

Protein

Kuliah Biokimia ke-3

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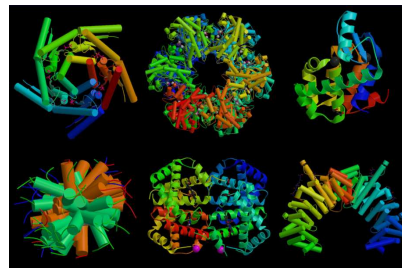
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PROTEIN

- Protein berasal dari kata latin “Proteus” (penting)
- Makromolekul yang dibentuk dari satu atau lebih rantai tidak bercabang dari **asam amino** (*polimer dengan ikatan peptida*).
- Protein umumnya terdiri dari 200-300 asam amino, tetapi beberapa ada yang berukuran lebih kecil (peptida). Protein dengan rantai asam amino yang paling panjang adalah titin (34.350 asam amino).



<http://www.biosci.ohio-state.edu/~prg/journalclubs.html>



<http://martin-protean.com/protein-structure.html>

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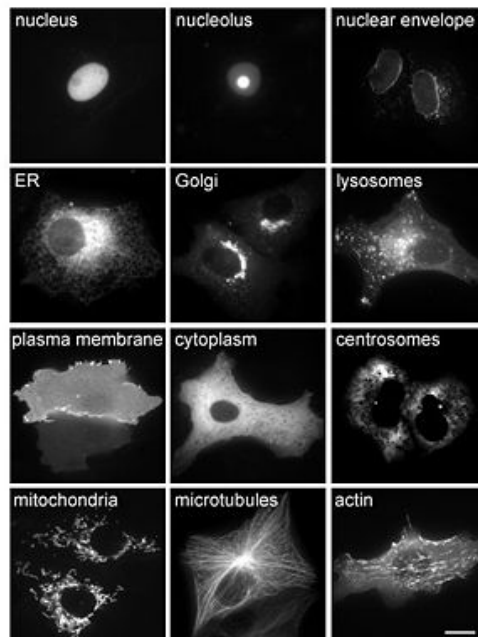
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Fungsi

- Gerakan (otot, silia, flagela)
- Katalis (enzim)
- Struktur sel (kolagen)
- Alat transport dalam cairan tubuh (hemoglobin)
- Reseptor untuk hormon
- Nutrisi (4 kkal/g)
- Dll

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Keberadaan protein
diberbagai lokasi dalam sel

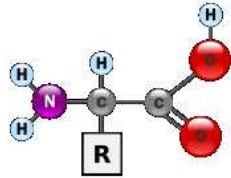
<http://en.wikipedia.org/wiki/Protein>

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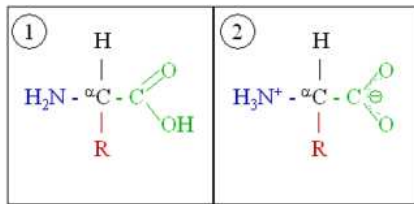
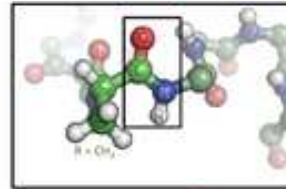
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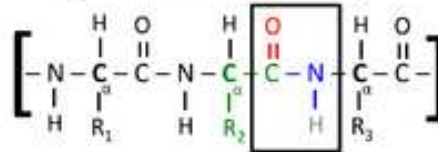
Asam amino



