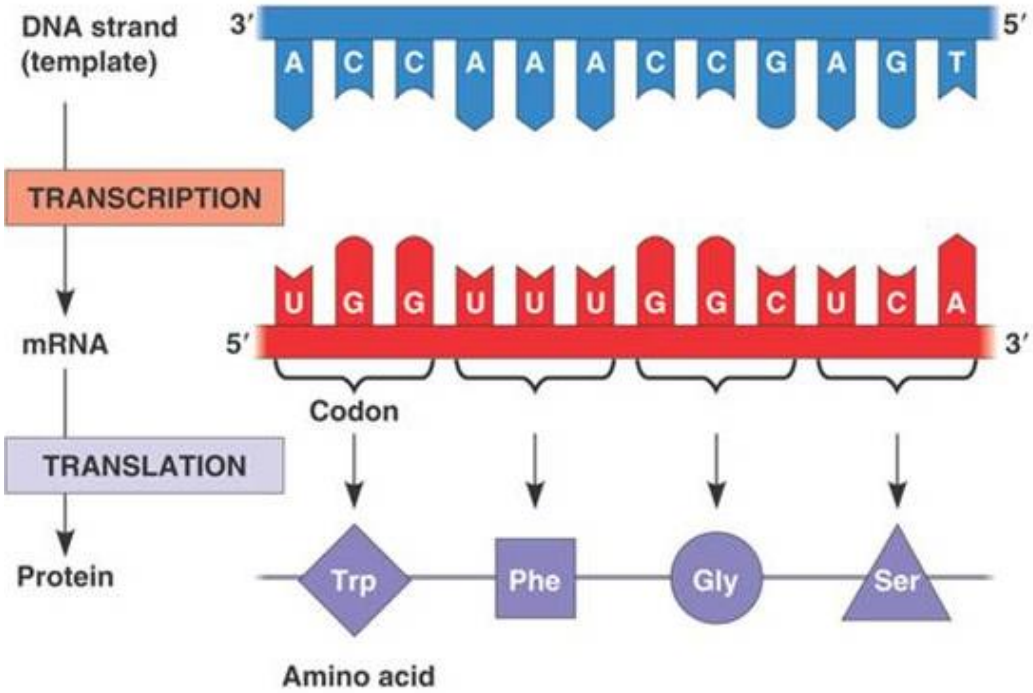
Ribosom



http://telstar.ote.cmu.edu/biology/animation/thumbnails/protein_synthesis.jpg

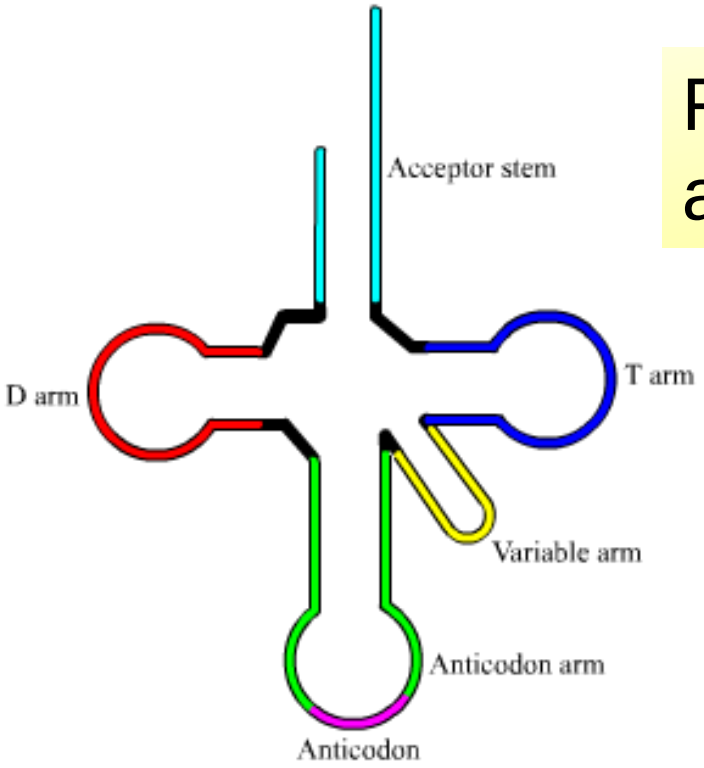
RNA DUTA (M-RNA)

