

Asam Nukleat

Kuliah Biokimia ke-5

Beberapa Laman Web untuk Asam Nukleat:

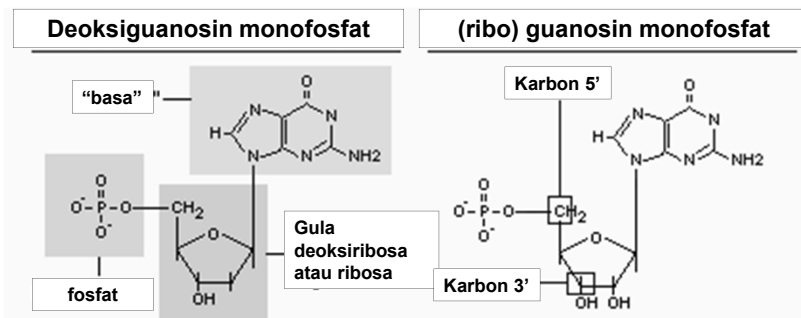
1. <http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/nucacids.htm>
2. http://en.wikipedia.org/wiki/Nucleic_acid
3. http://www.visionlearning.com/library/module_viewer.php?mid=63
4. <http://library.med.utah.edu/NetBiochem/nucacids.htm>
5. <http://www.scienceclarified.com/Mu-Oi/Nucleic-Acid.html>
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>

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Prof.Dr.Krishna Purnawan Candra, 2016

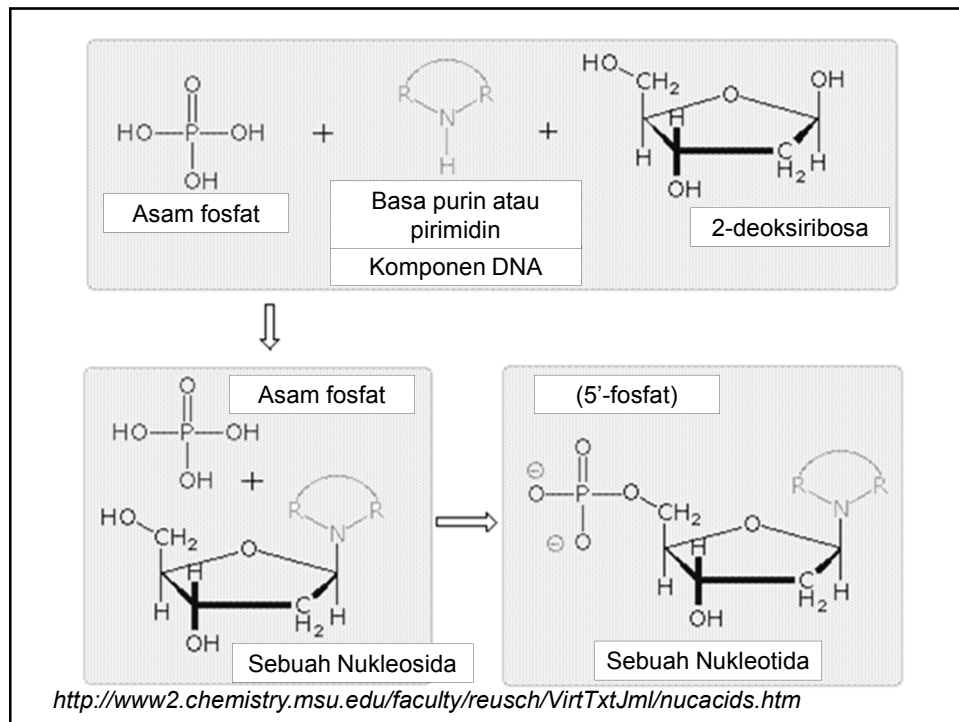
DEFINISI

- 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>

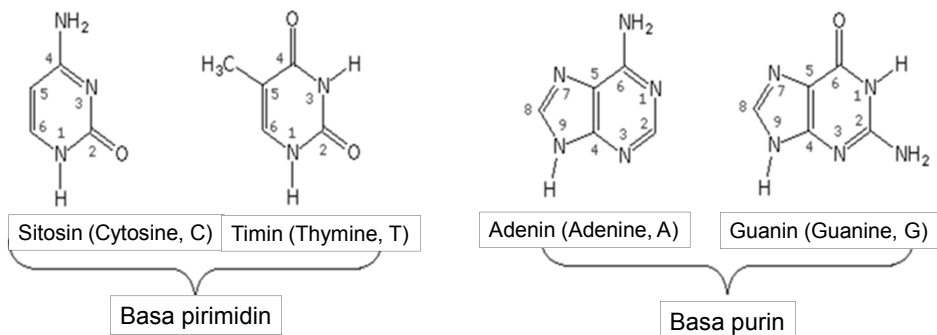
Prof.Dr.Krishna Purnawan Candra, 2016



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)

