

Конформационные параметры пептидов

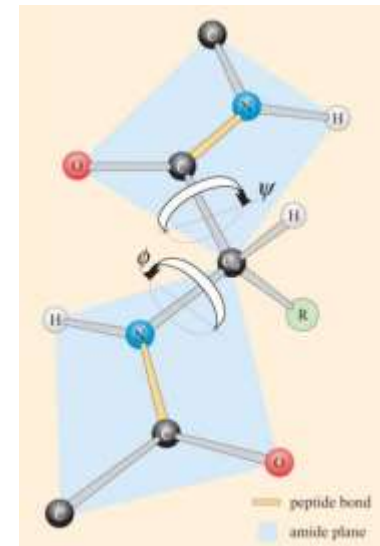
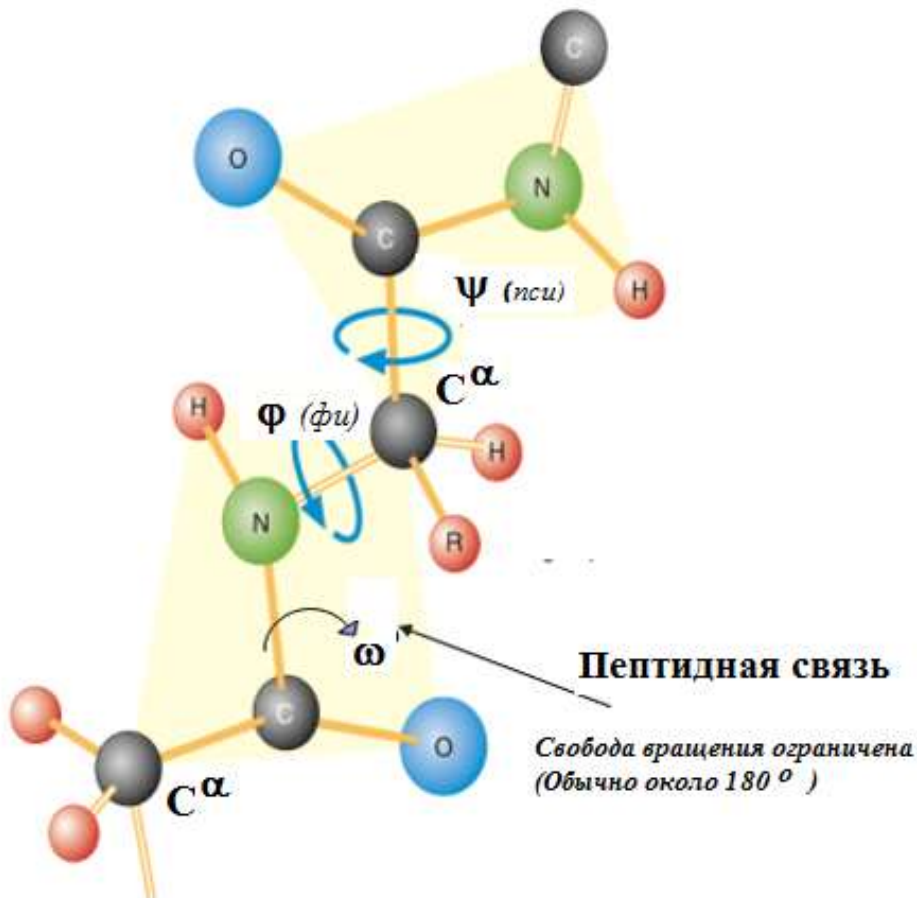
**IUPAC-IUB Commission on Biochemical Nomenclature (CBN)
Abbreviations and Symbols for the Description of the Conformation of
Polypeptide Chains**

