Phospholipid-induced structural changes to an erythroid β spectrin ankyrin-dependent lipid-binding site.

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The region of β-spectrin that is responsible for interactions with ankyrin was shown to comprise an ankyrin-sensitive lipid-binding site. Structural studies indicate that it exhibits a mixed $3_{10}/\alpha$ helical conformation and is highly amphipathic. These features together with the distinctively conserved sequence of the lipid-binding site motivated us to explore the mechanism of its interactions with biological membranes. A series of singly and doubly spin-labeled erythroid β-spectrin-derived peptides was constructed, and the spin-label mobility and spin–spin distances were analyzed via electron paramagnetic resonance spectroscopy and two different calculation methods. The results indicate that in β-spectrin, the lipid-binding domain, which is part of the 14^{th} segment, has the topology of typical triple-helical spectrin repeat. However, it undergoes significant changes when interacting with phospholipids or detergents. A mechanism for these interactions is proposed in this paper.

Słowa kluczowe

Site-directed spin labeling, Electron paramagnetic resonance (EPR) spectroscopy, Erythroid spectrin, Lipid-binding activity

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