**Effects of tension on entry of cell-penetrating peptide transportan 10 into a single vesicle and its pore formation in lipid membranes**

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Transportan 10 (TP10) can enter a GUV from its outside by translocating across the lipid membrane before TP10-induced pore formation (1). Here we investigated the effects of tension on pore formation and entry of TP10 into a 20%DOPG/80%DOPC-GUVs. During the interaction of TP10 with a single GUV with a constant tension the fractional change in the area of the GUV membrane increased with time, thus suddenly pore formation occurred. The rate constant of pore formation in the presence of same concentration of TP10 increased with an increase in tension. Tension also enhanced the fraction of the entry of TP10 into the inside of GUV before pore formation. We discussed the mechanism of the effect of tension on these phenomena. (1)Biochemistry 53, 386, 2014.

**Effects of Electrostatic Interactions on the Rate Constant of Tension-Induced Pore Formation in Lipid Membranes**


Using the method developed in our previous paper (1), we investigated the effects of electrostatic interactions on the rate constant (kₑ) of constant tension-induced pore formation in lipid membranes. The increase in surface charge density increased kₑ of dioleoylphosphatidylglycerol (DOPG) /dioleoylphosphatidylcholine (DOPC) - giant unilamellar vesicle (GUVs) at 150 mM NaCl. The decrease in salt concentration increased kₑ in 40%DOPC/60%DOPC-GUVs. These results indicate that kₑ values increases with an increase in the electrostatic interactions. Bending modulus of DOPG/DOPC-GUVs decreased with surface charged density. It may change the line tension of a preore. We discussed the mechanism for the effects of electrostatic interactions on kₑ.

**Stretch-Activated Pore of the Antimicrobial peptide, Magainin 2**


The pore formation induced by antimicrobial peptide magainin 2 (mag) was investigated using single giant unilamellar vesicles (GUVs). The binding of mag to the membrane of GUVs increased the fractional change in the area of the membrane, δ, which increased the rate of pore formation. The tension of a membrane following aspiration of a GUV activated mag-induced pore formation. These indicate that the mag-induced pore is a stretch-activated pore. Simultaneous measurements of the leakage of a fluorescent probe, the location of carboxyfluorescein (CF)-mag, and mag-induced change in δ indicate that mag cannot translocate from the outer to the inner monolayer until just before pore formation. Based on these results, we discuss the mechanism for mag-induced pore formation.