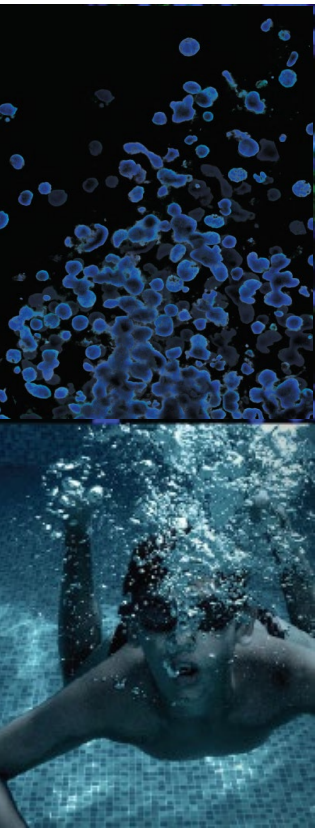
Cell-based Models for the Discovery and Development of Cancer Therapeutics

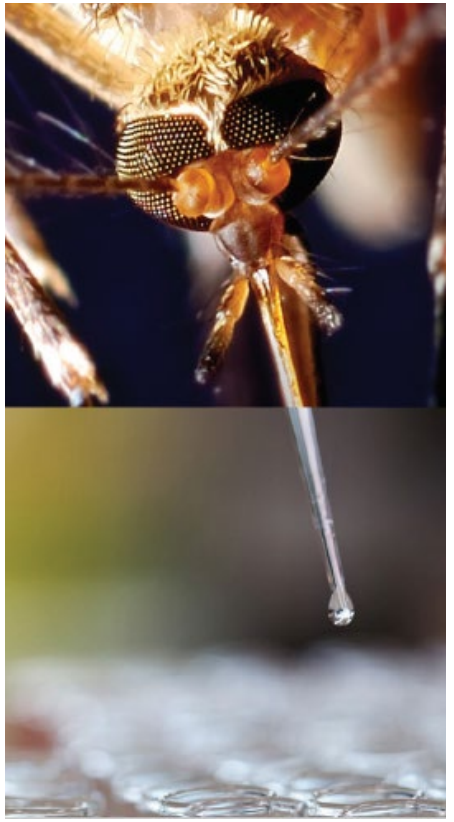
Utsav Sharma, PhD
Product Manager – Oncology

