Interaction of the propeptide NH$_2$-terminal of surfactant protein SP-B with phospholipid membranes
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To avoid alveolar collapse during expiration, pulmonary surfactant forms lipid/protein surface active films at the air-liquid interface of the lungs. Although phospholipids, particularly DPPC, are the main components responsible to reduce surface tension, surfactant proteins are strictly required to facilitate formation and dynamics of the interfacial films. Surfactant protein SP-B is the essential protein for the biophysical properties of pulmonary surfactant membranes and films. Mature SP-B is flanked by NH$_2$-terminal and COOH-terminal propeptides before its proteolytic processing. The NH$_2$-terminal propeptide (SP-B$_N$) contains a saposin-like domain. This domain has conserved cysteines that form disulfide bridges, which confer extreme thermal and protease stability, and has a predominantly $\alpha$-helical structure, with amphipathic motifs that facilitate stable or temporal interaction with lipids. It has recently been reported that the saposin-like domain of mouse SP-B$_N$ possesses antimicrobial activity at low pH.

We have produced a recombinant form of human SP-B$_N$ in E. coli. Circular Dichroism, Fluorescence and Differential Scanning Calorimetry studies of the propeptide in the absence or presence of Large Unilamellar Vesicles with different lipid composition have been carried out as a function of pH in order to detect and characterize the mode and extent of interaction of SP-B$_N$ with membranes.