- Berisi kodon (kode genetik) asam amino
- Dicetak oleh DNA sense



http://3.bp.blogspot.com/_nVf4So8wN2A/TQ8WNDR2TiI/AAAAAAAAAAw/NohVpoMzo9A/s1600/protein-synthesis-overview.jpg

RNA- Transfer



Fungsi : Membawa asam amino ke ribosom

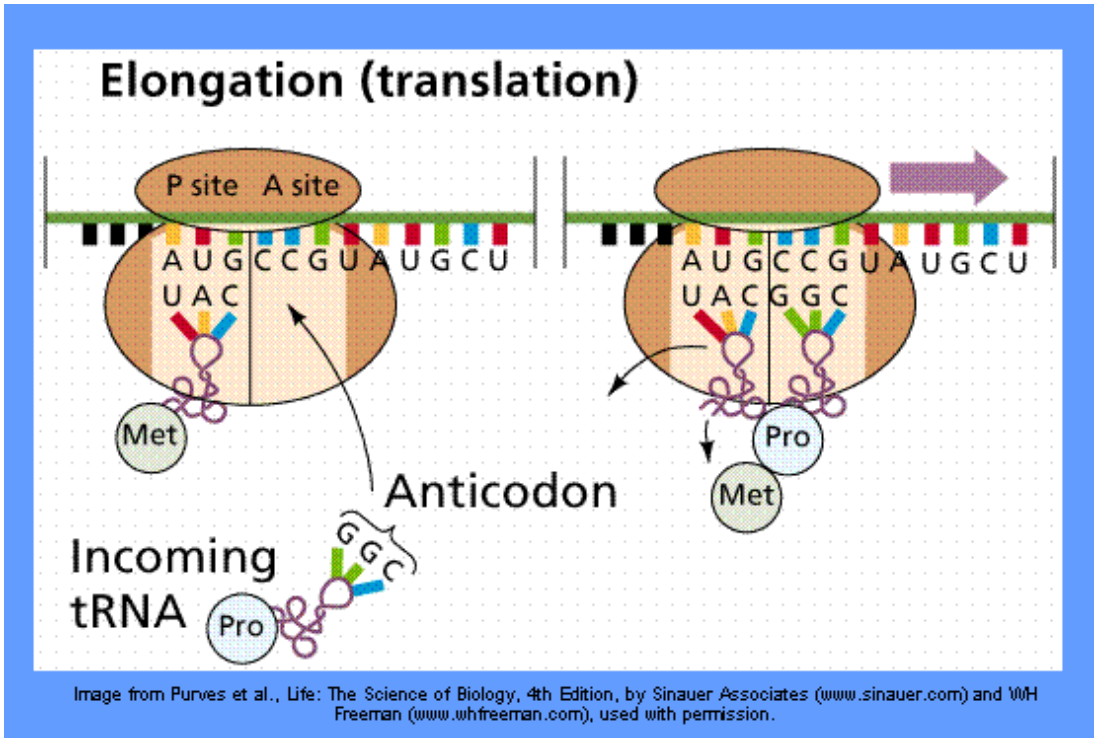
Basa N RNA-t yang akan berpasangan dengan basa N RNA-d disebut ANTIKODON

DNA → TAA (kodogen)
m-RNA → AUU (Kodon)
t-RNA → UAA (Antikodon)

