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Mutant and Its Functional Revertant Signal Peptides of *Escherichia coli* Ribose Binding Protein Show the Differences in the Interaction with Lipid Bilayer

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Signal peptides of secretary proteins interact with various membranes and non-membrane components during the translocation. We investigated the interaction of signal peptides of ribose binding protein (RBP) with *Escherichia coli* (*E.coli*) signal recognition particle (SRP), SecA and lipid bilayer. Previous studies showed that the functional signal peptides inhibit the GTPase activity of E.coli SRP which consisted of Ffh and 4.5S RNA. But, the revertant signal peptides of RBP, known to be functional *in vivo*, did not inhibit the activity as is the case of nonfunctional mutant. In order to study the functional interaction of signal peptides with SecA, the stimulation of ATPase activity by the peptides was investigated. All revertant and mutant signal peptides of RBP were found to inhibit this activity. The significant difference of functional revertants from mutant could be seen only in the presence of lipid bilayer. Revertant signal peptides assume predominantly alpha-helical conformations in the presence of anionic phospholipid vesicles and restrict the acyl chain motion of the lipids, suggesting the deep penetration of these peptides into the acyl chain region. On the other hand, the alpha-helical contents of the mutant peptide was only about half of that of revertant peptides as judged by curve-fitting method. The restriction of acyl chain motion by the mutant peptide binding was apparently less than in the case of revertant peptides, indicating the reduced insertion potential as compared to the functional revertants.