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Membrane interaction of the coiled-coil motif of HIV gp41 and its implication in the membrane fusion process

Bong-Suk Jin and Yeon Gyu Yu

Division of Life Sciences, Korea Institute of Science and Technology.

Phone: 02-958-5936/5946

e-mail: ygy@kist.re.kr/eljin@kist.re.kr

The envelope glycoprotein of HIV, gp41, mediates the membrane fusion with human cells. The extracellular domain of gp41 has two helical regions. The N-terminus helical region (N-helix) forms trimeric coiled coil, interacts with the C-terminus helical region (C-helix) of gp41 to form a stable helical bundle structure. In this study, we have shown that the N-helix of gp41 has membrane interacting and disrupting abilities. It was localized into the interface of the lipidic phase and head group of the membrane. In contrast, the N-helix region with membrane fusion defective mutations could not bind to membrane. In addition, the N-helix bound on the membrane was released from the membrane by the C-helix, and the complex of the N- and C-helix did not interact with membrane. These results suggested that the membrane binding ability of the N-helix is necessary for the fusion activity of gp41, and such property is possibly controlled by the C-helix.