http://www.chemistrydaily.com/chemistry/upload/1/15/TRNA2.png

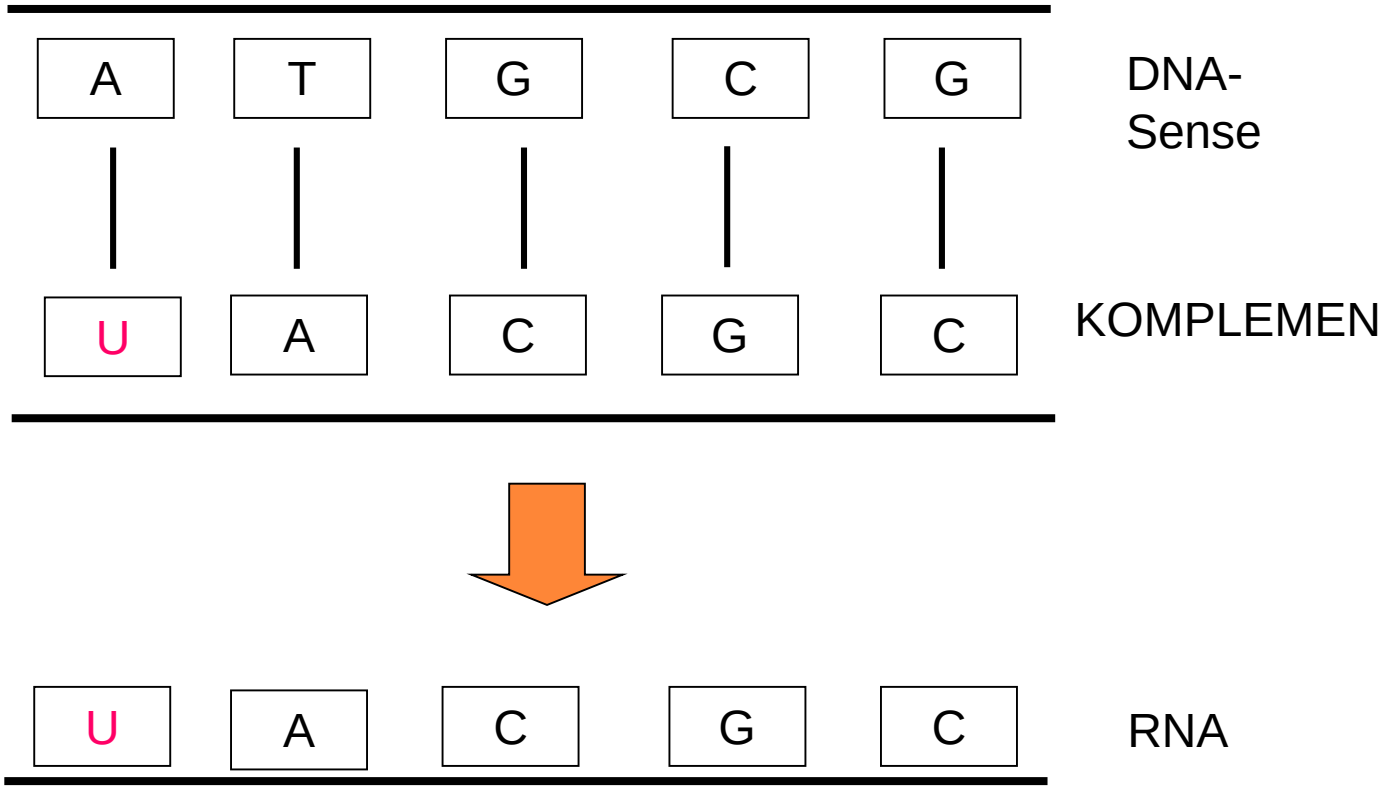
RNA RIBOSOM

- Di ribosom
- Sebagai tempat perakitan polipeptida (protein)

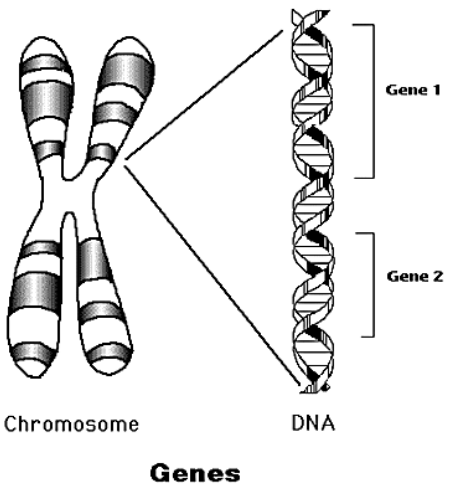


http://www.elmhurst.edu/~chm/vchembook/images/584ELONGATION3.gif

Transkripsi RNA



HUBUNGAN KROMOSOM-DNA-GEN



- Nukleus :→ Kromosom
- Kromosom : → DNA
- Segmen DNA-sense → gen
- GEN :kodogen Inisiasi ke Terminasi

GEN → PROTEIN → ENZIM → METABOLISME (FENOTIP)

SEE YOU!