Rules approved 1974

<https://iupac.qmul.ac.uk/misc/ppep1.html>

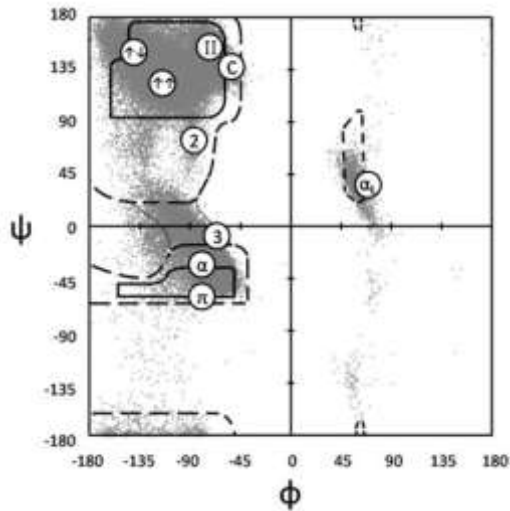
Определения IUPAC

3.2.1. «Основные торсионные углы описывают вращение вокруг связей **N-C α** - **угол ϕ** , вращение вокруг связи **C α -C** – **угол ψ** , и вокруг связи **C-N** - **угол ω** .»
.....Углы вращения равны нулю при *cis* -конформации

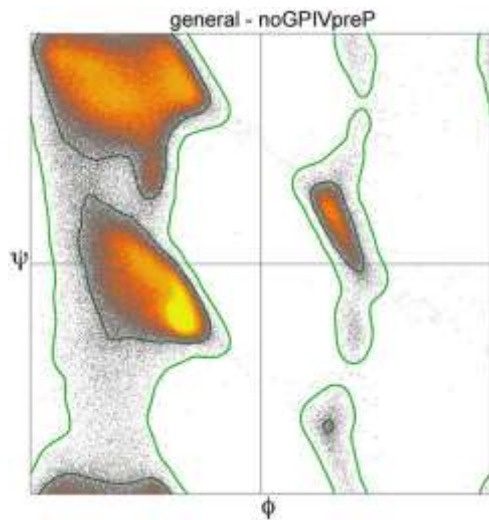


Карты Рамачандрана

Канонический график



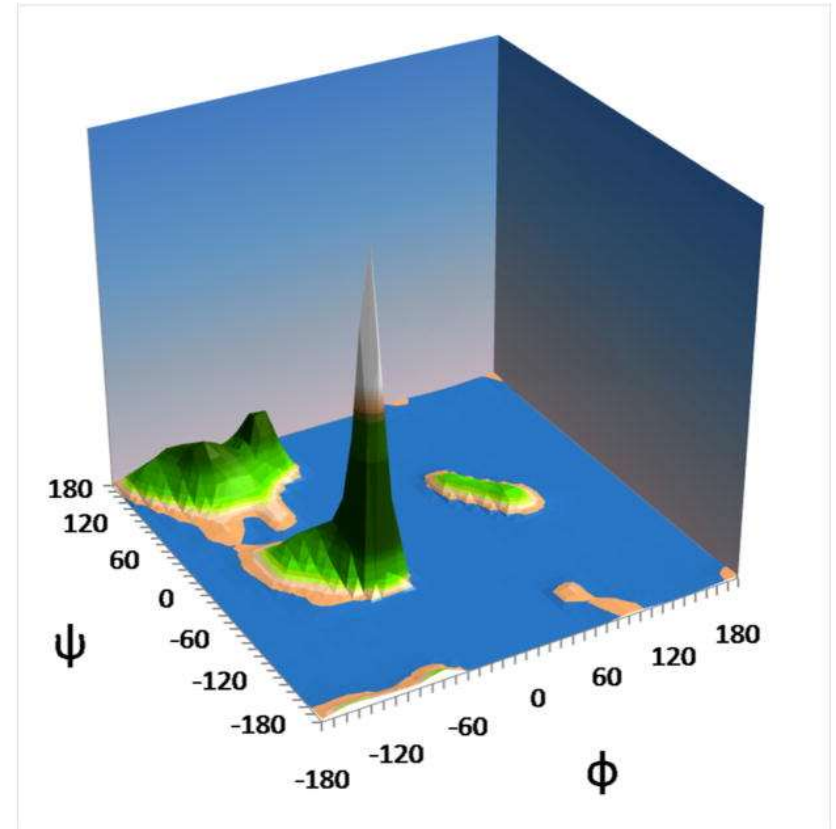
Экспериментальные данные
(более миллиона точек)



