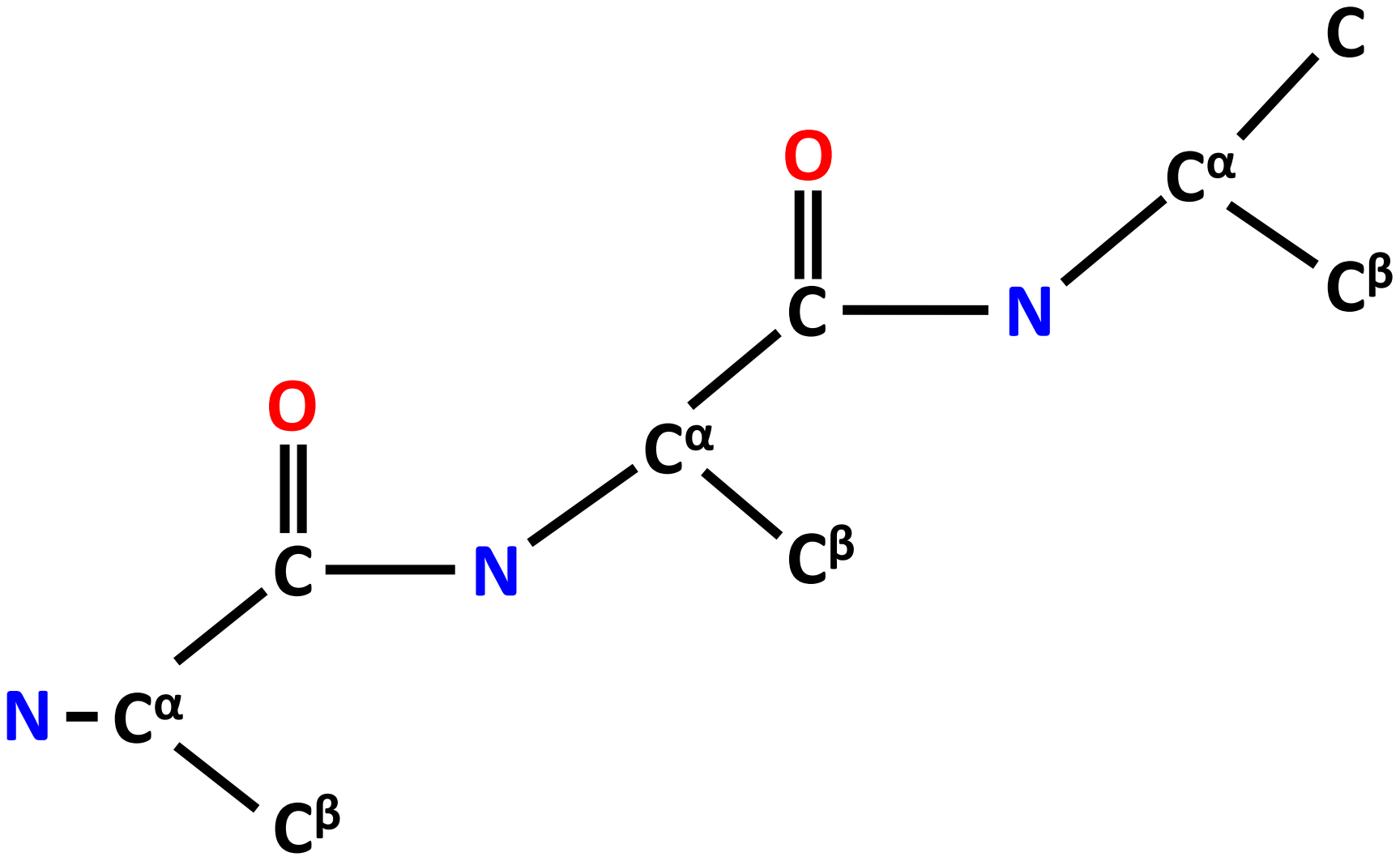
