

# Stabilization of $\alpha$ -helices by side-chain to main hydrogen bonds. Can current force fields describe the hydrophobic shielding?

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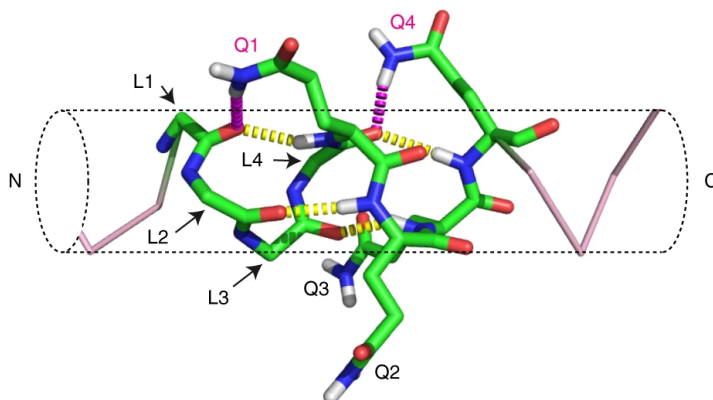
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Poly-glutamine (polyQ) rich tracts are common in transcription factors and their length determines several health disorders. The polyQ tract of the androgen receptor shows a surprisingly high helical content. We previously showed that this is caused by stabilizing side-chain to main-chain hydrogen bonds [1]. Here we use NMR and Molecular Dynamics to understand how the polyQ flanking residues affect these hydrogen bonds. We also explore to which extent current force fields can describe the hydrophobic shielding that is the source of the stabilization.



*Figure 1: Conformation of a polyQ peptide showing some side-chain to main-chain hydrogen bonds stabilizing the  $\alpha$ -helix.*

## References

1. A. Escobedo, B. Topal, M. B. A. Kunze, J. Aranda, G. Chiesa, D. Mungianu, G. Bernardo-Seisdedos, B. Eftekharzadeh, M. Gair, R. Pierattelli, I.C. Felli, T. Diercks, O. Millet, J. Garca, M. Orozco, R. Crehuet, K. Lindorff-Larsen, and X. Salvatella, *Nature Commun.* **10** (2019), 2034.