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Poster 1

A Comparison of Three Dimensional Structures of Biosynthesized Preproinsulin and Insulin Using NMR and CAMM

Mina Oh, K. Hun Mok and Yoongho Lim*

Department of Applied Biology and Chemistry, Konkuk University

The solution conformation of the human insulin precursor, preproinsulin, is described in terms of NMR spectral data and CAMM. NMR experiments were performed on preproinsulin, whose structure was compared with the NMR structure of native human insulin. Despite the presence of the C-peptide and/or the signal peptide, secondary structure analyses indicate that the native structures of the insulin A and B chains are well conserved in preproinsulin. Molecular dynamics simulations support the NMR spectroscopy results that the C-peptide is relatively disordered and does not influence the overall conformation of the native structure. The observed relative robustness of the native structure in precursor forms permits further protein engineering experiments where the C-peptide or N-terminal signal sequence can be altered for the purpose of increasing expression or purification yields when producing recombinant human insulin.