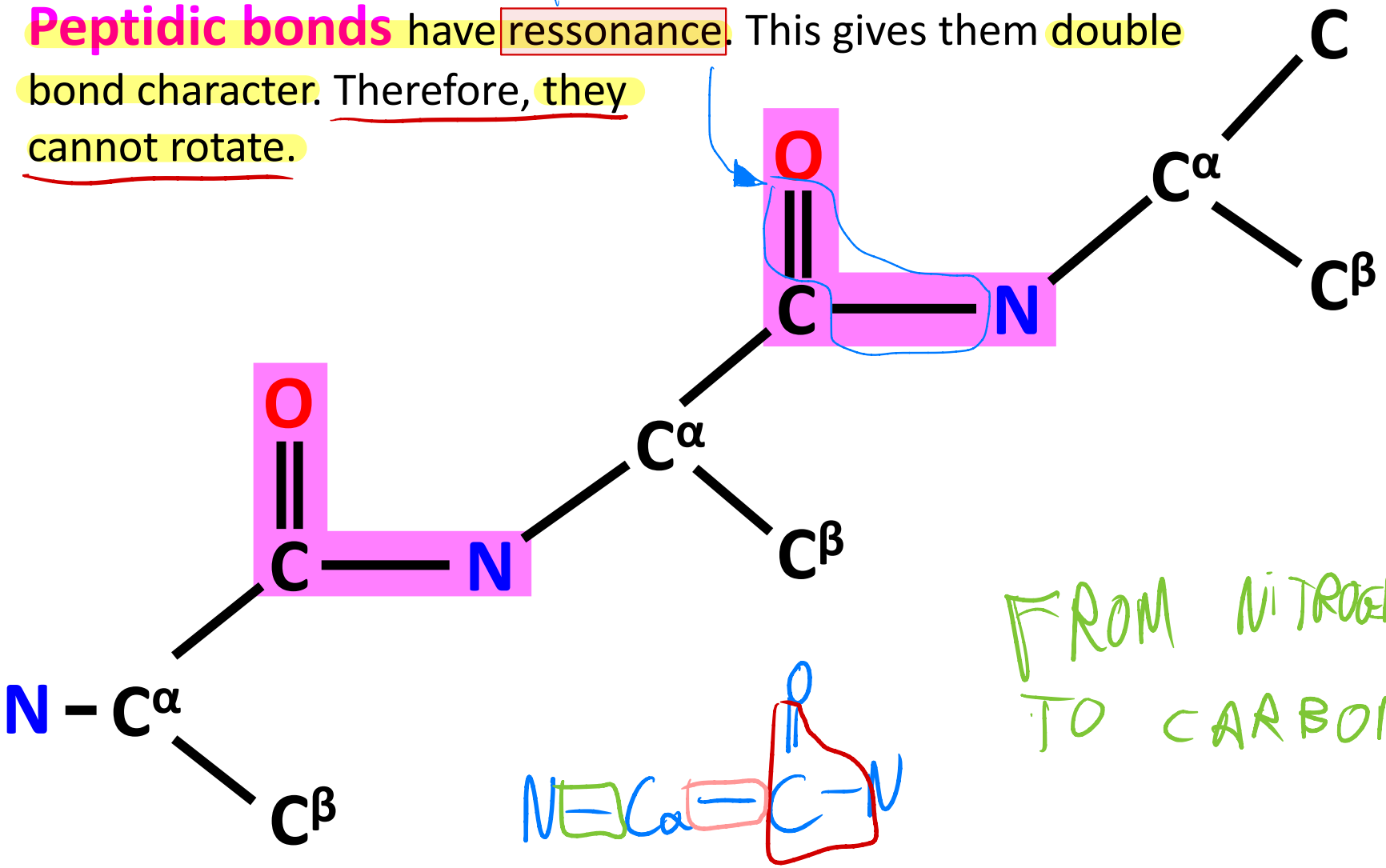
Understanding protein geometry