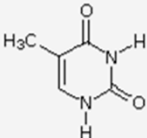
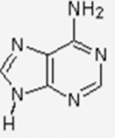
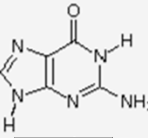
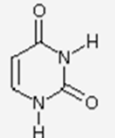
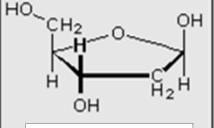
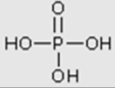
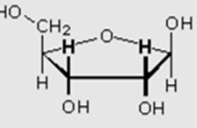
Tipe basa nitrogen



Tipe nukleotida

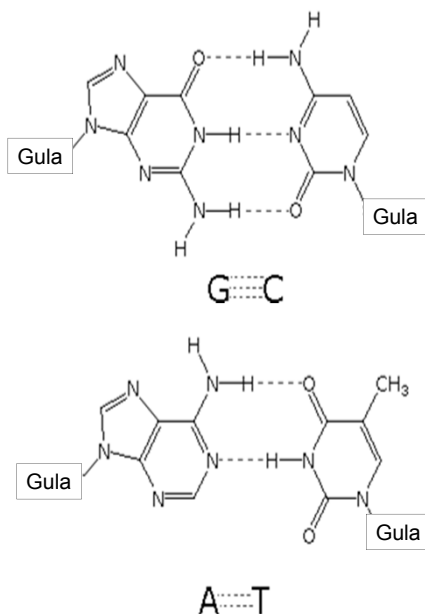
Singkatan	Basa	Nukleosida	Asam Nukleat
A	Adenin	Deoksiadenosin	DNA
		Adenosin	RNA
G	Guanin	Deoksiguanosin	DNA
		Guanosin	RNA
C	Sitosin (Cytocin)	Deoksisitidin (Deoxycitidin)	DNA
		Sitidin (Cytidine)	RNA
T	Timin	Deoksithimidin (thimidin)	DNA
U	Urasil	Uridin	RNA

Perbedaan antara DNA dan RNA

Komponen Asam Nukleat				
	Hanya DNA	DNA dan RNA		Hanya RNA
Basa Nitrogen	 Timin	 Adenin	 Guanin	 Urasil
Gula dan Fosfat	 2-Deoksiribosa	 Fosfat		 Ribosa
	Untai ganda / <i>double stranded</i>		Untai tunggal / <i>single stranded</i>	