[G.N.Ramachandran](#)[C.Ramakrishnan](#)[V.Sasisekharan](#)

Stereochemistry of polypeptide chain configurations. J.Mol.Biol. 1963 Jul;7:95-9.

doi: [10.1016/s0022-2836\(63\)80023-6](https://doi.org/10.1016/s0022-2836(63)80023-6)



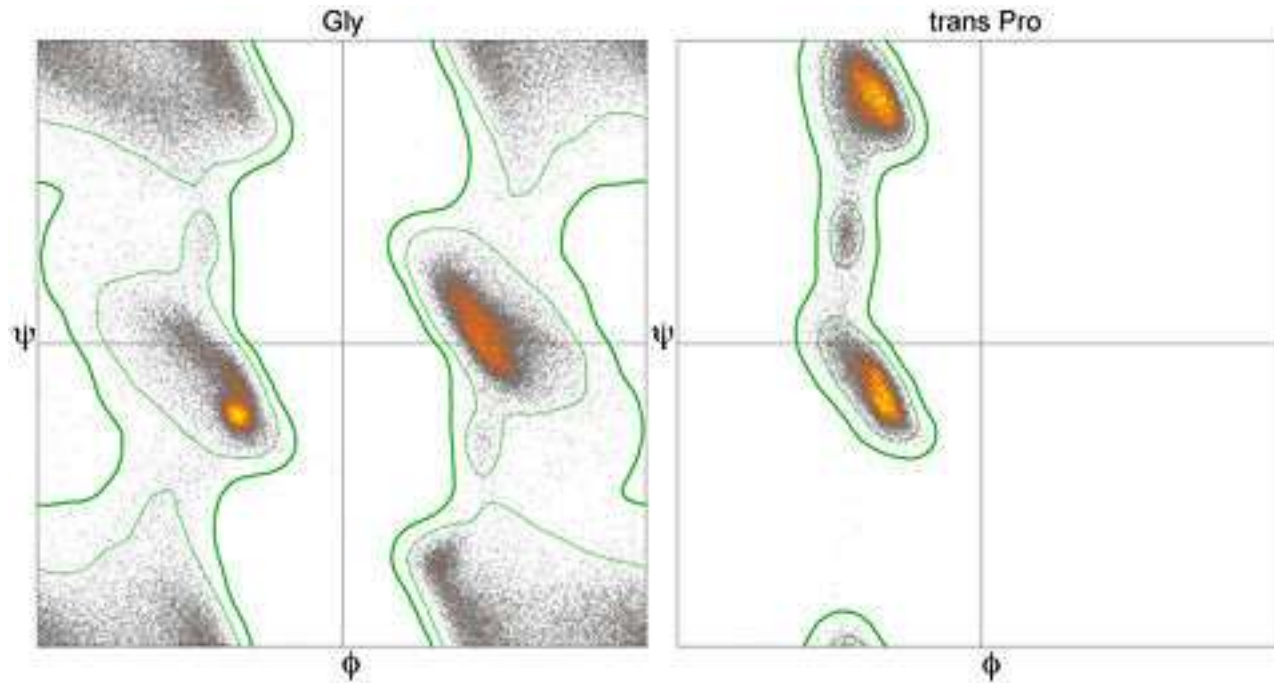
[Scott A. Hollingsworth](#) and [P. Andrew Karplus](#)

A fresh look at the Ramachandran plot and the occurrence of standard structures in proteins

[Biomol Concepts. 2010 Oct; 1\(3-4\): 271–283.](#)

