Asam Nukleat

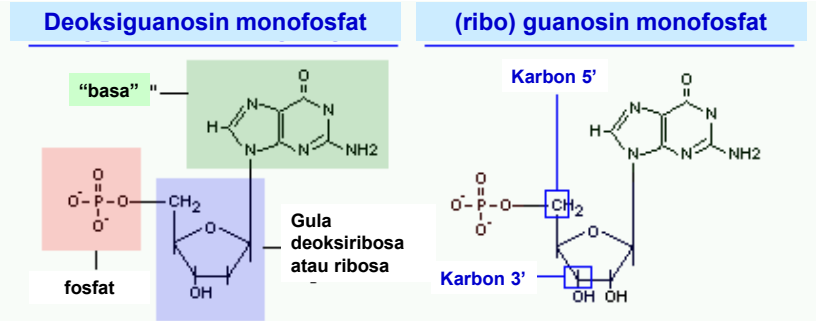
Kuliah Biokimia ke-5

Beberapa Laman Web untuk Asam Nukleat:

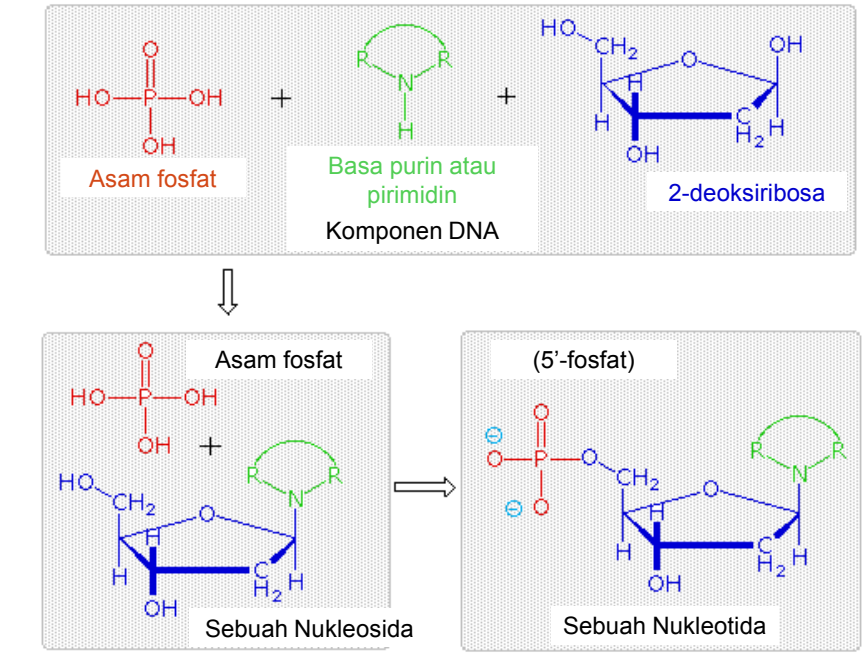
1. http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/nucacids.htm
2. http://en.wikipedia.org/wiki/Nucleic_acid
3. http://www.visionlearning.com/library/module_viewer.php?mid=63
4. http://library.med.utah.edu/NetBiochem/nucacids.htm
5. http://www.scienceclarified.com/Mu-Oi/Nucleic-Acid.html
6. http://en.wikipedia.org/wiki/DNA
7. http://www.vivo.colostate.edu/hbooks/genetics/biotech/basics/nastruct.html
8. http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/N/Nucleotides.html
9. http://www.wiley.com/college/pratt/0471393878/student/animations/dna_sequencing/index.html
10. http://en.wikipedia.org/wiki/RNA

DEFINISI

- Asam Nukleat adalah linier, polimer nukleotida tidak bercabang polymer (biopolimer).
- Asam Nukleat adalah nama umum untuk DNA dan RNA, disebut juga sebagai polinukleotida.
- Pertama kali ditemukan oleh Friedrich Miescher (1844-1895), seorang Biokimiawan dari negara Swiss, pada kira-kira tahun 1870.
- Terdiri dari 3 (tiga) komponen



http://www.vivo.colostate.edu/hbooks/genetics/biotech/basics/nastruct.html Prof.Dr.Krishna Purnawan Candra, 2016



