

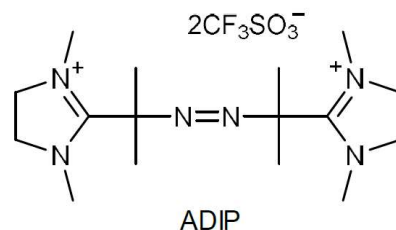
Cationic polymers for intracellular delivery without cell toxicity

Be promising as drug delivery vehicles, cell incubation indicators and cell thermometers

Introduction

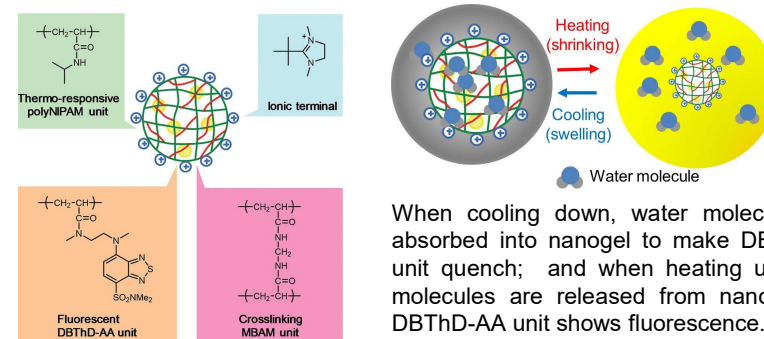
Cationic polymers are known to be used as nucleic drug delivery carrier because they are easy to be introduced into cells. However, it has been reported that the cationic polymers may inhibit cell proliferation by unspecific binding to intracellular proteins. This invention provides cationic polymer nanoparticles (nanogels) for intracellular delivery without inhibiting cell proliferation, by conducting radical polymerization reaction using a cationic polymerization initiator ADIP.

Cationic polymerization initiator



Synthesized from AIBN by 3 steps only
(AIBN: abbr. for Azobisisobutyronitrile, a common used radical initiator)

Nanogels synthesized by cationic polymerization initiator



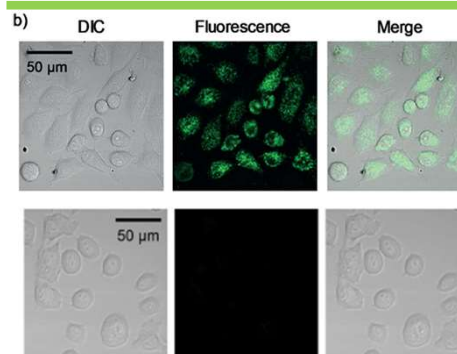
When cooling down, water molecules are absorbed into nanogel to make DBThD-AA unit quench; and when heating up, water molecules are released from nanogel and DBThD-AA unit shows fluorescence.

Effect

Properties of NIPAM-based cationic nanogels synthesizing through ADIP:

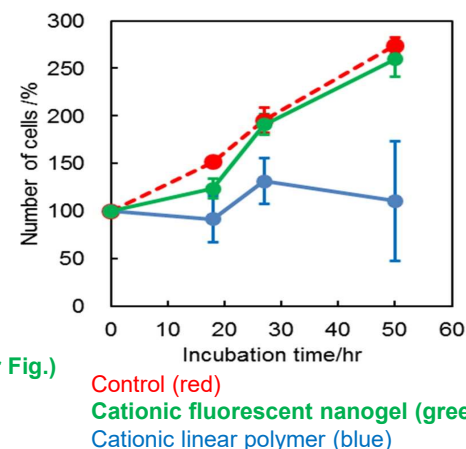
- Can be delivered into many kinds of cells (e.g. HeLa) simply by mixing cells and the nanogels without special treatment
- In cells, nanogels do not effect the cell division or the differentiation of the brown adipocyte
- Intracellular temperature can be measured because of the heat-sensitive unit NIPAM

Nanogels' cell delivery property

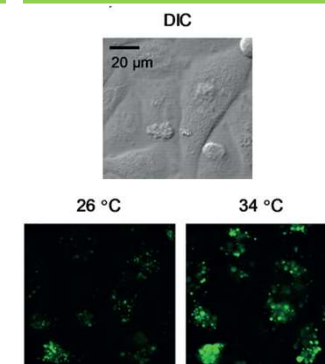


Cationic fluorescent nanogel (upper Fig.)
Fluorescent nanogel (bottom Fig.)

Cell toxicity (surviving cells' percentage)



Intracellular temperature



Patent Data Sheet

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