Struktur umum



Zwitterion



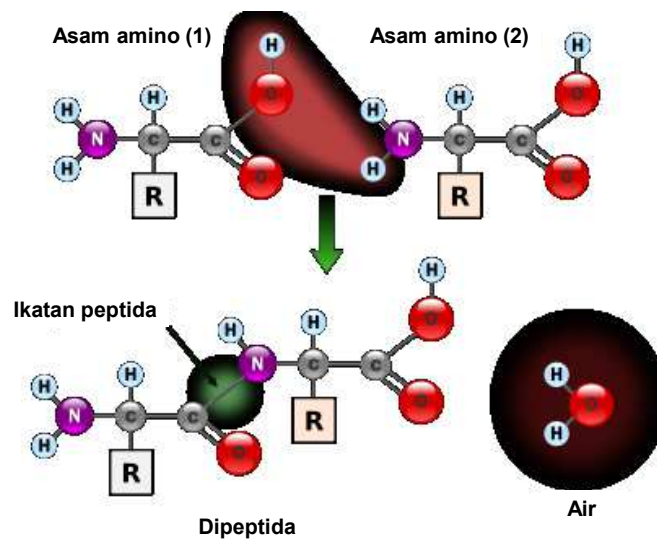
Ikatan peptida

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

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Bentuk dipeptida



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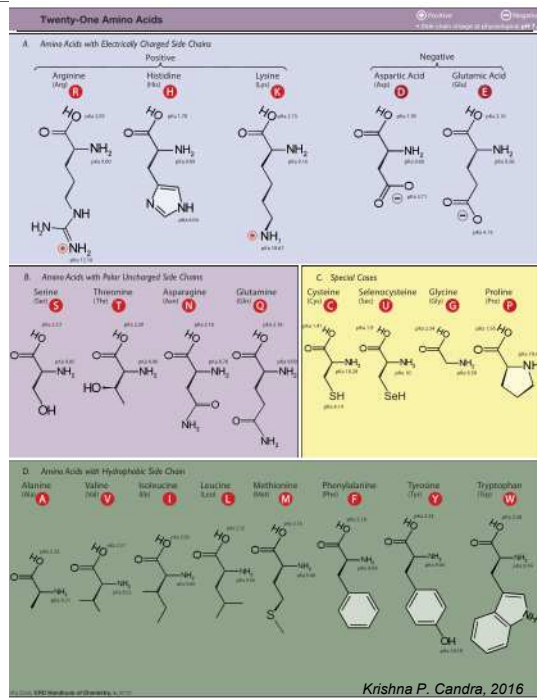
Tipe asam amino

Esensial

- Methionin
- Arginin*
- Threonin
- Triptophan
- Histidin*
- Isoleusin
- Lisin
- Leusin
- Valin
- Fenilalanin

Nonessential

- Alanin
- Asparagin
- Asam aspartat
- Sistein*
- Asam glutamat
- Glutamin*
- Glisin*
- Prolin*
- Selenosistein*
- Serin*
- Tirosin*
- Ornithin*
- Taurin



Tipe asam amino

Esensial

- Methionin
- Arginin*
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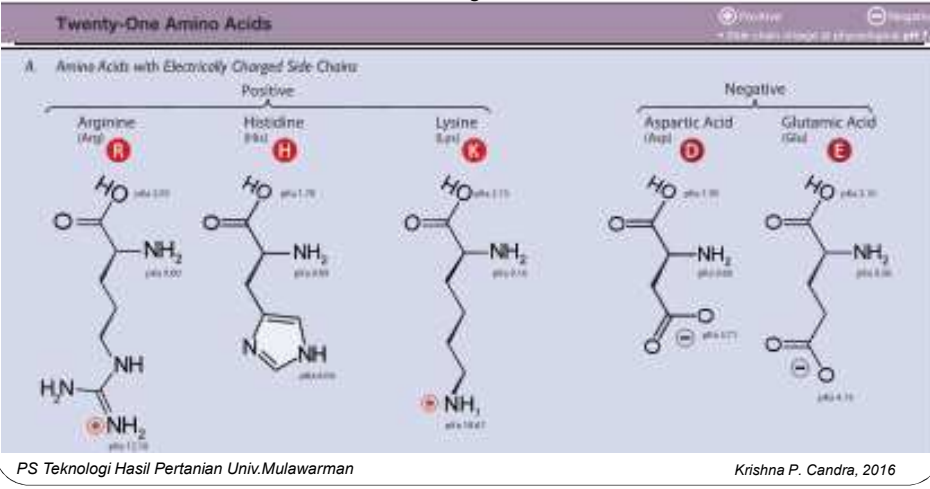
- Alanin
- Asparagin
- Asam aspartat
- Sistein*
- Asam glutamat

Nonessential

- Glutamin*
- Glisin*
- Prolin*
- Selenosistein
- Serin

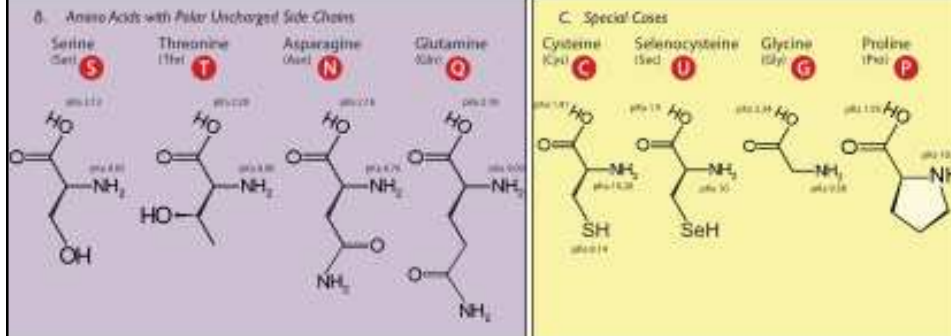
Nonessential

- Tirosin
- Ornithin
- Taurin



Tipe asam amino

<i>Esensial</i>	<i>Esensial</i>	<i>Nonessential</i>	<i>Nonessential</i>	<i>Nonessential</i>
Methionin	Isoleusin	Alanin	Glutamin*	Tirosin
Arginin*	Lisin	Asparagin	Glisin*	Ornithin
Threonin	Leusin	Asam aspartat	Prolin*	Taurin
Tryptophan	Valin	Sistein*	Selenosistein	
Histidin*	Fenilalanin	Asam glutamat	Serin	