Hyeyoun Chang, PhD
Scientist, Cell Biology R&D

James Clinton, PhD
Lead Scientist, Cell Biology R&D

Credible Leads to Incredible™





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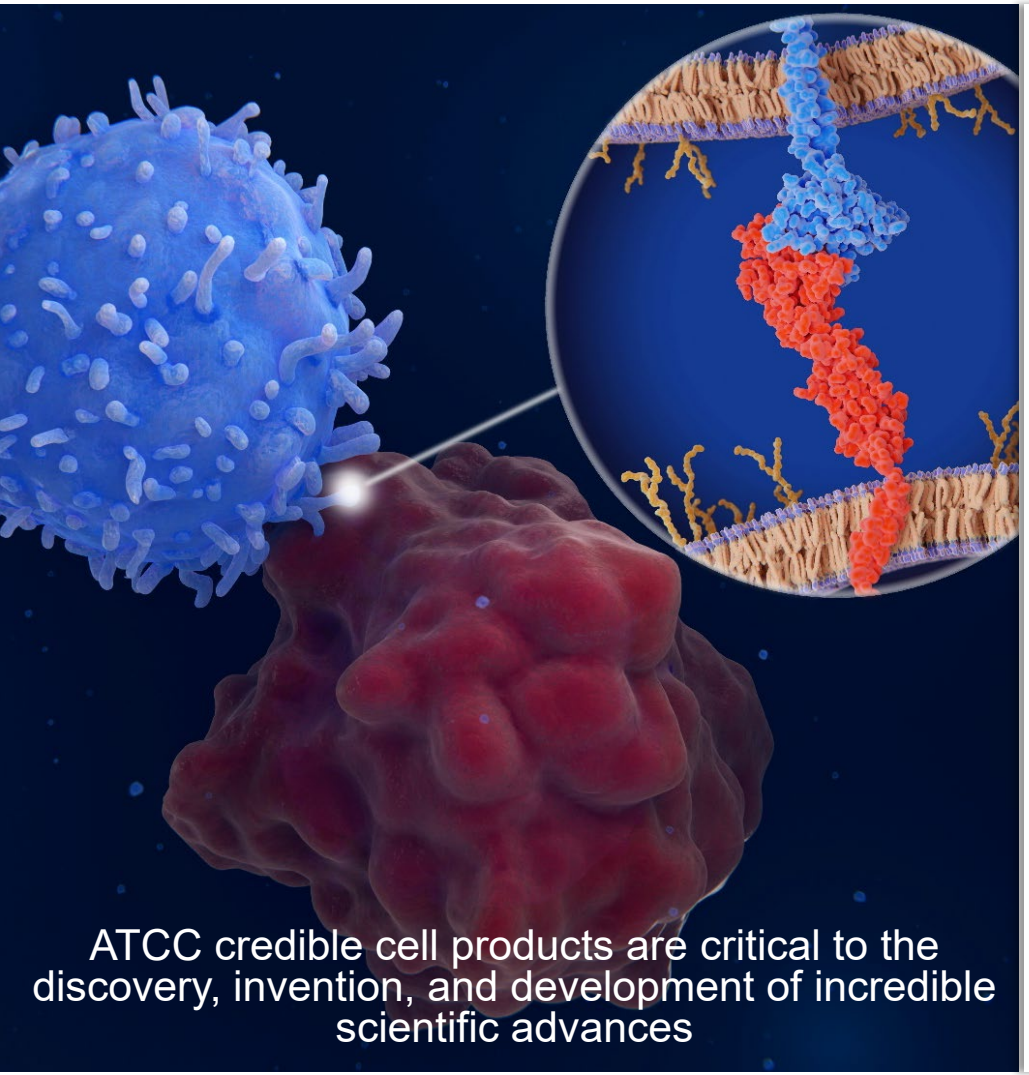
ATCC – *Life Science Innovations That Touch People*

A trusted partner to the global scientific community since 1925

- Founded in 1925, ATCC is a non-profit organization with HQ in Manassas, VA, and R&D & Services center in Gaithersburg, MD
- World's premiere biological materials resource and standards development organization
- World's largest, most diverse biological materials and information resource for cell biology – the "gold standard"
- Innovative R&D company featuring advanced cell models and immuno-oncology tools
- Leading global supplier of authenticated cell line, viral and microorganism standards
- Supports the global scientific community, with sales and distribution over 140 countries, 18 International distributors

ATCC

Agenda



- Evolution of Cancer Therapeutics
- ATCC Oncology Portfolio
- Immuno-Oncology Reporter Models
- Patient-derived Models from the HCMI
- Q&A

Evolution of the ATCC Portfolio

Utsav Sharma, PhD
Product Manager – Oncology, ATCC

Dr. Utsav Sharma is the Product Manager for the Oncology portfolio at ATCC. Utsav obtained his PhD in Cancer Biology at the University of Miami School of Medicine and completed his postdoctoral training at Georgetown University. His prior research work was focused on metastasis, liquid biopsy, and clinical cancer research. Prior to ATCC, Utsav worked as a Senior Scientist at Autolus Therapeutics PLC on their CD19 CAR-T platform Obe-cel, providing technical and scientific oversight to their global phase-II clinical trial on adults with Acute Lymphoblastic Leukemia (ALL) disease. In his current role, Utsav oversees all aspects of the product strategy for the oncology segment at ATCC.

ATCC

Evolution of Oncology Therapies and Cell-Based Models

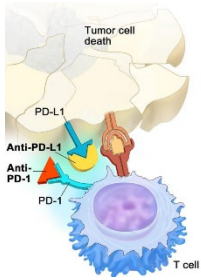
1925
ATCC Founded
2112 M St,
Washington, DC, NW.

