

제목 : NMR Studies on the Structure of Human Annexin I

연구자 : Yeon-Hee Lee °, Hee-yong Han, Jee-Young Oh¹, Doe-Sun Na¹ and
Bong-Jin Lee

소속 : College of Pharmacy, Seoul National University, Seoul
College of Medicine, University of Ulsan¹, Seoul

Human annexin I is a member of annexin family of calcium dependent phospholipid binding proteins, which have been implicated in various physiological roles including phospholipase A₂ (PLA₂) inhibition, membrane fusion and calcium channel activity. In this work, the structure of N-terminally truncated human annexin I (Δ -annexin I) and its interactions with Ca²⁺, ATP and cAMP were studied at atomic level by using ¹H, ¹⁵N, ¹³C NMR (nuclear magnetic resonance) spectroscopy. The effect of Ca²⁺ binding on the structure of Δ -annexin I was investigated, and compared with that of Mg²⁺ binding. The addition of Ca²⁺ to Δ -annexin I caused some changes in the high field and low field regions of ¹H NMR spectra. Whereas, upon addition of Mg²⁺ to Δ -annexin I, almost no change could be observed. Also we found that the binding ratio of ATP to Δ -annexin I is 1. Because Δ -annexin I is a large protein with 35 kDa molecular weight, site-specific (carbonyl-¹³C, amide-¹⁵N) labeling technique was used to determine the interaction sites of Δ -annexin I with Ca²⁺ and ATP. Assignments of all the histidiny carbonyl carbon resonances have been completed by using Δ -annexin I along with its specific 1,2-subdomain. The carbonyl carbon resonances originating from His52 and His246 of Δ -annexin I were significantly affected by Ca²⁺ binding, and some Tyr and Phe resonances were also affected. The carbonyl carbon resonances originating from His52 is significantly affected by ATP binding, therefore His52 seems to be involved in the ATP binding site of Δ -annexin I.