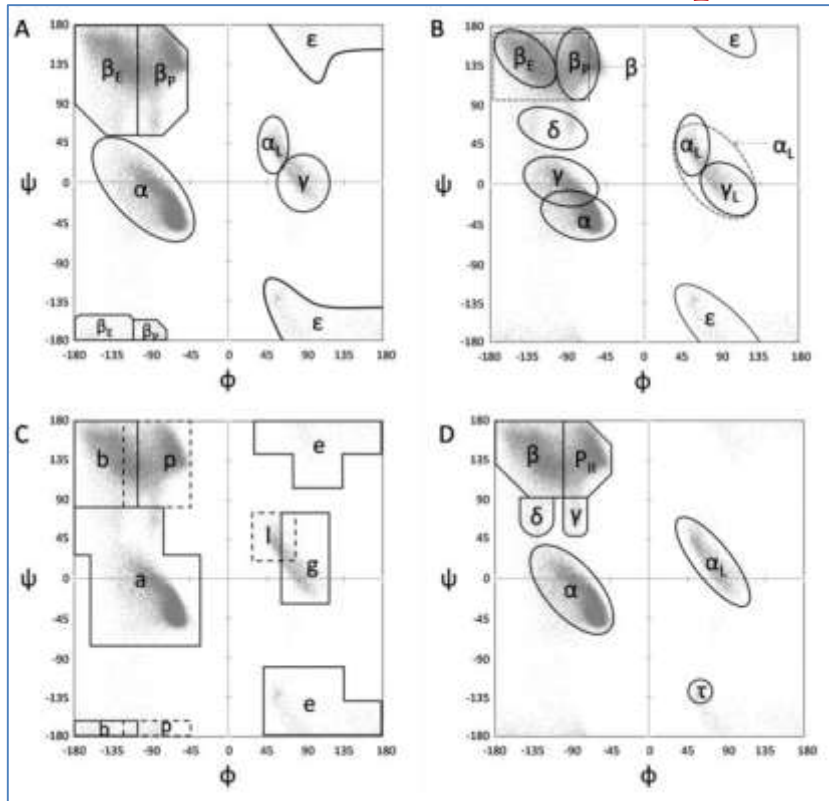
doi: [10.1515/BMC.2010.022](https://doi.org/10.1515/BMC.2010.022)

Карты Рамачандрана



https://proteopedia.org/wiki/index.php/Ramachandran_Plots

Различные варианты классификации структур



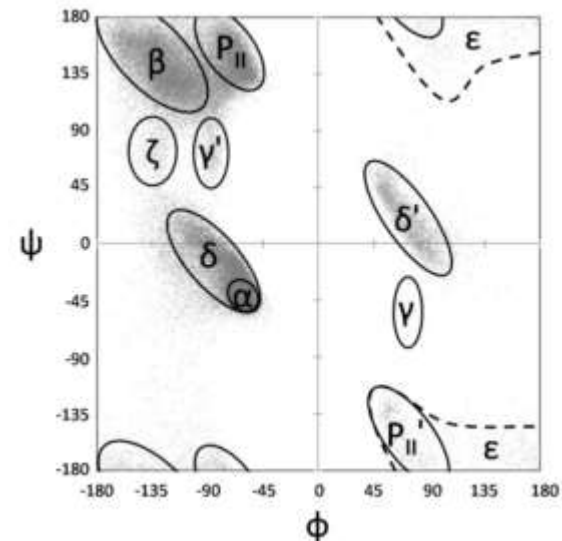
A) Beta-turns and their distortions: a proposed new nomenclature.
Wilmot CM, Thornton JM
Protein Eng. 1990 May; 3(6):479-93.

B) Review Standard structures in proteins.
Efimov AV
Prog Biophys Mol Biol. 1993; 60(3):201-39.

