

# Chemotherapeutic Nanoparticles for Cancer Diagnosis and Therapeutics

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May 31, 2005

## **STATE OF THE ART CHEMOTHERAPY**

- 1. Diagnosis.*
- 2. Imaging.*
- 3. Treatment “Roadmap”.*
- 4. Non-Treatment Time Period.*
- 5. Diagnostic Imaging.*

## **RESEARCH MILESTONES**

- 1. Development of a Superparamagnetic Nanoparticle.*
- 2. Engineer a Method of Surface Functionalization.*
- 3. Conjugate Nanoparticle with a Chemotherapeutic Drug.*
- 4. Test the Drug in Vitro.*

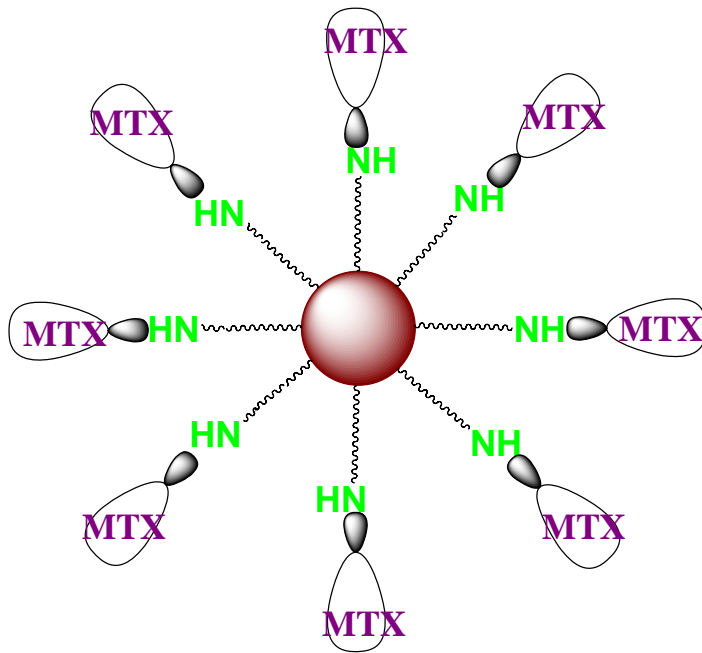


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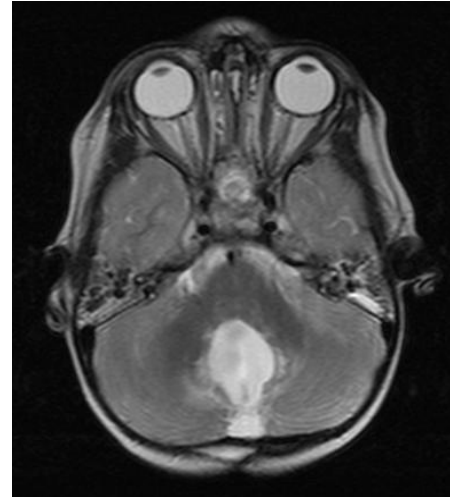


# Methotrexate Conjugated Magnetite Nanoparticles

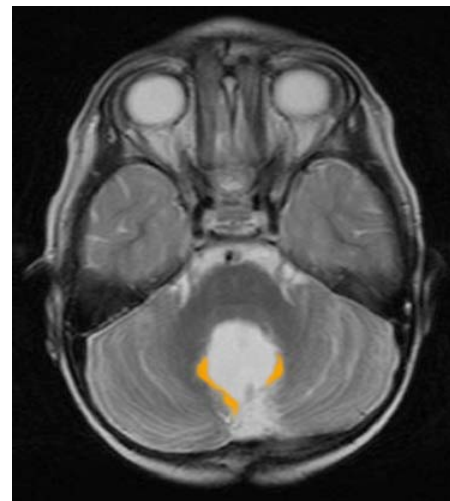
*Long Circulating MTX Immobilized MRI Contrast Agent*



