Targeting of Vulnerable [atherosclerotic] Plaque using [tin-117m]-DOTA-ANNEXIN


Abstract

Objective

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Why Tin-117m Annexin?

- Annexin binds to cells expressing phosphatidylinerine (PS) on the outer leaflet of the cell membrane
- Severely stressed cells
- Cells which have initiated apoptosis

- Annexin bound to PS provides the 'eat me' signal to phagocytic cells
- The combination of severely stressed cells and permeability of the lesion to radio-labeled annexin allows the tin-117m annexin to bind to macrophages in the lesion

HYPOTHESIS:

- 5760mTm conversion electrons would cause the stressed macrophages to undergo apoptosis instead of necrosis, decreasing inflammation in the lesion.

Why Tin-117m Annexin?

- Lesions with:
  - Cap thickness < 65 μm
  - Large lakes of lipid
  - Containing numerous activated macrophages & foam cells

Treat vulnerable plaque with conversion electrons

Activated macrophages & foam cells undergo either necrosis or apoptosis

Necrosis

- Caused by loss of integrity of cell membrane
- Noxious substances released into surrounding tissue, increasing inflammation

Apoptosis

- Organized, programmed cell destruction
- Noxious substances packaged into 'apoptosomes' for phagocytosis by adjacent cells
- No increase in inflammation

TIN-117M HAS UNIQUE CAPABILITIES

- Produces a range of tissue penetration
- Penetrates a set distance (Mcroenergy)

T-117M + DOTA-ANNEXIN

HUMAN STUDY TO IMAGE VULNERABLE PLAQUE IN CAROTID ARTERIES - CONFIRM WITH HISTOLOGY OF EXCISED TISSUE

Goals and Rationale

- Planar imaging in first 5 human studies did not image carotid plaque.
- SPECT/CT images on next 4 subjects demonstrated.
- Focal uptake in 3 subjects with histologically confirmed carotid VP.
- No uptake in one patient with calcified lesion.

Conclusions

- The clinical studies performed to date have provided evidence as a comparison and measure of plaque instability in this trial.

Localize vulnerable atherosclerotic plaque

Lesions with:
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