

Supplementary Table 1. Description of tumors and corresponding tumor grafts.

Patient information														Tumor graft information											
Sample ID	Tissue ID	Patient ID	Source	Primary Diagnosis	Systemic treatment (up to time of sample collection)	ER status	PR status	HER2 status	PAM50 subtype	FFPE block	Pathological features	Other IHC results	Clinical metastasis	Vital Status	Sample ID	ER status	PR status	HER2 status	Time to grow to 2 cm in NOD.SCID (and NSG, if known)	PAM50 subtype	Pathological Features	Other IHC results	Estrogen Dependence	Metastasis	Current transplant generation
HCI-001 (Fig.2)	070412	YOACPS	1 <sup>st</sup> breast tumor collected/implanted June 2007	IDC; June 2007; Stage 4	None	neg	neg	neg	basal-like	available	Poorly differentiated, papillary architecture, extensive necrosis. Nuclei: 3, tubules: 3, mitoses: 3 (41 per 10 HPF)=Grade III	CK+ Ecad+(mixed) Bcat+(memb/cyto) Vm-(mixed)	Lung	Died December 2007	HCI-001_x1 through HCI-001_x4	neg	neg	neg	NOD.SCID: 2 months	basal-like	Poorly differentiated, papillary/ciriform architecture, extensive necrosis. Nuclei: 3, tubules: 3, mitoses: 2 (35 per 10 HPF)=Grade III	CK+ Ecad+ Bcat+(memb/cyto) Vm+	n/a	Lung	6th
HCI-002 (Supp Fig.6)	0900570	ORR2HE	1 <sup>st</sup> breast tumor collected/implanted February 2009	IDC; January 2009; Stage 3A	None	neg	neg	neg	basal-like	available	Poorly differentiated, "medullary type" (solid with lymphocytic infiltrate, pushing border), no tumor necrosis. Nuclei: 3, tubules: 3, mitoses: 3 (25 per 10 HPF)=Grade III	CK+(mixed) Ecad+(weak) Bcat+(memb/cyto) Vm-(mixed)	LN	Died December 2009	HCI-002_x1 through HCI-002_x7	neg	neg	neg	NOD.SCID: 1 month	basal-like	Syncytial sheets, no lymphocytes, moderate tumor necrosis. Nuclei: 2, tubules: 3, mitoses: 3 (14-55 per 10 HPF)=Grade III	CK+(mixed) Ecad+ Bcat+(memb/cyto) Vm-(mixed)	n/a	LN	7th
HCI-003 (Supp Fig.6)	0903293	3BW6YS	1 <sup>st</sup> breast tumor collected/implanted May 2009	IDC; May 2009; Stage 3A	None	pos	pos	neg	luminal B	available	Invasive ductal carcinoma and high grade micropapillary DCIS; sclerotic stroma with chronic inflammatory reaction. Nuclei: 3, tubules: 2, mitoses: 3 (24 per 10 HPF)=Grade III	CK+ Ecad+ Bcat+(memb) Vm-	LN	Alive	HCI-003_x1 through HCI-003_x6	pos	pos	neg	NOD.SCID: 4 months (1cm)	luminal B	Invasive ductal carcinoma with sclerotic stroma. No necrosis. Nuclei: 3, tubules: 3 (24 per 10 HPF)=Grade III	CK+ Ecad+ Bcat+(memb) Vm-	Yes	Lung, LN	6th
HCI-004 (Supp Fig.7)	0907177	N12K3Y	1 <sup>st</sup> breast tumor collected/implanted September 2009	IDC; July 2009; Stage 2A	None	neg	neg	neg	basal-like	available	Invasive ductal carcinoma, poorly diff. with peritumoral invasion, possible lymphovascular invasion and sclerotic stroma. DCIS is also present. Tubules: 3, Nuclei: 2, Mitoses: 3 (22 per 10 HPF)=Grade III	CK+ Ecad+ Bcat+(memb/cyto) Vm-	not detected	Alive	HCI-004_x1 through HCI-004_x4	neg	neg	neg	NOD.SCID:4 months (up to 1cm) NSG, 5 months (up to 2cm)	basal-like	Poorly differentiated malignancy, consistent with invasive ductal carcinoma. Tubules: 3, Nuclei: 3, Mitoses: 3 (40 per 10 HPF)=Grade III	CK+ Ecad+ Bcat mixed Vm-	n/a	None	4th
