

Table W1. Review of Preclinical Imaging Using Trastuzumab to Target HER-2.

Imaging Modality	Imaging Agent	<i>In Vitro/In Vivo:</i> Cell Lines Used	Dose	Route	Reference
Nuclear medicine PET	⁶⁴ Cu-DOTA-Herceptin	<i>In vivo</i> (mice): BT-474,	4 MBq	i.v.	[41]
	⁶⁸ Ga-DOTA-F(ab') ₂	MCF-7, MDA-MB-468 (s.c.)	309 MBq		
SPECT/CT	⁸⁹ Zr-trastuzumab	<i>In vivo</i> (mice): SKOV3, GLC4 (s.c.)	100 µg of trastuzumab, 1 MBq	i.v.	[42]
	¹¹¹ In-DOTA-Fab4D5, ¹¹¹ In-DOTA-AB.Fab4D5	<i>In vivo</i> (mice): tumors cells derived from MMTV/HER-2 transgenic mice (s.c.)	4 mg/kg (300-500 µCi) 25 MBq (30 µg)	i.v.	[43] [44–46]
Scintigraphy (whole body)	[^{99m} Tc]-HYNIC-trastuzumab Fab, ¹¹¹ In-trastuzumab Fab, ¹¹¹ In-DTPA-trastuzumab	<i>In vivo</i> (mice): BT474, SK-OV-3 (s.c.) <i>In vivo</i> (mice, humans)	3.7 MBq (30 µg) Mice: 450 ± 25 kBq (25 µg); human: 100-150 MBq (5 mg)	i.v.	
Scintillation counter (tissue/cells)	¹¹¹ In-DOTA-Herceptin, ¹¹¹ In-DOTA-F(ab') ₂ , ¹¹¹ In-CHX-A -DTPA-Herceptin, ⁹⁰ Y-DTPA-Herceptin	<i>In vivo</i> (mice): BT474 (s.c.) <i>In vitro</i> : MCF-7, SKBr-3	1.6 MBq	i.v.	[41]
Magnetic resonance tomography	WSIO-Herceptin	<i>In vivo</i> (mice): NIH3T6.7 (s.c.)	400 µg of Fe	i.v.	[47,48]
	Biotinylated Herceptin with streptavidin-SPIO microbeads	<i>In vitro</i> : MCF-7, MDA-MB-231, AU-565 (gel phantoms)	2-50 × 10 ¹⁰ biotin/µl		
Optoacoustic tomography	Herceptin nanoparticles	<i>In vivo</i> (mice): SKBr3, KB	20 µmol/kg	i.v.	[49] [50]
	Herceptin conjugated with gold nanoparticles (MabNP)	<i>In vitro</i> : SKBR3, BT-474, MDA-MB-231, and MCF-7	10 ⁹ Mab/NP		
Optical imaging Fluorescence imaging	Cy5.5-labeled Herceptin	<i>In vitro</i> : SK-BR-3, L6 rat myoblasts	100 µg	i.v.	[51]
	Herceptin-RhodG	<i>In vivo</i> (mice): SK-BR-3, PE/CA-PJ34 (s.c.)	50 µg in 200 µl of PBS	i.v.	[52]
	Tra-Cy5.5 (SQ) Tra-Alexa680(SQ)	<i>In vivo</i> (mice): 3T3/HER-2+, Balb/3T3/HER-2- (s.c.)	50 µg/100 µl of PBS	i.v.	[53]
Fluorescence quantum dots	Trastuzumab-Qdots	<i>In vivo</i> (mice): 3T3/HER-2+, Balb/3T3/HER-2- <i>In vivo</i> (mice), <i>Ex vivo</i> (tumor from mice): KPL-4, MBA-MB-231 (s.c.)	2 µM (100 µl), 5-6 µm tissue sections stained with 10 nM	i.v.	[54,55]
Dual-labeled imaging agents (nuclear and optical)	(¹¹¹ In-DTPA) _n -trastuzumab-(IRDye800) _m	<i>In vitro</i> : SKBr3 and MDA-MB-231 <i>In vivo</i> : SKBr3-luc (s.c.)	80-200 µg (70-200 µCi)	i.v., i.d.	[10,14]

i.v. indicates intravenous; s.c., subcutaneous; i.d., intradermal.