Late 1800
Surgical Treatments

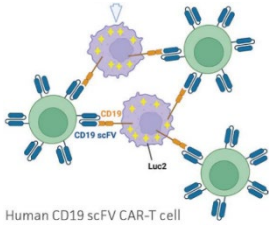
1900
Radiotherapy

1940
Chemotherapy

1980
Targeted Therapy



2010
Checkpoint Inhibitors



Human CD19 scFV CAR-T cell

2017
CAR T-cell Therapy

1998
ATCC HQ
Manassas, VA

ATCC R&D
Gaithersburg, MD

Continuous Cell Lines

Primary Cells
Cell Immortalization

Animal Models

Stem Cells
iPSCs

3D Models
Organoids

Future
"Organ on Chip"

ATCC®

Oncology Portfolio

Classical Cell Culture

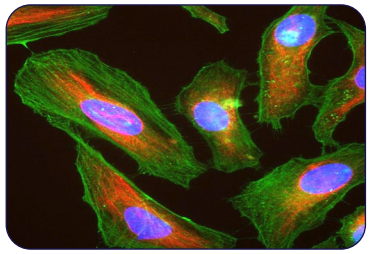
✓Human Cell Lines

✓Animal Cell Lines

✓Certified Reference Material

✓Cell Culture Media

✓Cell Culture Reagents

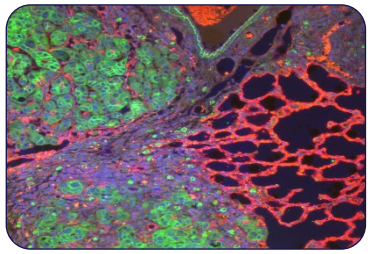


Biomarker Discovery

✓Matched Tumor - Normal Cells

✓Cancer Cell Panels

✓Quantitative Cell Line DNA



Tumor Biology

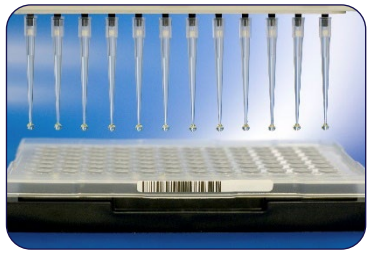
✓Cell Lines by Gene Mutation