HCI-005 (Supp Fig.8)	1007496		Pleural Effusion collected/implanted December 2008		doxorubicin; cyclophosphamide; tamoxifen; letrozole; zoledronic acid; fulvestrant; capecitabine; trastuzumab; vinorelbine										HCI-005_x1 through HCI-005_x3				NOD.SCID: 5 months (1cm)		Pleomorphic-type ILC. Poorly differentiated with vague papillary features; tumor necrosis and single cell necrosis. Nested cells, some papillary structures. Tubules: 3, Nuclei: 3, Mitoses: 3 (12 per 10 HPF)=Grade III		Yes	Lung, LN, peritoneum	3rd
HCI-006	0908097	79NTL6	Pleural Effusion-tap 3 collected/implanted October 2009	mixed IDC and ILC; March 2001; Stage 2B	added paclitaxel; iposomol; doxorubicin; gemtastine; carboplatin	pos	pos	pos	luminal B	not available	Cytosin: Highly atypical cells with large irregular nuclei, which look malignant. There is abundant cytoplasm and intracytoplasmic inclusions are seen. Emperipolesis is present.	n/a	Lung, bone	Died May 2011	HCI-006_x1 through HCI-006_x4	pos	pos	pos	NOD.SCID: 6 months	luminal B	Classical-type ILC. Cells are nested, and have intermediate to large nuclei with vesicular chromatin and prominent nucleoli; abundant eosinophilic cytoplasm; some nuclei have "salt and pepper" chromatin and raise the possibility of neuroendocrine differentiation; there is tumor necrosis and single cell necrosis present. Tubules: 3, Nuclei: 3, Mitoses: 3 (15 per 10 HPF)=Grade III	CK+ Ecad+ Bcat+(memb/cyto) Vm-	not yet tested	Lung, LN, peritoneum	4th
HCI-007	0908263		Pleural Effusion-tap 4 collected/implanted October 2009												HCI-007_x1 through HCI-007_x4				NOD.SCID: 4 months		Classical-type ILC. Nested architecture. Duct forms are seen in probably 20% of the tumor (score 2). Nuclei are intermediate to large with prominent nucleoli and abundant eosinophilic cytoplasm. Tubules: 2, Nuclei: 3, Mitoses: 3 (16 per 10 HPF)=Grade III		not yet tested	Lung, LN, bone	4th
HCI-008 (Supp Fig.9 and 15)	1007649	24PSK3	Pleural Effusion collected/implanted January 2009	Inflammatory breast cancer; December 2007; Stage 2B	5-fluorouracil; capecitabine	neg	neg	pos	basal-like	available	Cell block: Single cells and small clusters of cells with large nuclei, prominent nucleoli, but abundant cytoplasm, some vacuolated	cell block: CK+ Ecad+ (mixed) Bcat+ (memb/cyto) Vm-	Skin, lung	Died March 2009	HCI-008_x1 through HCI-008_x4	neg	neg	pos	NOD.SCID: 5 months to 2cm	luminal B	Clusters of malignant cells with pleomorphic nuclei and abundant eosinophilic cytoplasm (apocrine), consistent with invasive ductal carcinoma, lymphovascular invasion. Tubules: 3, Nuclei: 3, Mitoses: 2 (8 per 10 HPF)=Grade III	CK+ Ecad+ Bcat+(memb) Vm-	n/a	Lung, LN	4th
