

Supplementary Table S1. Detailed characterization of established STS PDX models.

Confirmed histological diagnosis	PDX model	Current passage	Tumor growth rate	Histopathological / molecular features	Patient's history before engraftment	Procedure from which tissue was engrafted in immunodeficient mice	Patient's history post engraftment	Current clinical status of donor patient at last follow up
Dedifferentiated liposarcoma	UZLX-ST53	50	1 month	MDM2 IHC + MDM2 amplification (FISH)	Localized disease	Surgical resection of primary tumor	/	NED
	UZLX-ST55	36	1 month	MDM2 IHC + MDM2 amplification (FISH)	Primary resection Adjuvant radiotherapy Recurrent disease	Surgical resection of recurrence	SD under doxorubicin/ifosfamide PD under pazopanib PD under trabectedin	DOD
	UZLX-ST5112	10	3 months	MDM2 IHC +- MDM2 amplification (FISH)	Primary resection Adjuvant radiotherapy Local recurrence PD after 24 cycles of gemcitabin+MORab/placebo: metastatic disease	Excision of metastatic nodules	PD after 12 cycles of olaratumab PD after 3 cycles of eribulin PD after 3 cycles of trabectedin PD under pazopanib	DOD
	UZLX-ST5124	11	1.5 months	MDM2 IHC strongly + MDM2 amplification (FISH)	Localized disease	Surgical resection of primary tumor	Metastatic disease Palliative local radiotherapy PD under doxorubicin monotherapy	DOD
	UZLX-ST5158	5	3 months	complex karyotype	Surgical resection Local recurrence	Wide excision	Adjuvant radiotherapy	NED
Myxofibrosarcoma	UZLX-ST545	Cryopreserved after p.21	1 month	High-grade tumor Complex karyotype	Upfront metastatic disease	Palliative en bloc resection	2 cycles of doxorubicin (discontinuation due to wound healing problems)	DOD
	UZLX-ST559A	Cryopreserved after p.16	1 month	High-grade tumor Complex karyotype	Upfront metastatic disease	Palliative surgical resection of primary tumor	PD after 3 cycles of doxorubicin PD after 2 cycles of ifosfamide PD under pazopanib PD after 2 cycles of trabectedin	DOD
	UZLX-ST589	Cryopreserved after p.14	1.5 months	High-grade tumor Complex karyotype	Localized disease	Surgical resection of primary tumor	/	NED
	UZLX-ST5126	Cryopreserved after p.10	1 month	High-grade tumor Complex karyotype	Primary resection Adjuvant radiotherapy Metastatic disease	Lymphadenectomy	Adjuvant radiotherapy	NED
	UZLX-ST5132	Cryopreserved after p.11	1 month	High-grade tumor Complex karyotype	Localized disease	Incision biopsy	Surgical resection Adjuvant radiotherapy Amputation Metastatic disease	DOD
	UZLX-ST5169	7	6-8 weeks	High-grade tumor complex karyotype	Localized disease	Surgical resection	Adjuvant radiotherapy	NED
	UZLX-ST5163	Cryopreserved after p.10	6-8 weeks	High-grade tumor	Localized disease Amputation Surgical resections of local recurrences	Surgical resection of local recurrence	Isolated limb perfusion	DOU

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Leiomyosarcoma	UZLX-ST522	Cryopreserved after p.18	1 month	Desmin +, α -SMA + Complex karyotype	Localized disease	Surgical resection of primary tumor	Adjuvant radiotherapy Metastatic disease PD after 6 cycles of doxorubicin+TH-302 PD after 3 cycles of trabectedin	DOD
	UZLX-ST581	13	3 months	High-grade tumor Desmin +, α -SMA +	Primary resection Adjuvant radiotherapy Metastatic disease Multiple metastasectomies	Metastasectomy	/	DOD
	UZLX-ST5111	11	3 months	Desmin+, α -SMA strongly + Complex karyotype	Localized disease	Surgical resection of primary tumor	Metastatic disease	AWD
	UZLX-ST5128	12	2 months	Desmin -, α -SMA strongly +	Surgical resection Local relapse	Surgical resection of recurrence	Adjuvant radiotherapy Metastatic disease	DOD
	UZLX-ST5149	Cryopreserved after p.13	4-6 weeks	Desmin partial +, α -SMA partial + complex karyotype	Localized disease no neoadjuvant therapy	Wide excision	Radiotherapy being delayed due to wound problems	NED
Malignant peripheral nerve sheath tumor	UZLX-ST539	Cryopreserved after p.16	2 months	S100 + Complex karyotype	Localized disease	Surgical resection of primary tumor	Metastatic disease Palliative radiotherapy Refusal of chemotherapy	DOD
	UZLX-ST557	Cryopreserved after p.16	1 month	MPNST ex neurofibroma S100 + Complex karyotype	Localized disease	Surgical resection of primary tumor	/	NED
Undifferentiated pleomorphic sarcoma	UZLX-ST584	Cryopreserved after p.15	2 months	High-grade tumor Complex karyotype	Localized disease	Surgical resection of primary tumor	Adjuvant radiotherapy Metastatic disease SD under pazopanib, but stopped due to toxicity	DOD
	UZLX-ST5104	Cryopreserved after p.18	2 months	Desmin focally +, α -SMA +	Localized disease	Surgical resection of primary tumor	Adjuvant radiotherapy	NED
	UZLX-ST5125	Cryopreserved after p.10	1.5 months	High-grade tumor	Localized disease	Surgical resection of primary tumor	Adjuvant radiotherapy	NED
Synovial sarcoma	UZLX-ST57	48	1 month	<i>SS18</i> rearrangement (FISH) <i>SS18-SSX1</i> fusion (RT-PCR) Poorly differentiated subtype EMA focally +	Surgical resection Recurrent + metastatic disease	Incomplete metastasectomy	Palliative radiotherapy No chemotherapy due to comorbidity	DOD