Understanding protein geometry

Peptidic bonds have ressonance. This gives them double bond character. Therefore, they cannot rotate.

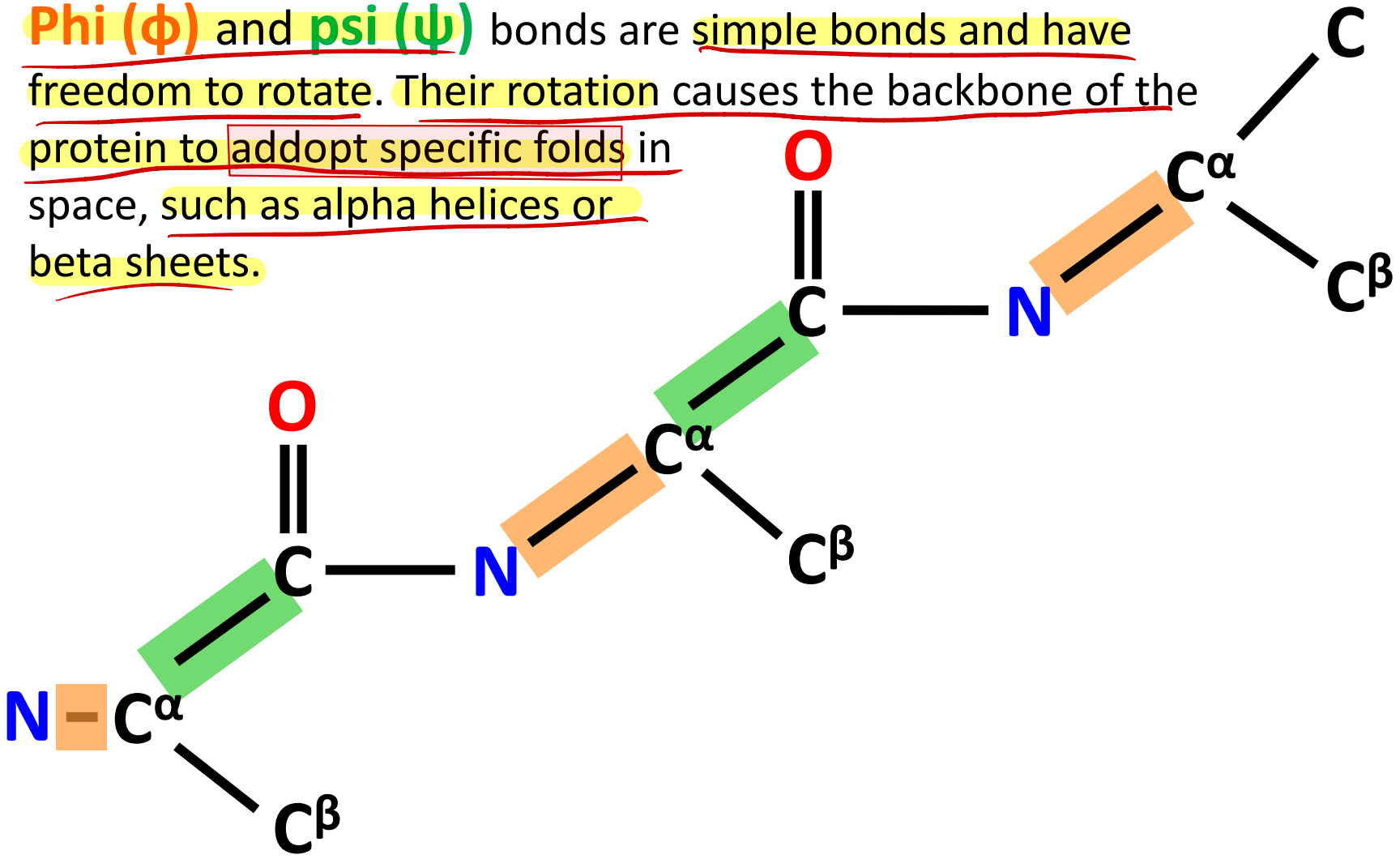


FROM NITROGEN TO CARBON

Understanding protein geometry

N–Cα Cα–C

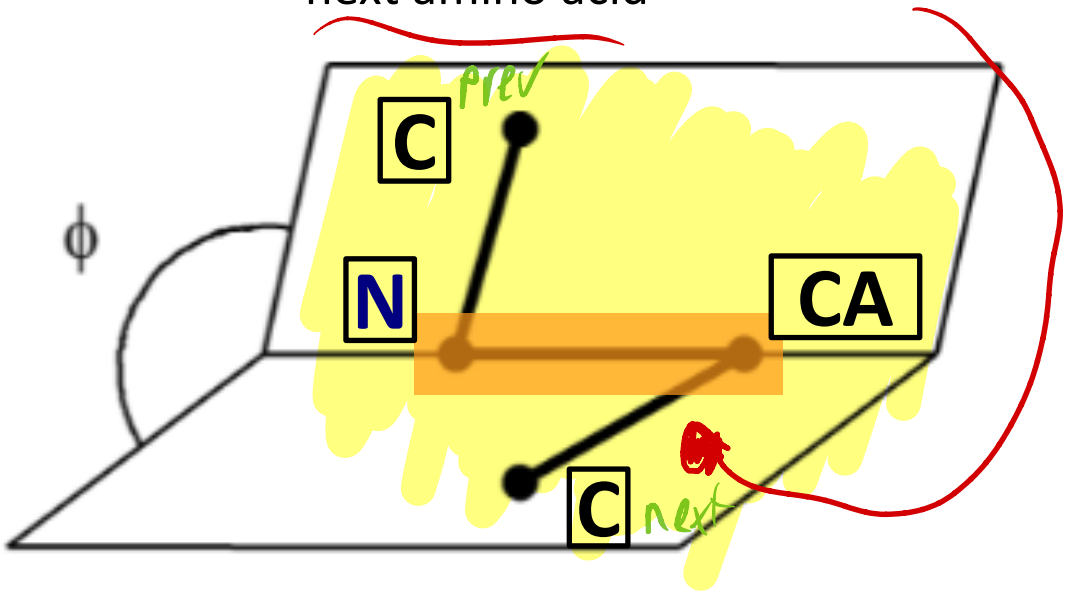
Phi (ϕ) and **psi (ψ)** bonds are simple bonds and have freedom to rotate. Their rotation causes the backbone of the protein to addopt specific folds in space, such as alpha helices or beta sheets.



Understanding protein geometry

Remember biochemistry, dihedrals are the angle created by two planes