✓EMT/MET Reporter Cells

✓Fluorescent Reporter Labeled Cells

✓Luciferase Labeled Cells

✓Exosomes



Drug Screening

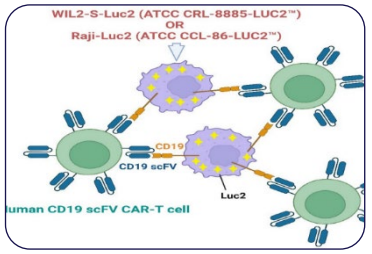
✓Isogenic Cell Lines

✓EMT/MET Reporter Cells

✓Primary Cells

✓hTERT-immortalized Primary Cells

✓iPSC-derived Cells



Immuno-Oncology

✓Primary Immune Cells and Cell Lines

✓THP-1 Reporter Cells

✓Hybridoma Cells

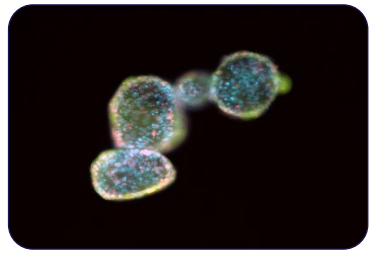
✓iPSC-Derived Immune Cells

✓CAR-T Target Reporters

✓Checkpoint Reporter Cells

✓Assay Ready Immune Cells

ATCC EXPERT
Hyeyoun Chang, PhD
Scientist
R&D



Patient-Derived Models

✓HCMI Organoids

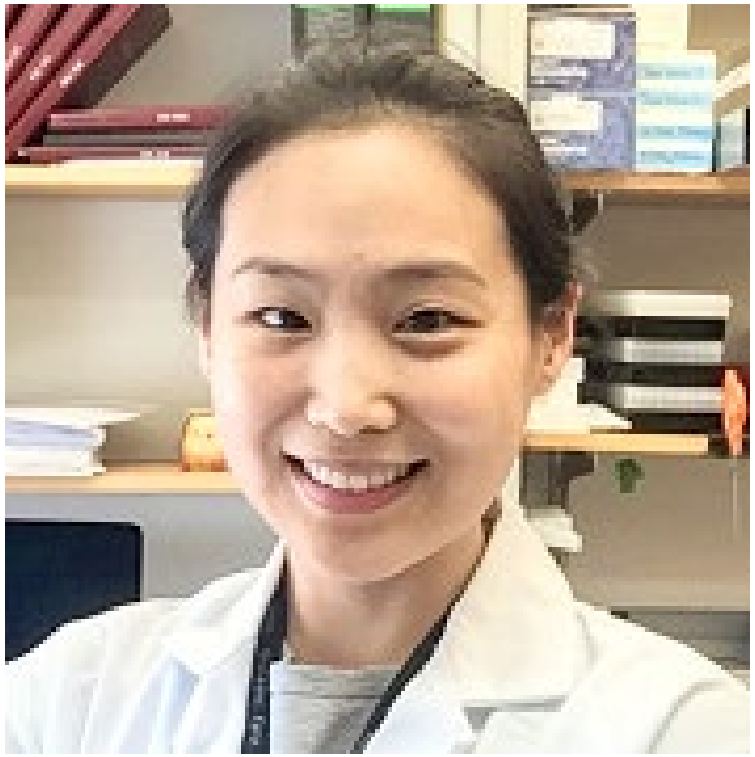
✓HCMI Adherent and Suspension Cell Models

✓Conditionally Reprogrammed (CRC) Cells

✓Organoid Growth Kits

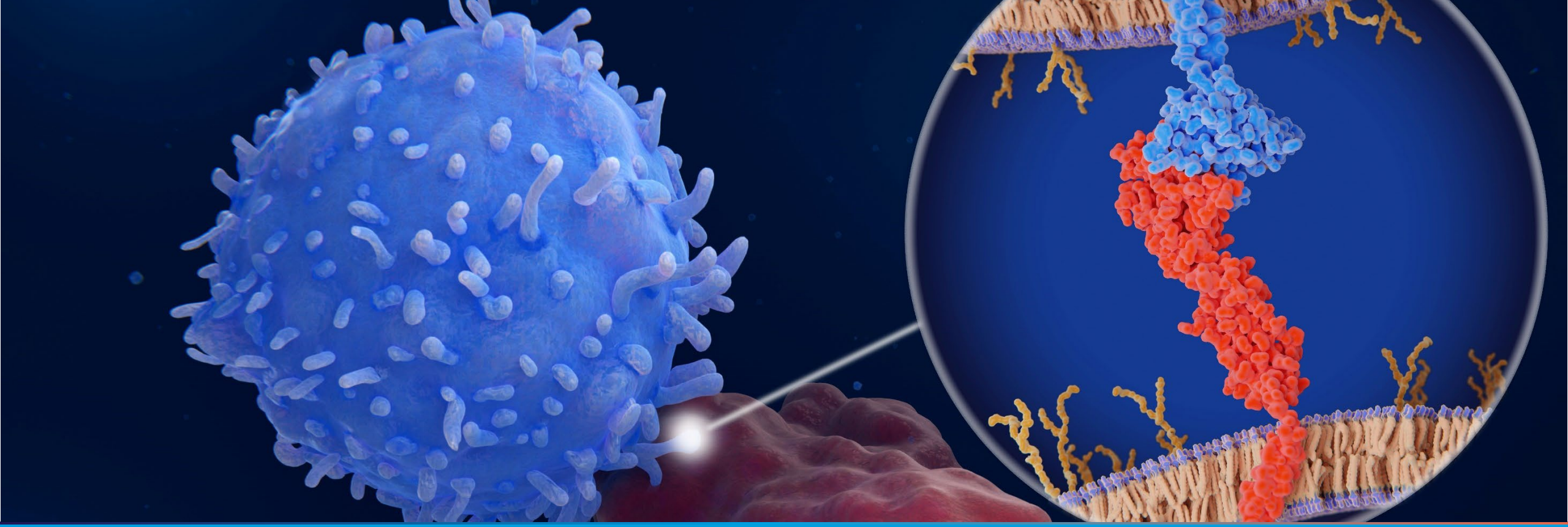
ATCC EXPERT
James Clinton, PhD
Lead Scientist
R&D

