83: Design of anti-GD2 (APN311) as a nuclear imaging probe for neuroblastoma xenografts: A theranostic proof of concept

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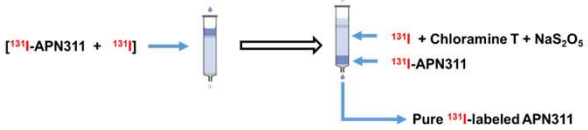
Background/Aims

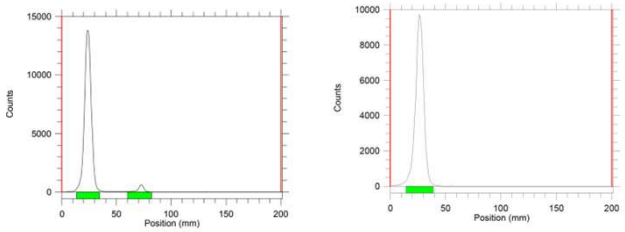
- High risk childhood neuroblastoma patients have poor survival outcomes with few treatment options for relapse or refractory disease
- A new treatment approach is targeted immuno-therapy using a monoclonal antibody against a tumour-associated antigen, the disialoganglioside GD2 (APN311), but the treatment has side effects and is costly
- Development of a noninvasive tool to image and quantify the presence of the GD2 tumour antigen may help in patient selection
- The aim is to label APN311 with radio-iodine and analyze the biodistribution in neuroblastoma–bearing mice

Results and discussion:

Labeling and purify using size exclusion PD10 column

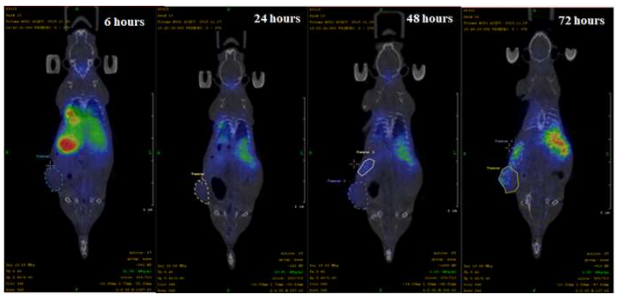


Radio-Thin Layer Chromatograph (Radio-TLC)



^{131}I-APN311: before purification: 73-96%; After purification: > 98%

Tumour mouse microPET imaging

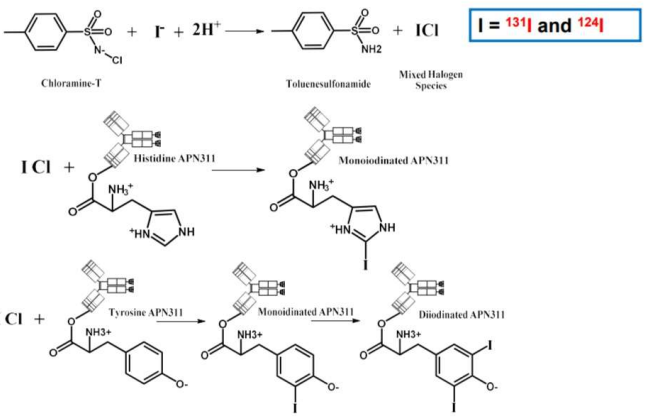


^{124}I-APN311 shows higher uptake in high GD2 expressing tumour than in low GD2 expressing tumour (control) at 48 hs (11.4 vs 3.2 %ID/g) and 72 hs (5.6 vs 1.2 %ID/g)

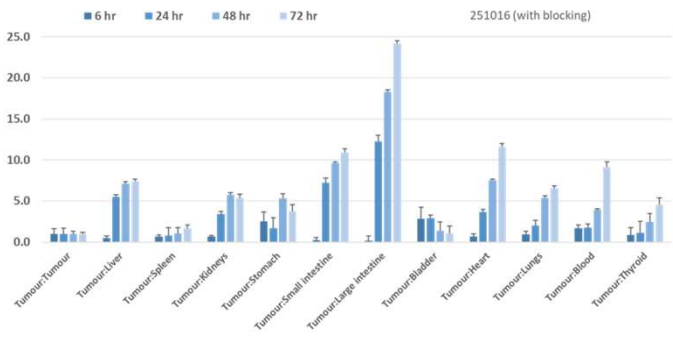
Methods and materials:

- All experiments were done in compliance with, and with the approval of, the institutional animal care and use committee
- APN311 was conjugated to radioactive iodine using Chloramine-T
- Biodistribution studies were performed 6, 24, 48 and 72 hours after injection of 15 to 20 Mbq ^{131}I-APN311 into BALB/c mice bearing high and low GD2-expressing patient derived neuroblastoma xenografts

^{131}I-labeling of APN311 using Chloramine T



Biodistribution studies



- High tumour-to-normal tissue ratio (tumour to blood ratio at 48 hs was 3.9:1 and at 72 hs was 9.1:1)

Conclusion:

- ✓ ^{131}I-APN311 displays high tumor-to-normal tissue contrast for detection of APN311.
- ✓ The study strongly suggests the clinical utility of radio-I-labeled APN311 in assessing GD2 expression status.
- ✓ The study demonstrated radio-I-labeled anti-GD2's theranostic potential on neuroblastoma.

References:

Gupta S, Batra S, and Jain M. Methods Mol Biol. 2014; 1141: 147.

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