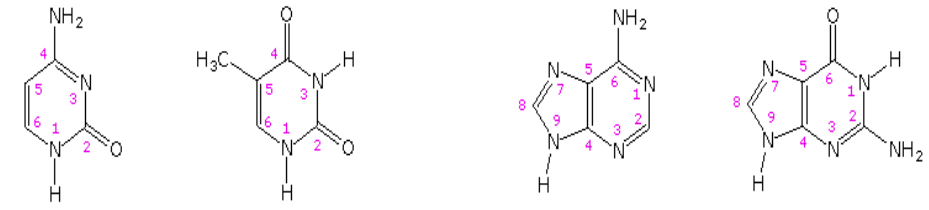
http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/nucacids.htm

Fungsi, asal, dan nomenklature

- ***Fungsi asam nukleat:*** pengkode, penyampai, dan ekspresi informasi genetik
- Ditemukan di semua organisme hidup (termasuk virus) dan organel sel
  - Sel eucariotik (dalam nukleus)
  - Bakteri, archaea, mitokondria, khloroplast, virus
- Tipe nukleotida dibedakan oleh basa nitrogen (purin and pyrimidin)

Dr.Krishna Purnawan Candra, 2011

Tipe basa nitrogen



Sitosin (Cytosine, C) Timin (Thymine, T)

Basa pirimidin

Adenin (Adenine, A) Guanin (Guanine, G)

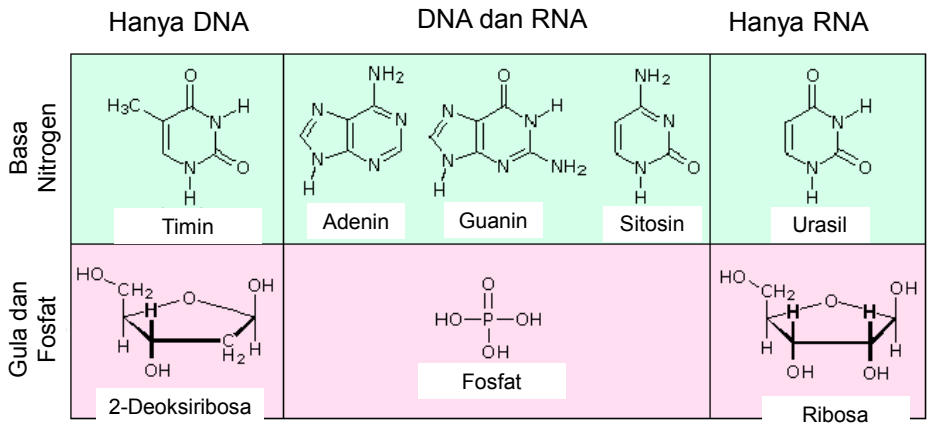
Basa purin

Tipe nukleotida

Singkatan	Basa	Nukleosida	Asam Nukleat
A	Adenin	Deoksiadenosin	DNA
		Adenosin	RNA
G	Guanin	Deoksiguanosin	DNA
		Guanosin	RNA
C	Sitosin (Cytocin)	Deoksisitidin (Deoxycitidin)	DNA
		Sitidin (Cytidine)	RNA
T	Timin	Deoksithimidin (thimidin)	DNA
U	Urasil	Uridin	RNA

Perbedaan antara DNA dan RNA

Komponen Asam Nukleat

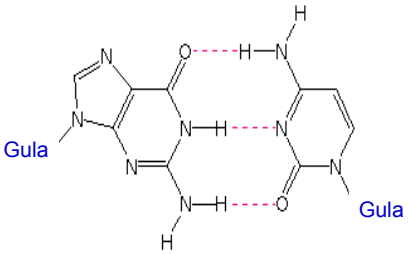


Untai ganda /
double stranded

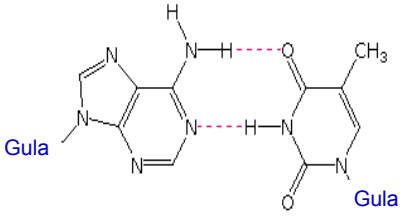
Untai tunggal /
single stranded

http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/nucacids.htm

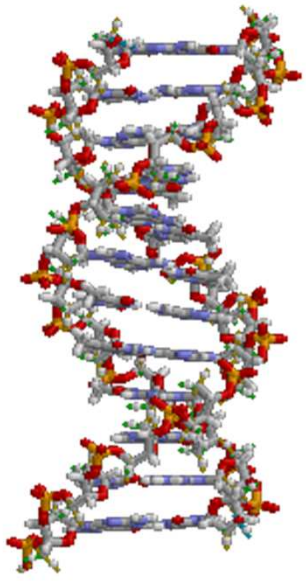
Struktur DNA, pasangan dengan basis ikatan hidrogen