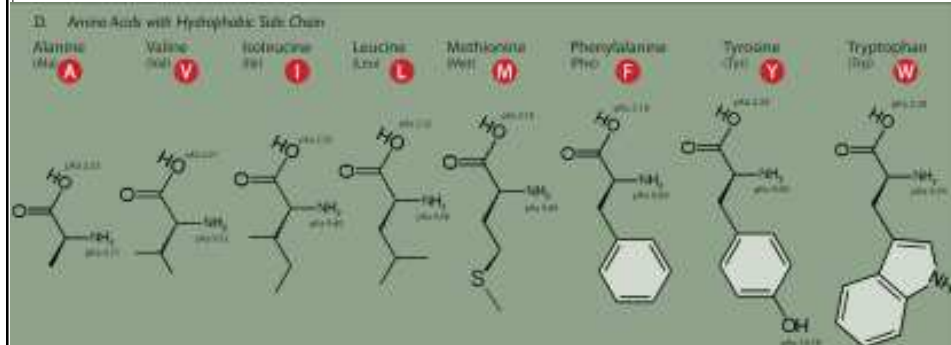


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Tipe asam amino

<i>Esensial</i>	<i>Esensial</i>	<i>Nonessential</i>	<i>Nonessential</i>	<i>Nonessential</i>
Methionin	Isoleusin	Alanin	Glutamin*	Tirosin
Arginin*	Lisin	Asparagin	Glisin*	Ornithin
Threonin	Leusin	Asam aspartat	Prolin*	Taurin
Tryptophan	Valin	Sistein*	Selenosistein	
Histidin*	Fenilalanin	Asam glutamat	Serin	



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Simbol asam amino

Esensial

Methionin (Met, M)
 Arginin* (Arg, R)
 Threonin (Thr, T)
 Tryptophan (Trp, W)
 Histidin* (His, H)
 Isoleusine (Ile, I)
 Lisin (Lys, K)
 Leusin (Leu, L)
 Valin (Val, V)
 Fenilalanin (Phe, F)

Nonessential

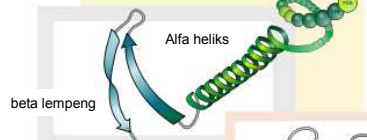
Alanin (Ala, A)
 Asparagin (Asn, N)
 Asam aspartat (Asp, D)
 Sistein* (Cys, C)
 Asam glutamat (Glu, E)
 Glutamin* (Gln, Q)
 Glisin* (Gly, G)
 Prolin* (Pro, P)
 Serin* (Ser, S)
 Tirosin* (Tyr, Y)

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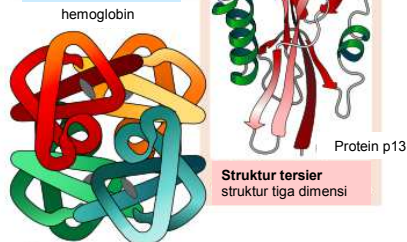
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Struktur Protein

