

## Synthetic membrane lipids regulating the DNA duplication

**Yuichi Ishikawa**

*Department of Applied Chemistry, Oita University*

DnaA protein is the initiator of chromosomal DNA replication in *Escherichia coli*. We examined the influence of artificial mixed membrane composed of synthetic anionic (phosphate) lipid and cationic (ammonium) lipid on the affinity of DnaA protein for ATP. Two sets of anionic and cationic lipids with distinguishable numbers of hydrophobic alkyl chains were devised for regulating the cluster (phase separated) formation of anionic lipid around the cationic matrix. Anionic lipid, not cationic membranes, inhibited the ATP-binding and stimulated ATP-release from the ATP-DnaA active form. In the case of the mixed membrane, only anionic lipids forming cluster structures inhibit of ATP-binding and stimulate the ATP release. These results suggest that in mixed membrane a cluster formation (phase separated state) of anionic lipids seems to be an important factor to affect the affinity of DnaA protein for ATP.