ATCC Immuno-oncology R&D Program



Hyeyoun Chang, PhD
Scientist, ATCC

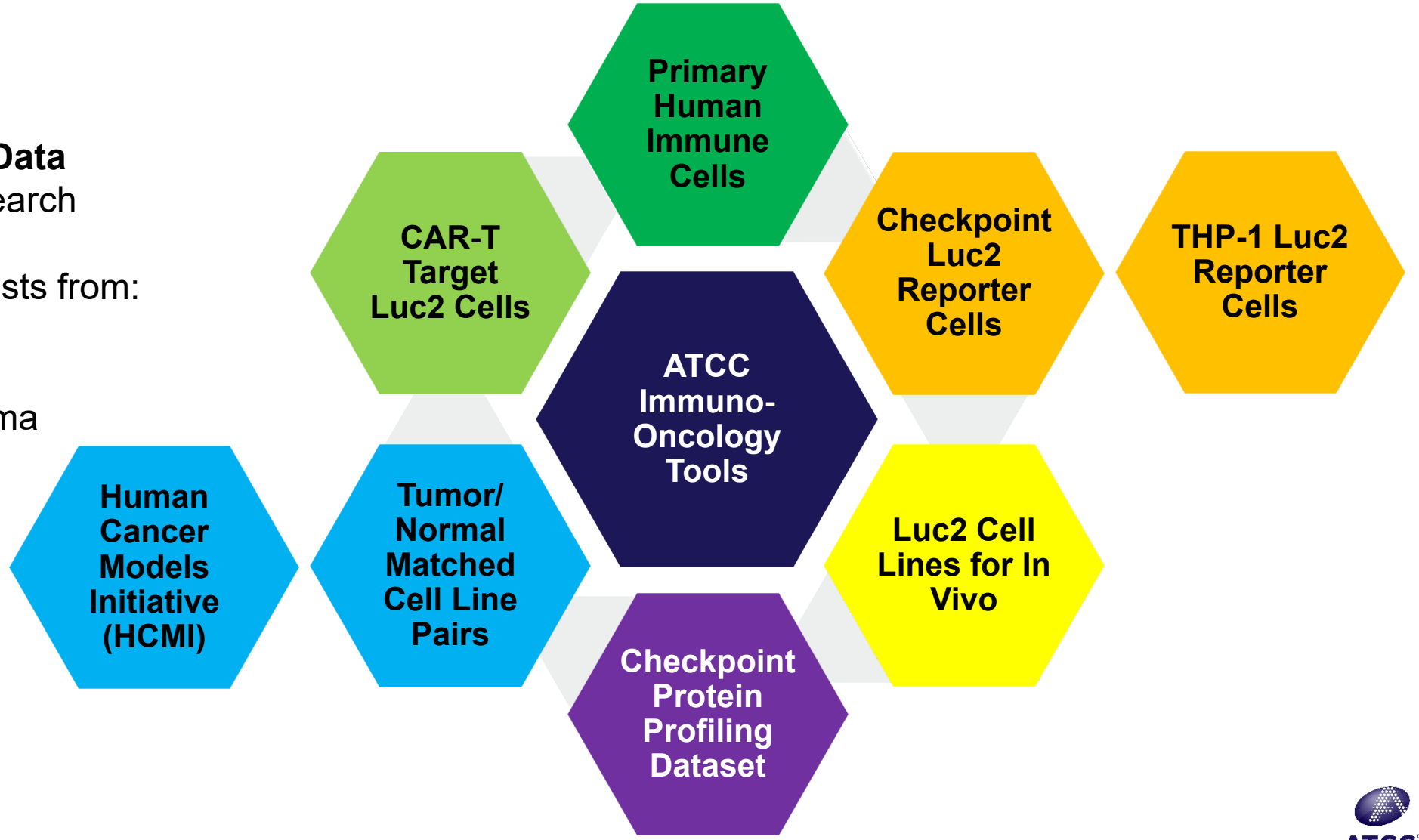
Hyeyoun Chang, PhD, is a Scientist in the Immuno-oncology group of the R&D department at ATCC. She has extensive experience in the fields of biomedical engineering and cancer biology that focuses on drug delivery, intracellular signaling, and gene therapy. Prior to joining ATCC, Dr. Chang received her PhD in biomedical engineering from Korea University of Science and Technology and completed her postdoctoral training at Dana-Farber Cancer Institute/ Harvard Medical School.