1. *Superparamagnetic Nanoparticle*
2. *PEG Self Assembled Monolayer*
3. *Drug (MTX) Conjugate*



**Before Drug  
Carrier  
Administration**



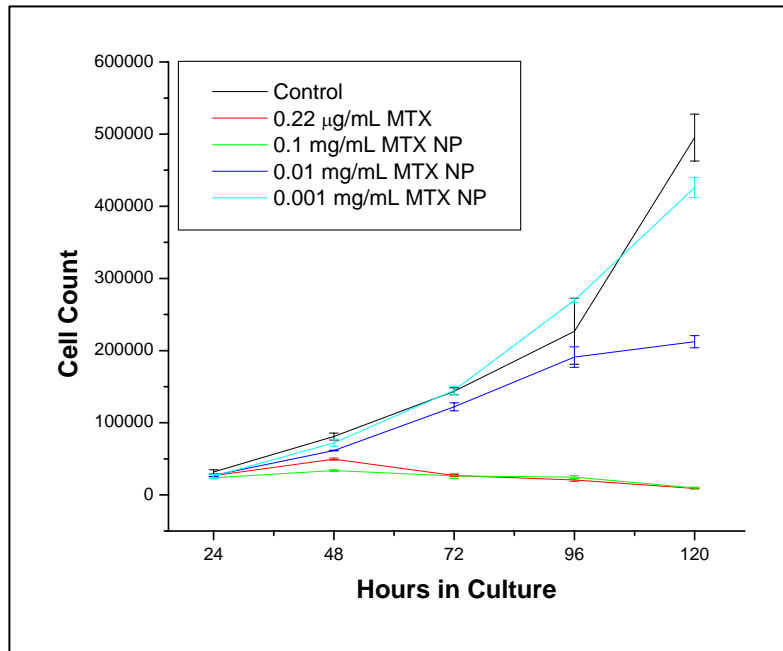
**After Drug  
Carrier  
Administration**



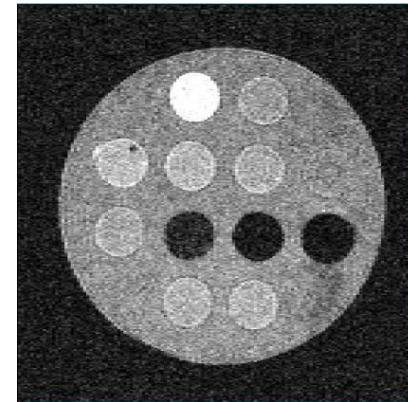
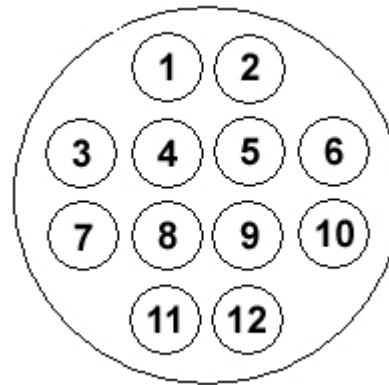
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# *in vitro* Results in Brain Cancer (Glioma Cells)



**Cytotoxicity of PEG MTX Nanoparticles**



- Sample 1 – 0.5% Agarose
- Sample 2 – N/A
- Sample 3 – 9L cells only
- Sample 4 – 9L cells w/ 0.001mg/mL NP-Dextran
- Sample 5 – 9L cells w/ 0.01mg/mL NP-Dextran
- Sample 6 – 9L cells w/ 0.1mg/mL NP-Dextran
- Sample 7 – N/A
- Sample 8 – 9L cells w/ 0.001mg/mL NP-MTX
- Sample 9 – 9L cells w/ 0.01mg/mL NP-MTX
- Sample 10 – 9L cells w/ 0.1mg/mL NP-MTX
- Sample 11 – N/A
- Sample 12 – N/A



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