



Antibody Conjugated Silk Nanoparticles for Targeted Doxorubicin Delivery in GBM

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Project Goals



01

Determine the best receptor for targeting

02


Establish the appropriate nanoparticle size for dosing and tumor uptake

03

Induce successful dual antibody conjugation

04

Determine the proper antibody quantity



Specific Aim 1:
Develop dual antibody
conjugated doxorubicin
loaded silk nanoparticles

Determine appropriate size, dose, and target receptors via lit review

Create product:

1. Process silk and load with doxorubicin during formation of nanoparticles
2. Conjugate chosen antibodies to loaded NP surfaces using EDC/NHS crosslinking

Characterize nanoparticles:

1. Quantify ratio of antibodies on NPs via fluorescent imaging
2. Ensure successful crosslinking of antibodies

Specific Aim 2:
Create 3D GBM model
using transfected U87
cells

Transfect U87 cells to express the two receptors of interest:

1. Infect cells with lentivirus carrying genes for receptors
2. Characterize cells to ensure receptor expression using western blot or ELISA

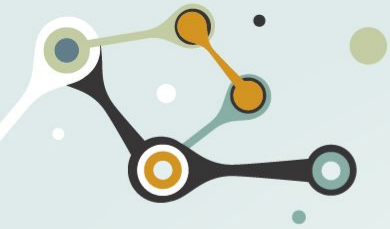
Seed transfected cells on silk sponges

Specific Aim 3:
Characterize therapy
efficacy

Load nanoparticles onto the 3D GBM model:

1. Evaluate binding efficacy and nanoparticle uptake
2. Evaluate conditions of drug release
3. Measure levels of apoptosis using live/dead assay

Compare efficacy of dual-antibody, antibody A, and antibody B nanoparticles



What Has Been Done so Far

01

LITERATURE REVIEW

Glioblastoma Multiforme (GBM)
vs Breast Cancer vs HCC

02

ANTIBODY RESEARCH

IL-13Ra2 vs EphA2 vs EphA3
vs EGFRviii

03

SILK PROCESSING

SciTech Room 166 (1 to 2 times a
week for the past 3 weeks)

04

SILK NANOPARTICLES

SciTech Silk Nanoparticles
Training led by Sunny

05

CELL CULTURE

Thawing, passaging, seeding
U87s led by Maddie



Antibody Decision Matrix

Consideration	Weight	IL-13Ra2	EGFRviii	EPHA2
Expression in healthy tissue	5	3	5	3
Presence in GBM cells	5	5	3	4
Relevance/available background info	1	5	5	3
		45	45	38