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

Struktur DNA, pasangan dengan basis ikatan hidrogen



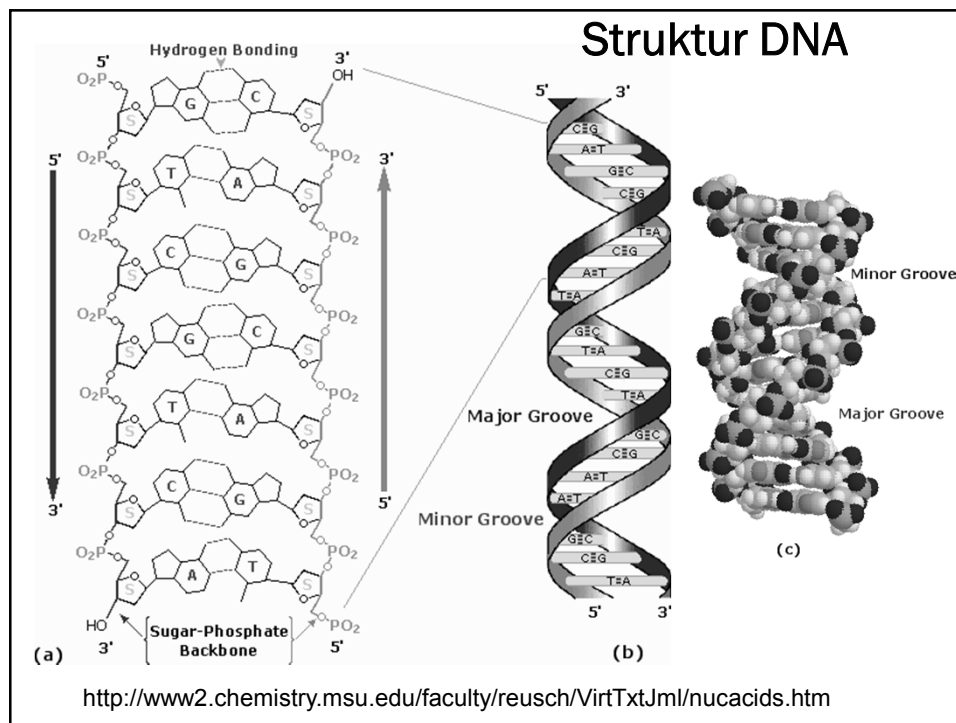
Penemu Struktur DNA



Rosalind Franklin 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)



Famili RNA

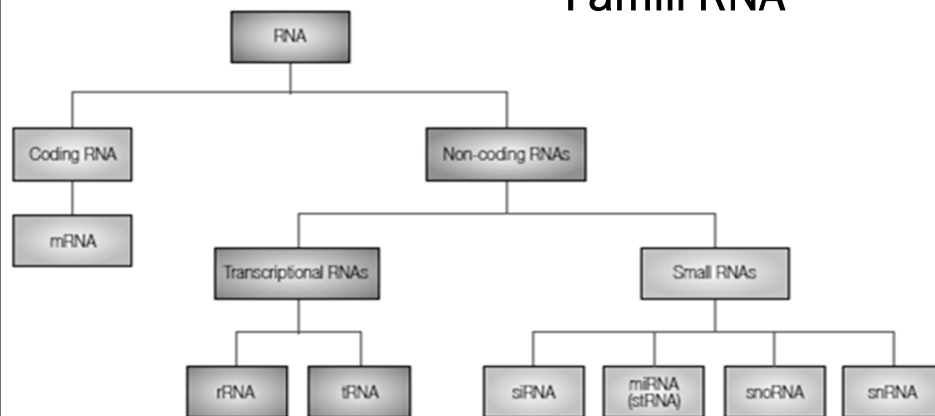
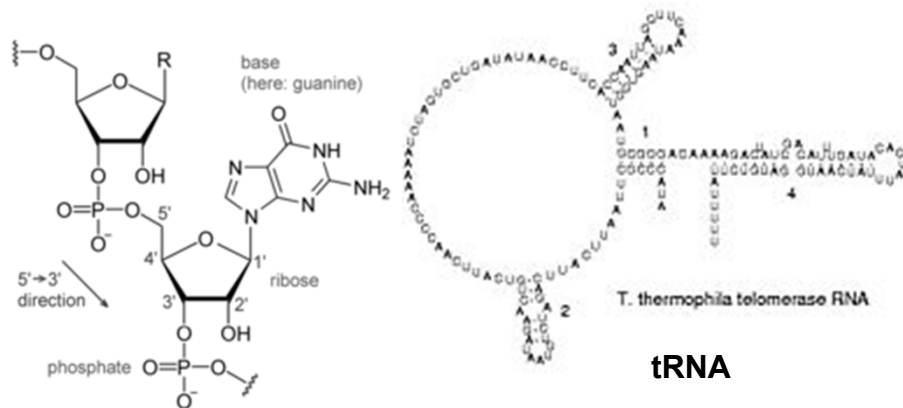


Figure 1 | **The RNA family.** In recent years the number of members in the RNA family has grown rapidly. In addition to the coding messenger RNAs (mRNAs) and transcriptional RNAs (ribosomal RNAs (rRNAs) and transfer RNAs (tRNAs)), another subfamily called small RNAs has been discovered, each member 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
[\[http://www.nature.com/horizon/rna/background/micrnas.html\]](http://www.nature.com/horizon/rna/background/micrnas.html)

Struktur dan tipe RNA



Tipe RNA : mRNA, tRNA, rRNA

Beberapa mempunyai karakteristik seperti enzim (Ribozyme)

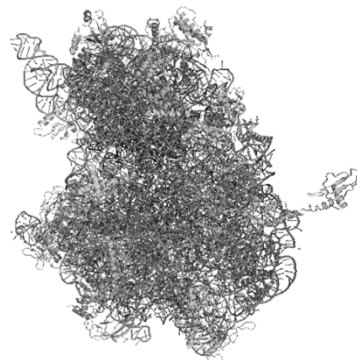
Tipe rRNA

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