Tohoku Univ. Technology

Intracellular delivery vehicle

Cationic Polymers without cell toxicity

Overview

Cationic polymers are known to be used as nucleic drug delivery carrier because they are ease 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.

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

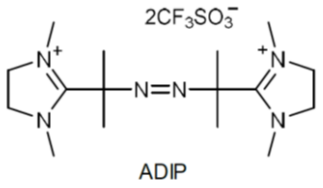
Product Application

- Drug Delivery Vehicles
- Cell Incubation Indicators
- Cell Thermometers

IP Data

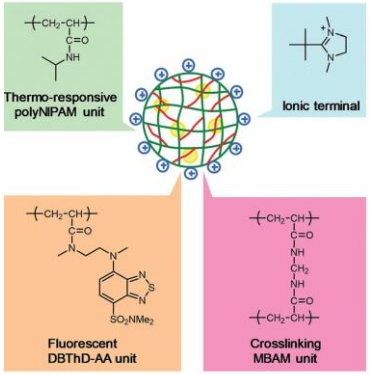
IP No.	:	WO2017/043484
Inventor	:	TOKUYAMA Hidetoshi, OKANO Kentaro et. al.
Admin No.	:	T19-438

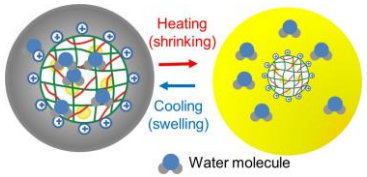
Cationic polymerization initiator ADIP



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

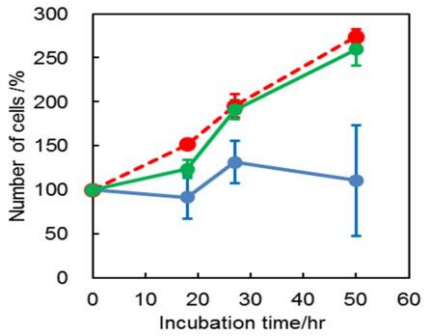
Nanogels synthesized by cationic polymerization initiator

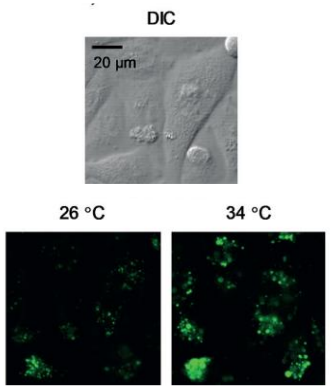




When cooling down, water molecules are absorbed into nanogel to make DBThD-AA unit quench; and when heating up, water molecules are released from nanogel and DBThD-AA unit shows fluorescence.

Cell toxicity (Left) Intracellular temperature(Right)





Control (red)

Cationic fluorescent nanogel (green)

Cationic linear polymer (blue)

Contact

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Please visit CONTACT here