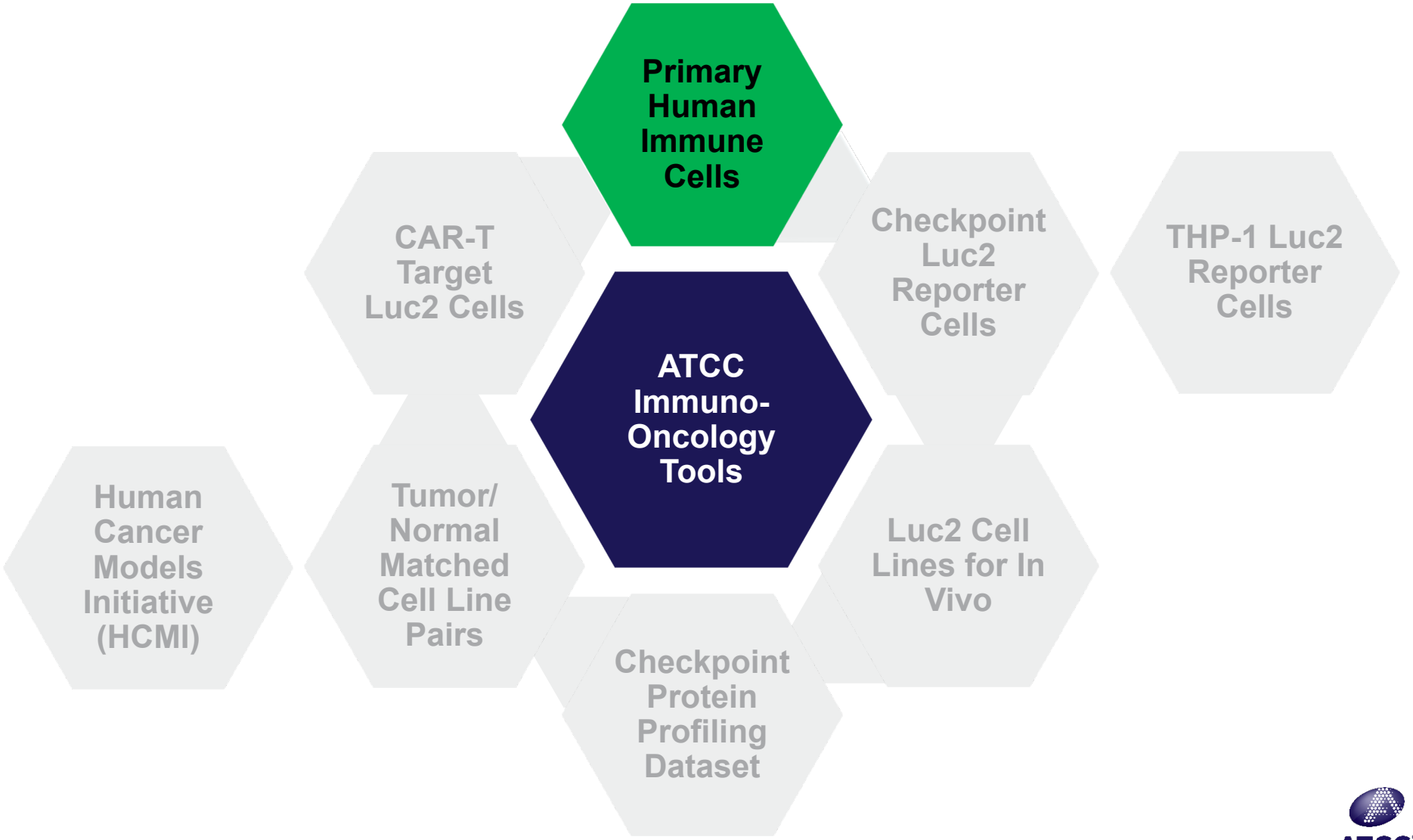
ATCC Immuno-oncology Models

ATCC Immuno-oncology Tools

- **Develop & produce:**
  - Novel cell lines
  - Cell assays
- **Generate Application Data**
  - Conduct scientific research
  - Publish our work
- **Collaborate** with scientists from:
  - Academia
  - Small biotech/startup
  - Medium-to-large pharma