For the **Phi (ϕ)** angle, the involved atoms are the carbonil carbon and the nitrogen of one amino acid; and the alpha carbon and carbonil carbon of the next amino acid

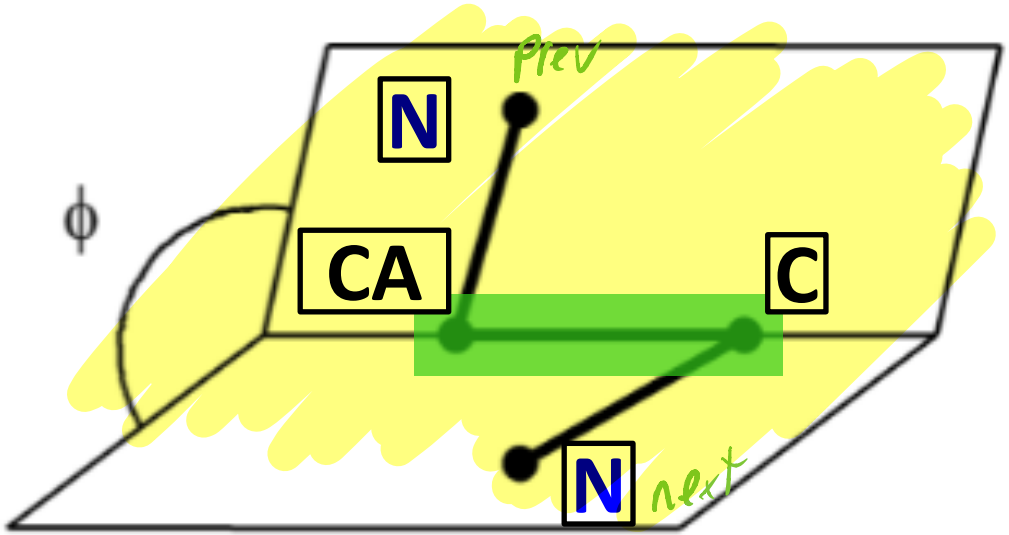


Dihedral Angle ϕ

Understanding protein geometry

Remember biochemistry, dihedrals are the angle created by two planes

For the Psi (ψ) angle, the involved atoms are the the nitrogen of one amino acid; and the alpha carbon, carbonil carbon and nitrogen of the next amino acid



Dihedral Angle ϕ

The Ramachandran plot

The Ramachandran plot is a representation of the phi (ϕ) and psi (ψ) dihedrals in a protein.