

Kinetics of uptake of radioiodinated MAb to a target in the vascular space

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Objectives: There is growing interest in delivery of drugs and radioisotopes with carriers designed to target molecular receptors in the vascular space. In contrast to targets outside of blood vessels vascular receptors are easily accessed and targeting is not significantly impacted by the size of the drug carrier. Although it is accepted that vascular targeting is very efficient, the kinetics of tracer-target interactions have not been evaluated over very short times.

Methods: MAb 201B to murine thrombomodulin accumulates in lung, and has been used as a model for immunoimaging protocols and radioimmunotherapy. MAb 201B was radioiodinated with ¹²⁵I or ¹²⁴I using either chloramine T or a *N*-succinimidyl benzoate derivative to prevent dehalogenation. Accumulation and retention was monitored by standard biodistribution experiments or by dynamic microPET imaging after iv injection in mice.

Results: Lung uptake and clearance ($t_{1/2}$ ~40 hrs) of ¹²⁵I MAb 201B was similar for both radioiodination methods. Lung uptake of ¹²⁴I MAb 201B occurred within seconds of injection as observed by dynamic microPET imaging with little ¹²⁴I MAb detected in the peripheral circulation at any time. In contrast, distribution kinetics of control ¹²⁴I MAb 14 or ¹²⁴I MAb 201B that had been diluted with excess cold MAb 201B equilibrated throughout the vascular space.

Conclusion: Accumulation of iv injected, high-affinity MAbs that target epitopes in the vascular space occurs very rapidly and likely within the first blood pass.

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