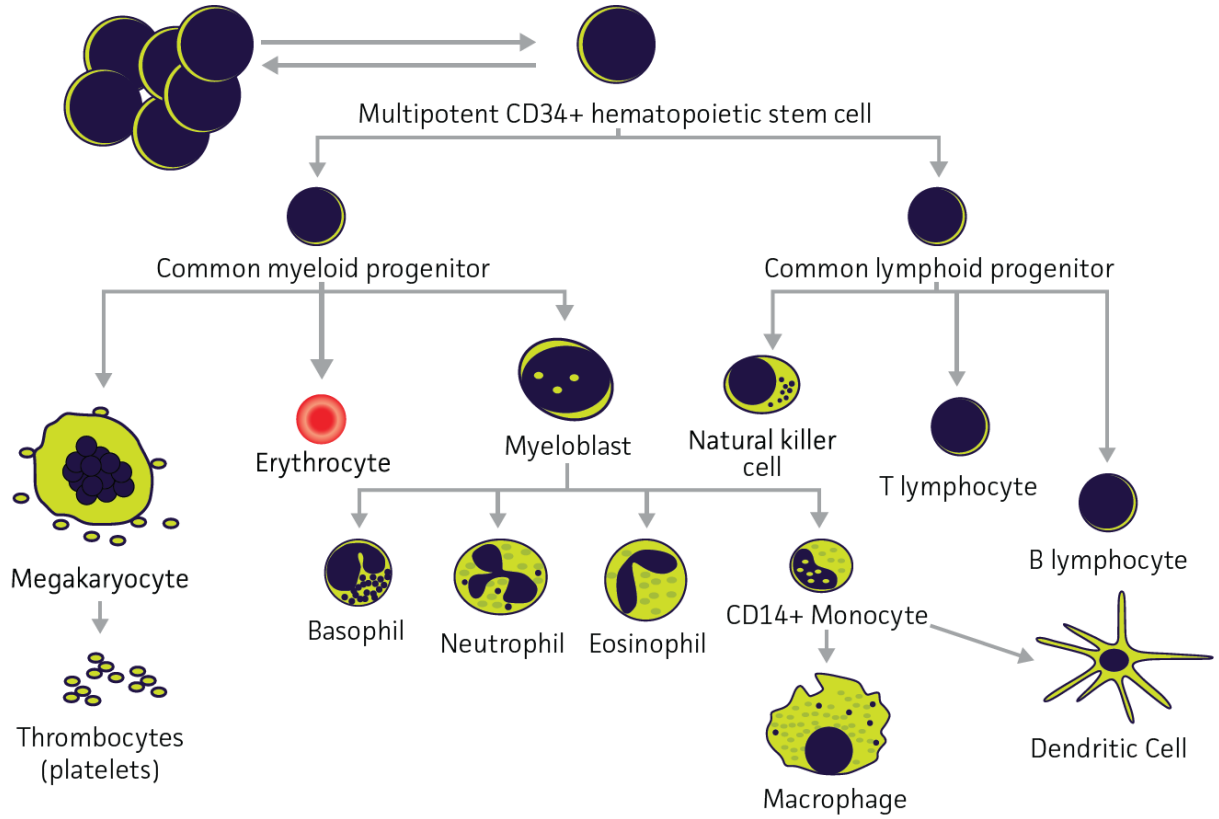
ATCC Immuno-oncology Tools



Primary and iPSC-Derived Primary Immune Cells

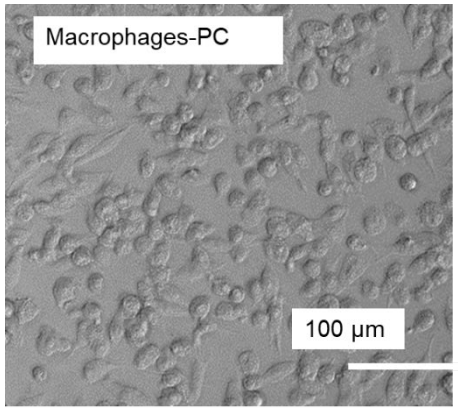
- Cells from most hematopoietic lineages available
- Many can be further differentiated
- Donor information available: Gender, ethnicity, age, cause of death
- iPSC-derived primary cells provide almost unlimited source of cells from same lot

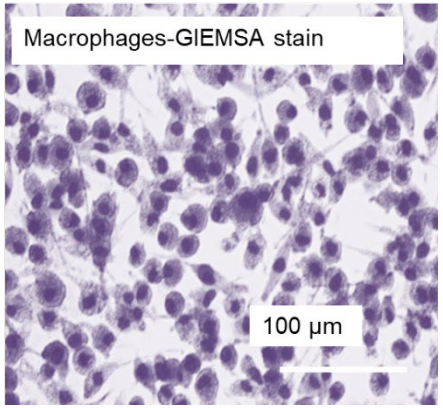
Cell Type	ATCC® No.	Positive Biomarkers
CD14+ Monocytes	PCS-800-010™	CD14, CD45
Peripheral Blood Mononuclear Cells	PCS-800-011™	CD45
Bone Marrow CD34+ Cells	PCS-800-012™	CD34, CD45
Bone Marrow Mononuclear Cells	PCS-800-013™	CD45