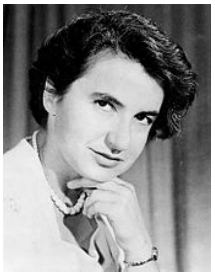
G C



A T



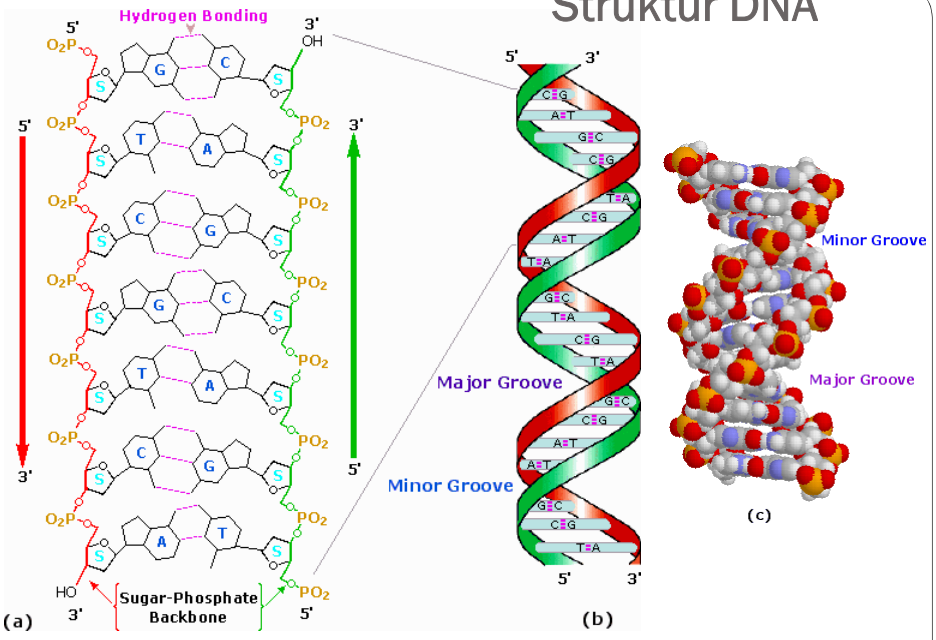
Penemu Struktur DNA



Rosalind Franklind used X-ray crystallography menolong memvisualisasikan struktur DNA

James D.Watson and Francis Crick (kanan), *co-originators* dari model *double-helix*, dengan Maclyn McCarty (kiri)

Struktur DNA



http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/nucacids.htm

Famili RNA

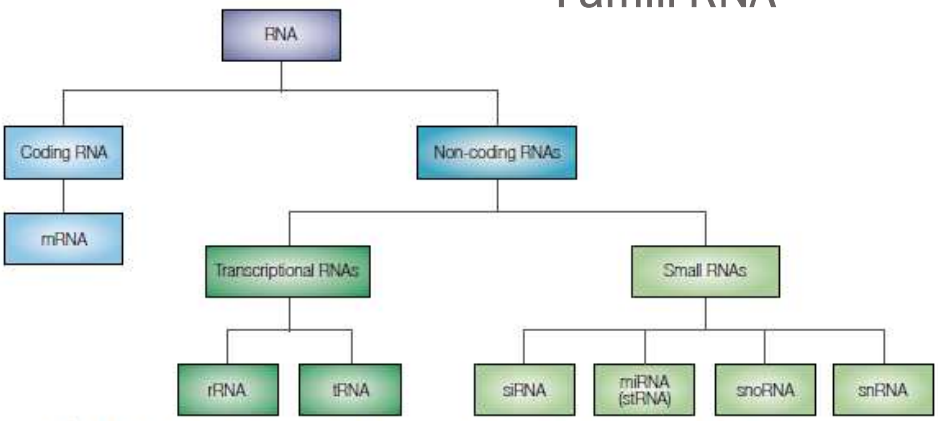
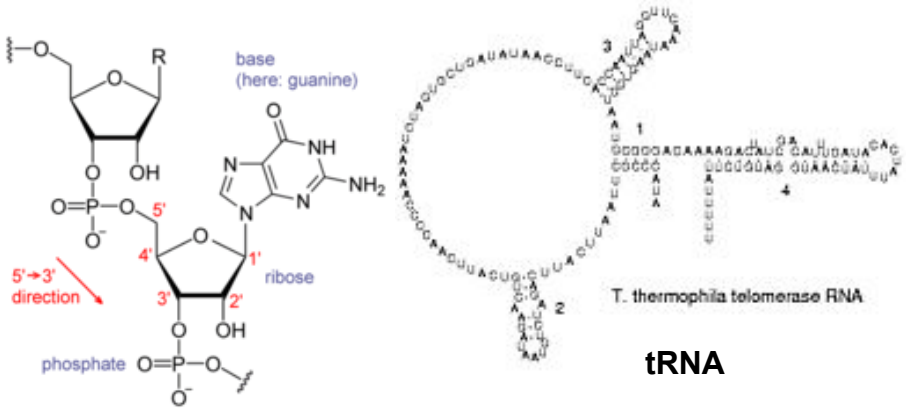