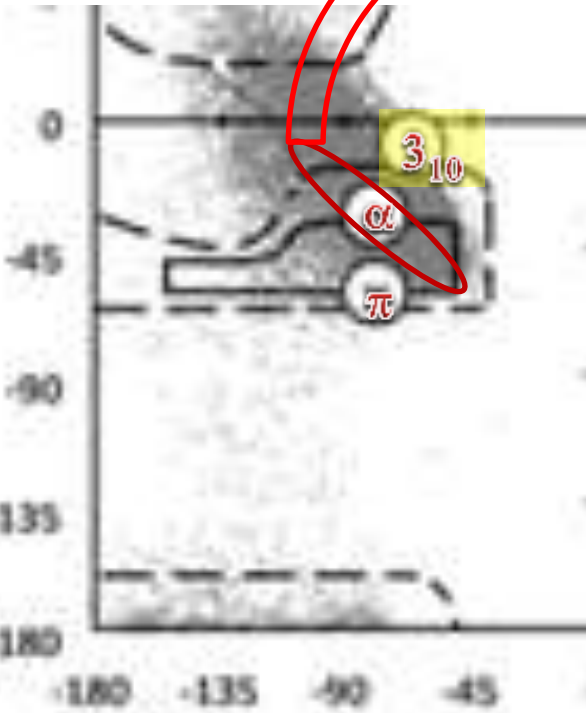
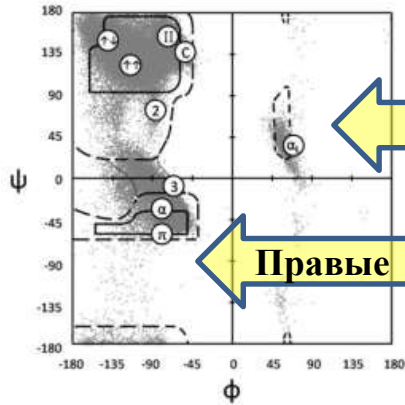
C) An automated classification of the structure of protein loops.
Oliva B, Bates PA, Querol E, Avilés FX, Sternberg MJ
J Mol Biol. 1997 Mar 7; 266(4):814-30.

D) Structures, basins, and energies: a deconstruction of the Protein Coil Library.
Perskie LL, Street TO, Rose GD
Protein Sci. 2008 Jul; 17(7):1151-61

Scott A. Hollingsworth and P. Andrew Karplus. A fresh look at the Ramachandran plot and the occurrence of standard structures in proteins . *Biomol Concepts*. 2010 Oct; 1(3-4): 271-283.
doi: [10.1515/BMC.2010.022](https://doi.org/10.1515/BMC.2010.022)



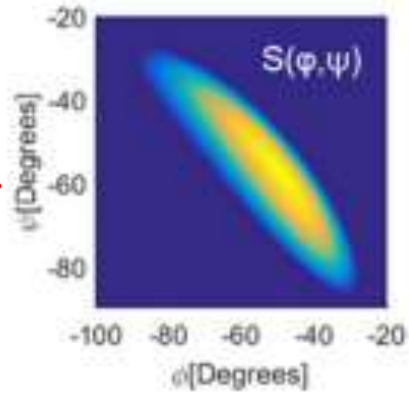
Правые стирали



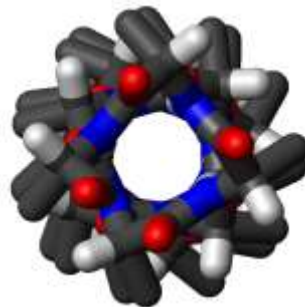
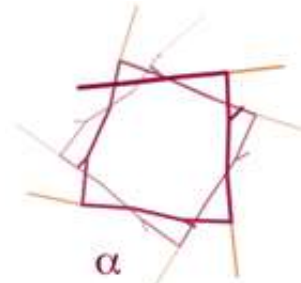
https://en.wikipedia.org/wiki/Alpha_helix

https://proteopedia.org/wiki/index.php/Alpha_helix

Scientific Reports | 6:38341 |
DOI: 10.1038/srep38341



(-60°, -45°)



Составляют 10-15%
спиральных структур.