HCI-009 (Supp Fig.10)	0900642	779812	Axilles collected/implanted February 2009	Poorly differentiated adenocarcinoma; June 1985	cyclophosphamide; methotrexate; 5-fluorouracil; tamoxifen; anastrozole; paclitaxel; zoledronic acid/fulvestrant	neg	neg	neg	HER2-like	available	Nested cells with large round nuclei and abundant cytoplasm; apocrine features; single cell necrosis and high mitotic rate. Poorly differentiated. Tubules: 3, Nuclei: 2, Mitoses: 3 (17 per 10 HPF) = Grade III.	CK+ Ecad- Bcat weak(cyto) Vm+	LN, bone, pancreas, peritoneum	Died February 2009	HCI-009_x1 through HCI-009_x6	neg	neg	neg	NOD.SCID: 4 months	luminal B	Nested cells with apocrine features, single cell necrosis and high mitotic rate. Poorly differentiated. Tubules: 3, Nuclei: 3, Mitoses: 3 (14 per 10)=Grade III	CK+ Ecad weak (cyto) Bcat- (cyto) Vm-	n/a	Lung, LN, peritoneum	6th
HCI-010 (Supp Fig.11)	0903211	SUCWJ9	Pleural Effusion collected/implanted February 2009	IDC; February 2007; Stage 3C	cyclophosphamide; doxorubicin; paclitaxel; iposomol; doxorubicin; zoledronic acid; docetaxel	neg	neg	neg	basal-like	not available	n/a	n/a	Lung	Died February 2009	HCI-010_x1 through HCI-010_x5	neg	borderline	neg	NOD.SCID: 4 months	basal-like	Invasive ductal carcinoma, poorly differentiated with necrosis, some with eosinophilic cytoplasm and prominent nucleoli. Nuclei: 2, tubules: 3, mitoses: 3 (84-115 per 10 HPF)=Grade III	CK+ Ecad+, Bcat+(memb/cyto) Vm+	n/a	Lung, LN	5th
HCI-011 (Supp Fig.12)	0907163	Y0T6JD	Pleural Effusion collected/implanted September 2009	IDC; September 2007; Stage 3C	doxorubicin; cyclophosphamide; paclitaxel; fulvestrant	pos	pos	neg	luminal B	Primary not available. PE available as a cell block	Cytosin: Large nuclei with vesicular chromatin and prominent nucleoli. Abundant eosinophilic cytoplasm. Emperipolesis is present. There are also admixed lymphocytes and mesothelial cells.	n/a	LN, pleura	Died 2008	HCI-011_x1 through HCI-011_x4	pos	pos	neg	NOD.SCID: 4 months	luminal B	Classical-type ILC with nested architecture. Large nuclei with vesicular chromatin and prominent nucleoli. Emperipolesis is present.	CK+ Ecad+ Bcat+-(memb/cyto) Vm-	No, but estrogen responsive	Lung, LN	4th
HCI-012 (Supp Fig.13)	0908104	2SF730	Pleural Effusion collected/implanted October 2009	IDC; March 2007	capecitabine; vinorelbine; trastuzumab; lapatinib	neg	neg	pos	luminal B	not available	Cytosin: Malignant cells with large nuclei, coarse chromatin, and prominent nucleoli; mitotic figures seen.	n/a	LN, pericardium	Died November 2009	HCI-012_x1 through HCI-012_x6	neg	neg	pos	NOD.SCID:4 months NSG; 4 months	luminal B	Poorly differentiated ductal with hyperchromatic nuclei and extensive tumor necrosis. Tubules: 3, Nuclei: 3, Mitoses: 3/61 per 10=Grade II	CK+ Ecad+ Bcat+ (memb) Vm-	n/a	LN, thymus	5th

Abbreviations: SFU, 5-fluorouracil; Bcat, beta-catenin; CK, cytokeratin; CMF, cyclophosphamide, methotrexate and fluorouracil; cyto, cytoplasm; Ecad, E-cadherin; FFPE, formalin-fixed, paraffin embedded;HPF, high power field; ID, identifier;IDC, infiltrating ductal carcinoma; IHC, immunohistochemistry; ILC, infiltrating lobular carcinoma; LN, lymph node; n/a, not applicable; memb, membrane; NOD.SCID, non-obese/obese/severe combined immunodeficient mice; NSG, NOD.SCID/IL2Ralpha-/- mice; PE, pleural effusion; vim, vimentin; XRT, X-ray therapy