Active human ferritin H/L-hybrid and sequence effect on folding efficiency in *Escherichia coli*

안지영, 김양훈, 김성우[1], 이지원*
고려대학교; [1]KRIBB
(leejw@korea.ac.kr*)

Overexpressed recombinant L-chain ferritin (rFL) in *E. coli* formed inclusion bodies. rFL was relatively thermostable at low protein concentration, but it became extremely thermolabile at high protein concentration. Glucagon · ferritin mutant (GrFL), consisting of an N-terminus fusion partner, showed enhanced thermal stability even at high protein concentration. We developed a recombinant ferritin H/L-hybrid by a direct gene fusion between H- and L-chain subunits. The presence of H-chain at the N-terminus of L-chain significantly increased the cytoplasmic solubility of the recombinant ferritin hybrid. The ferritin H/L-hybrid was biologically active with the iron storage capacity equivalent to ferritin standard. Different types of hybrid mutants were also developed using various H-chain derivatives. Comparison of the intracellular solubilities of the hybrid mutants showed that the N-terminus four helices of heavy subunit were of importance in maintaining the high solubility in *E. coli* cytoplasm. Consequently, the solubility of the ferritin hybrid seems to be related to such H-chain sequence that forms ferroxidase center and promotes effective intra-molecular interaction with L-chain domain of H/L-hybrid for enhancing the folding efficiency.