Attenuated Membrane-lytic Peptides for Intracellular Delivery

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Biography

Shiroh Futaki obtained his Ph.D. in 1989 from Kyoto University, Japan. Following his appointment as a Research Associate and an Associate Professor at the University of Tokushima, he moved to Kyoto University in 1997. Meanwhile, he spent 16 months (1989-1991) in the US as a Postdoctoral Associate in the Department of Biochemistry, Rockefeller University. He has been a Professor of Biochemistry at the Institute of Chemical Research, Kyoto University, since 2005.

Abstract

One of the major research interests of our group is to design peptides for intracellular delivery based on the understanding of the molecular interplay between peptides and membranes. Thus, the spider toxin-derived peptide, L17E, was developed and was found capable of delivering biomacromolecules into cells [1]. This peptide was obtained by substituting a hydrophobic leucine (Leu) to a negatively charged glutamic acid (Glu) to reduce hydrophobic interactions, thereby attenuating the membrane lytic activity on cell surfaces. L17E has achieved the efficient intracellular delivery of antibodies (IgGs) and other biofunctional molecules.

In our efforts to further enhance the delivery efficacy of L17E, Fc region binding peptide conjugated with L17E trimer [FcB(L17E)$_3$] was designed for IgG delivery into cells. Particle-like liquid droplets were generated by mixing Alexa Fluor 488 labeled IgG (Alexa488-IgG) with FcB(L17E)$_3$. Droplet contact with the cellular membrane led to spontaneous influx and distribution of Alexa488-IgG throughout cells in serum containing medium [2].

This presentation will introduce the impact of attenuated membrane-lytic peptides for intracellular delivery and chemical and biological studies.

References:

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