Systemic and Targeted Drug Delivery

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Systems of Drug Delivery

Systemic:
- Oral Administration
- Intravenous Administration

Local:
- Bronchopulmonary Administration
- Ocular Administration
Systems of Drug Delivery

Systemic

Oral Administration

Intravenous Administration
Systems of Drug Delivery

Systemic Administration
- Oral Administration
- Intravenous Administration

Local Administration
- Bronchopulmonary Administration
- Ocular Administration
Targeted Drug Delivery Systems

Cell Based

Gene Therapy

Microvesicle Based

Nanoparticle Based
Mesothelioma is a Pleural Malignancy
Mesothelioma

A- Subcutaneous extension of Malignant Mesothelioma

B- CT Scan of Pleural Mesothelioma
Pleural Mass

C- Diffuse rind of tumor

(Lake et al., Lancet 2005; (366) 397-404)
EphA-2 Receptor is a Biomarker for Mesothelioma

(Surawska et al./Cytokines And Growth Factor, 15; 2004).
Malignant Mesothelioma cells but not Normal Mesothelial cells Express EphA2 Receptors
Early Detection of Tumor is Critical for Effective Therapy
The Normal Pleura
Stage 1 mesothelioma is curable
Thoracoscopic Pleural Biopsy
A “smart” Nanoparticle

- Therapeutic or imaging payload
  - Drug A
  - Drug B
  - Contrast enhancer
  - Permeation enhancer

- Biological surface modifier
  - PEG
  - Targeting moieties

Nature Reviews | Cancer
BIODEGRADABLE, FLUORESCENT EPHRIN ANTIBODY LOADED NANOPARTICLE

2D Cross-section

FITC
PLGA
EPHRIN ANTIBODY
SiRNA

Hydrophobic portion
PEG Chains
Mesothelioma cells eat particles
Mesothelioma Cells Fluoresce with EphA-2 NP
Nanoparticle Based Detection and Killing of Mesothelioma
Crossing the “Valley of Death”
Translating from Mice to Men
HIPPOCRATES (CA.460-CA.377 B. C.)

PRIMUM NON NOCERE

( FIRST DO NO HARM)