Figure 1 | **The RNA family.** In recent years the number of members in the RNA family has grown rapidly. In addition to the coding messenger RNAs (mRNAs) and transcriptional RNAs (ribosomal RNAs (rRNAs) and transfer RNAs (tRNAs)), another subfamily called small RNAs has been discovered, each member of which has its own particular function (see text for more detail on the small RNAs). The small RNA subfamily contains small interfering RNAs (siRNAs), microRNAs (miRNAs; which include small temporal RNAs (stRNAs)), small nucleolar RNAs (snoRNAs) and small nuclear RNAs (snRNAs).

Buckingham S (2003) The major world of microRNAs. Horizon Symposia Understanding RNAissance , May 2003 p.1-2 [http://www.nature.com/horizon/rna/background/micrornas.html]

Struktur dan tipe RNA



tRNA

Tipe RNA : mRNA, tRNA, rRNA
Beberapa mempunyai karakteristik seperti enzim (Ribozyme)

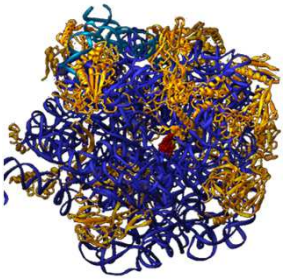
Tipe rRNA

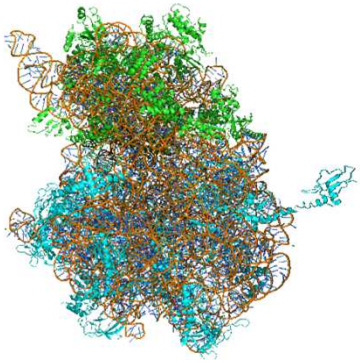
Tipe	Ukuran	Subunit besar (rRNAs)	Subunit kecil (rRNA)
Prokariotik (*E.coli*)	70S	50S (5S : 120 nt, 23S : 2906 nt)	30S (16S : 1542 nt)
Eukariotik (human)	80S	60S (5S : 121 nt, 5,8S : 156 nt, 28S : 5070 nt)	40S (18S : 1869 nt)

S in 16S mempresentasikan Svedberg units, nt= panjang nukleotida.

- S unit dari subunit (atau rRNAs) tidak dapat ditambahkan secara sederhana karena ia merepresentasikan laju sedimentasi lebih berdasarkan ukuran daripada massa. Laju sedimentasi setiap subunit dipengaruhi oleh bentuk, juga oleh massanya.
- nt unit dapat ditambahkan karena ini mempresentasikan jumlah unit pada polimer linier rRNA (contoh, panjang total rRNA manusia = 7216 nt).

http://en.wikipedia.org/wiki/Ribosomal_RNA





70S RNA bakteri

http://www.calvin.edu/academic/chemistry/faculty/arnoys/arnoys-chem324-70S%20ribosome.html

Struktur dan Fungsi Ribosom :
http://www.weizmann.ac.il/sb/faculty_pages/Yonath/

MicroRNAs and small interfering RNAs can inhibit mRNA expression by similar mechanisms

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