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Polypeptide formation from oligopeptides

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Many scenarios for abiotic polypeptide formation have been proposed for many years, while the research results have shown that both the large peptides and the structure variety of those from amino acids are difficult. Deamidation of asparagine in aqueous solutions and dehydration of aspartic acid in dry conditions give polyaspartic acid upon heating. However, many other amino acids have some difficulties to occupy their residues in backbone structure of the polypeptides. The reason may be considered the diketopiperazine formation, which is carried out from usual linear dipeptides by intramolecular cyclization. This research focuses the polypeptide formation from the oligopeptides containing asparagine, which is an anomalous amino acid. Chemically synthesized dipeptides Gly-Asn, Ala-Asn were heated in the aqueous solution to afford polypeptides with the molecular weight of 3000 to 5000 Da. Asparagine can be produced in the simulative abiotic conditions. If oligopeptides containing asparagine residues had been obtained in the primordial conditions, these oligopeptides would have yielded polypeptides.

Keywords: oligopeptides, polypeptides, asparagine, heating