Представлены на концах
α-спиралей

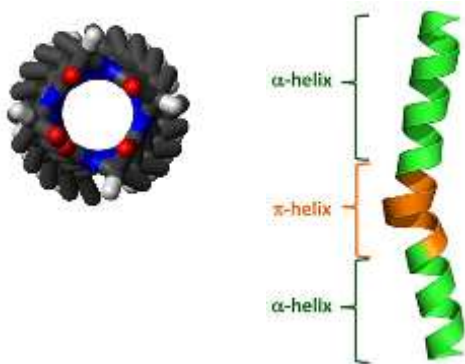
Стабилизируются
присутствием
аспартата на N-конце
участка 3₁₀

(Differences in the amino acid distributions of 3₁₀-helices and α-helices. *Protein Science* (1992), 1, 1333-1342. Cambridge University Pres)

Правые спирали

π -спираль

Найдена в структуре ~ 15% белков

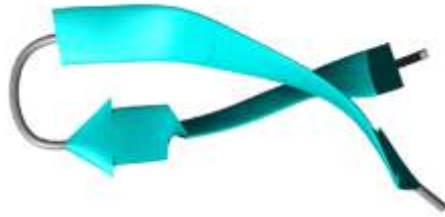


Fodje MN, Al-Karadaghi S
(2002). "[Occurrence, conformational features and amino acid propensities for the pi-helix](#)". *Protein Eng.* **15** (5): 353–358. [doi:10.1093/protein/15.5.353](https://doi.org/10.1093/protein/15.5.353)

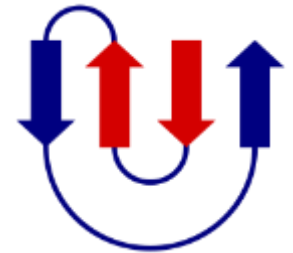
Richard B. Cooley , Daniel J. Arp , and P. Andrew Karplus .
Evolutionary origin of a secondary structure:
 π -helices as
cryptic but widespread insertional variations
of α -helices
enhancing protein functionality.
J Mol Biol. 2010 November 26; 404(2): 232–246. [doi:10.1016/j.jmb.2010.09.034](https://doi.org/10.1016/j.jmb.2010.09.034)

Структурные мотивы

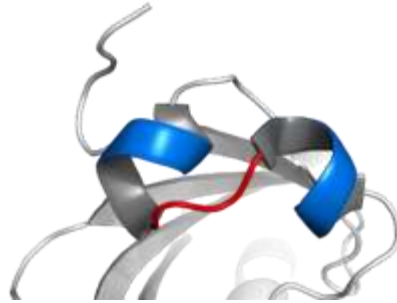
Beta hairpin



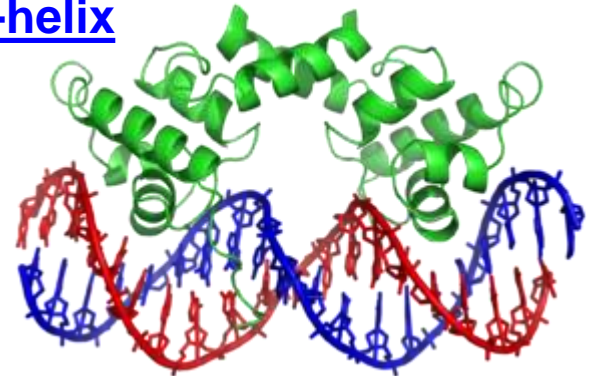
Greek key



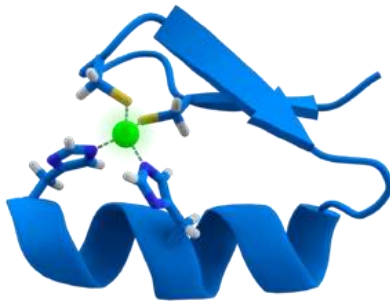
Helix-loop-helix



Helix-turn-helix



Zinc finger



Nest



Niche

