ABSTRACT

The proinsulin C-peptide has long been thought as a byproduct from the insulin synthesis were it promotes the folding of the A and B-chain of insulin, but several studies in the past decade has shown that C-peptide is a bioactive peptide that can be beneficial in preventing diabetes complications. Patients with type-1 diabetes mellitus that has received C-peptide doses has shown for example improved renal function, increased blood flow in skeletal muscle and stimulated glucose transport. The aim of this study was to investigate the inter- and intramolecular binding properties of the proinsulin C-peptide, and in particular to study if the peptide forms oligomers and how the oligomerization is affected by additatives such as metal ions, insulin and sodium chloride. A method to identify C-peptide by SDS- and Native PAGE was developed. Using this technique, proinsulin C-peptide was found to form oligomers in μM concentrations. The oligomerization was dependent on the concentration, time and temperature. Metal ions such as Mg^{+}, Zn^{2+} and Fe^{2+} affected the oligomerization. Insulin was shown to affect the oligomeric states of the C-peptide and to promote its disaggregation. Oligomerization of C-peptide was also detected with Surface Plasmon Resonance. Further studies are needed to find out how these finding can relate to the bioactivity of C-peptide.