

Hybrid Silica-coated Gold Nanorods for chemo and phototherapy

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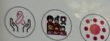
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Introduction

Find innovative therapies for triple-negative breast cancer



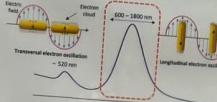
LOCAL treatment

- Invasive & non-aesthetic
- Risk of re-occurring

SYSTEMIC treatment

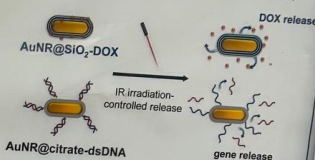
- Tumor cells lack these receptors (estrogens, progesterone and HER2)

Superstar of the poster : AuNR



- Localized Surface Plasmon Resonance (LSPR)
- Anisotropic shape & tunable aspect ratio
- Matching L-LSPR with Biological Windows

Hybrid nanoplatform for chemo or gene therapy



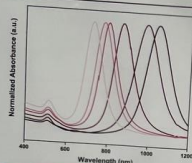
AuNR synthesis

Key parameters

- ✓ HCl
- ✓ AgNO₃
- ✓ V seeds add
- ✓ Aspect Ratio

Colloidal stability (CTAB)

+40 < ξ < +50 mV



CTAB is required for the synthesis but cytotoxic

Surface modification

Substitution CTAB by citrates

- Surface accessibility for grafting dsDNA
- / Biocompatibility AuNRs

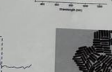
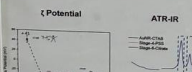
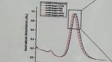
Porous silica coating

- Drugs loading
- dsDNA inside the porosity
- / Biocompatibility AuNRs

Citrate coating

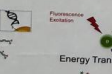
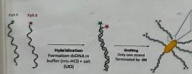
Remove CTAB excess CTAB - PSS exchange PSS - Citrate exchange

UV-vis

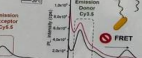
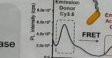


Sample	Length (nm)	Width (nm)	A.R (L/W)
AuNR@CTAB	90 ± 7	23 ± 3	4.1 ± 0.5
AuNR@citrate	88 ± 5	23 ± 2	4.1 ± 0.3

Grafting dsDNA & gene release

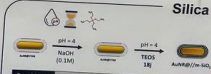


- Successful grafting of dsDNA labelled with fluorophores
- Monitoring therapeutic gene release & following by Fluorescence



*FRET Fluorescence Resonance Energy Transfer

Silica coating



DOX loading & release



Figure

- UV-vis spectra confirmed successful DOX adsorption onto AuNR@SiO₂
- Kinetic release : DOX release faster at acidic pH 5.5 compared to pH 7.4
- Disappearance of silica organisation layer during DOX release

Conclusions

- ✓ Successful synthesis AuNR with various aspect ratio
- ✓ CTAB substitution by citrate
- ✓ Grafting dsDNA & monitoring gene release
- ✓ Thick and porous silica coating
- ✓ Adsorption DOX
- ✓ pH monitoring DOX release

