

## Preparation of thermoresponsive hydrogels based on host-guest interactions for use in pharmaceutical applications

○ Daisuke IOHARA<sup>1,2</sup>, Masanori OKUBO<sup>1</sup>, Makoto ANRAKU<sup>1,2</sup>, Kaneto UEKAMA<sup>1</sup>, Fumitoshi HIRAYAMA<sup>1,2</sup>

<sup>1</sup>Sojo Univ. Fac. of Pharm. Sci., <sup>2</sup>Sojo Univ. DDS Res. Inst.

Cyclodextrins (CDs), cyclic oligosaccharides, are successfully utilized for improvement of pharmaceutical properties of drugs by virtue of the ability that forms inclusion complexes with various molecules. Recently, interactions of polymer side chains with CDs have attracted significant interest, because CDs encapsulate the hydrophobic moiety in the polymer, thereby modifying the association of the polymers. The process of the inclusion by CDs is generally temperature-dependent and is likely to occur at a lower temperature, whereas dissociation would occur higher temperatures. Thus, we hypothesized that thermal response of a hydrophobically modified polymer might be altered by utilizing the interaction of CDs and a hydrophobically modified polymer. In this study, we prepared thermoresponsive hydrogels by simply adding CDs into a hydrophobically modified hydroxypropylmethyl cellulose (HM-HPMC). HM-HPMC/CDs hydrogel was in a low viscous sol state at room temperature, which made administration easy, but it rapidly formed a viscous hydrogel in the physiological conditions. We report here the detailed mechanism responsible for the thermoresponsive sol-gel transition and the potency of the hydrogels in ocular drug delivery and for the sustained release carrier of the proteins.