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Epithelioid hemangio-endothelioma	UZLX-ST515	16	7 months	<i>CAMTA1</i> rearrangement (FISH) <i>WWTR1-CAMTA1</i> fusion (RT-PCR) Complex karyotype	Neo-adjuvant radiotherapy Surgical resection Recurrent disease	Surgical resection of local recurrence	Radiotherapy Metastatic disease 1 cycle of doxorubicin (intolerance) PD after 8 cycles of paclitaxel	DOD
Pulmonary artery intimal sarcoma	UZLX-ST5122F	9	3-4 months	<i>EGFR</i> amplification (FISH)	Localized disease	Enderterectomy	PR after 6 cycles of neo-adjuvant doxorubicin/ifosfamide Pneumonectomy with curative intent	NED
Mesenchymal chondrosarcoma	UZLX-ST541	21	3 months	<i>NCOA2</i> rearrangement (FISH)	Localized disease	Surgical resection of primary tumor	Adjuvant radiotherapy Metastatic disease PD after 6 cycles of doxorubicin + evofosfamide PD after 6 cycles of evofosfamide maintenance PD after 11 cycles of trabectedin PD after 3 cycles of gemcitabine/dacarbazine PD under sunitinib	DOD
Pleomorphic rhabdomyosarcoma	UZLX-ST5116	13	3 months	High-grade tumor Very extensive cellular and nuclear pleomorphism Desmin +, myogenin + Complex karyotype	Localized disease	Surgical resection of primary tumor	Adjuvant radiotherapy Metastatic disease PD after 2 cycles of pazopanib PR after 6 cycles of doxorubicin	DOU
Rhabdomyosarcoma NOS	UZLX-ST5172	6	3 months	desmin+, myogenin+, SOX9+	Localized disease	Surgical resection	Metastatic disease	AWD
<i>CIC-rearranged</i> round cell sarcoma	UZLX-ST5134	14	1-2 months	<i>CIC</i> rearrangement (FISH) Cell-rich tumor with round cells	Upfront metastatic disease	Incision biopsy	Decapeptyl PR after VIA/VIP chemotherapy Wide resection of residual lesion Adjuvant local radiotherapy and total lung irradiation New lung metastasis Metastasectomy	AWD
Telangiectatic extraskeletal osteosarcoma	UZLX-ST5119	6	5 months	complex karyotype	Localized disease Surgical resection (R1)	Wide re-resection	Adjuvant radiotherapy	NED
Undifferentiated sarcoma NOS	UZLX-ST5177	5	2 months	complex karyotype	Localized disease doxorubicine/ifosfamide radiotherapy	Resection	/	NED

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Myxoinflammatory fibroblastic sarcoma	UZLX-ST5179	8	1 month	Epithelioid cells with large eosinophilic cytoplasm and prominent macronucleoli <i>TGFBR3</i> rearrangement, <i>VGLL3</i> amplification	Localised disease Surgical resection Local recurrence	Resection local recurrence	/	NED

AWD: alive with disease; CAMTA1: calmodulin binding transcription activator 1; CIC: capicua transcriptional repressor; DOD: dead of disease; DOU: died of unknown cause; EGFR: epithelial growth factor receptor; EMA: epithelial membrane antigen; FISH: fluorescence in situ hybridization; IHC: immunohistochemistry; MDM2: mouse double minute 2 homolog; MPNST: malignant peripheral nerve sheath tumor; NCOA2: nuclear receptor coactivator 2; NED: no evidence of disease; PD: progressive disease; PR: partial response; SD: stable disease; SMA: smooth muscle actin; STS: soft tissue sarcoma; TGFBR3: Transforming Growth Factor β Receptor 3; VGLL3: Vestigial Like Family Member 3; WWTR1: WW domain-containing transcription regulator protein 1