Struktur primer sekuen asam amino



Struktur sekunder sub-struktur umum

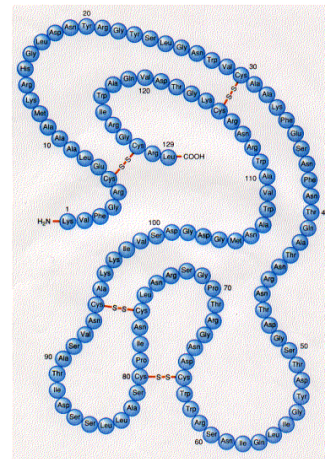


Struktur tersier struktur tiga dimensi

Struktur kuaterner

Kompleks dari molekul protein

Struktur Protein Primer



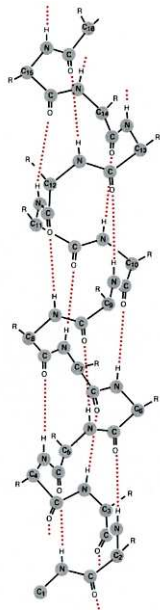
Struktur primer dari Lisozim

<http://sciencebiotech.net/struktur-molekul-protein/>

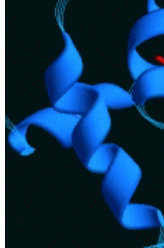
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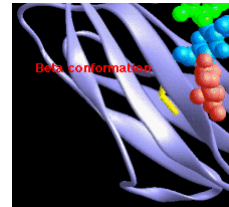
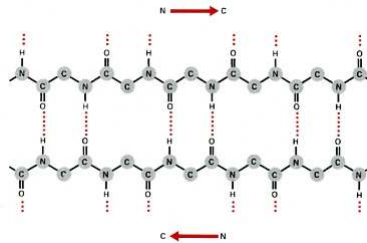
Struktur sekunder Protein



Bentuk alfa (α)



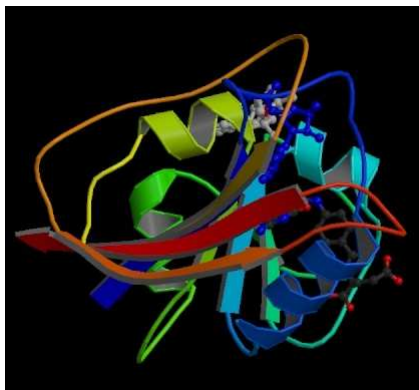
Bentuk beta (β)



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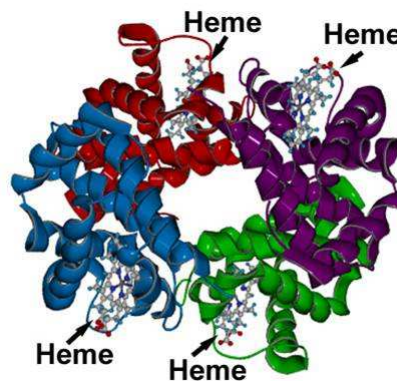
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Struktur Tersier dan Kuarterner Protein



Struktur Tersier

<http://www.chemguide.co.uk/organicprops/aminoacids/proteinstruct.html>



Struktur kuarterner (hemoglobin)

<http://ibhumanbiochemistry.wikispaces.com/C.2.4>

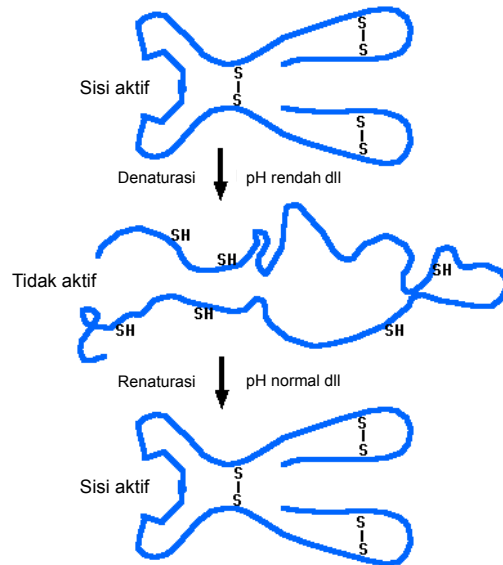
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Pembentukan struktur protein

Struktur protein dapat dirusak (denaturasi) oleh beberapa agen:

- Perubahan pH
- Perubahan konsentrasi garam
- Perubahan suhu
- Adanya agen pereduksi (memutus ikatan S-S)



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Analisis Protein

- Konsentrasi Protein
 - Metode Kjeldahl
 - Metode Dumas
 - UV-Vis Spektroskopi
 - Pengukuran langsung pada 280 nm
 - Metode Biuret
 - Metode Lowrey
 - Metode Dye binding
 - Metode Turbimetri

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Analisis Protein

- Pemisahan dan Karakterisasi Protein
 - Berdasarkan perbedaan karakteristik kelarutan
 - *Salting out*
 - Pengendapan Isoelektrik
 - Fraksinasi solven
 - Denaturasi dari kontaminasi protein
 - Pemisahan berdasarkan perbedaan karakteristik adsorpsi
 - Khromatografi tukar ion (*Ion exchange chromatography*)
 - Khromatografi afinitas (*Affinity chromatography*)
 - Pemisahan berdasarkan perbedaan ukuran
 - Dialisis
 - Ultrafiltrasi
 - *Size exclusion chromatography*

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Protein Analisis

- Pemisahan dengan elektroforesis
 - Elektroforesis non-denaturasi
 - Elektroforesis denaturasi
 - *Isoelectric focusing electrophoresis*
 - Elektroforesis dua dimensi
- Analisis asam amino

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