Cord Blood CD34+ Cells	PCS-800-014™	CD34, CD45
CD4+ Helper T Cells	PCS-800-016™	CD3, CD4, CD45
CD8+ Cytotoxic T Cells	PCS-800-017™	CD3, CD8, CD45
CD19+ B Cells	PCS-800-018™	CD20, CD45
CD56+ Natural Killer Cells	PCS-800-019™	CD45, CD56
iPSC-derived MSCs	ACS-7010™	CD29, CD44, CD73, etc.
iPSC-derived CD34+ Cells	ACS-7020™	CD34, CD45
iPSC-derived Monocytes	ACS-7030™	CD14

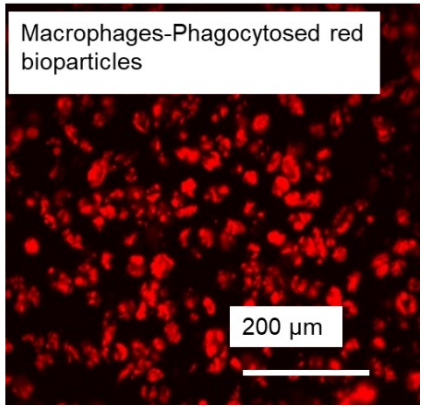


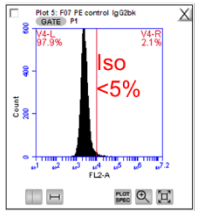
iPSC-derived CD34+ Differentiation Potential

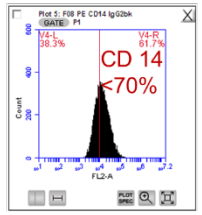
Macrophage differentiation capability

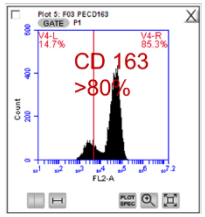


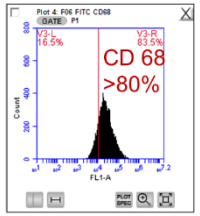


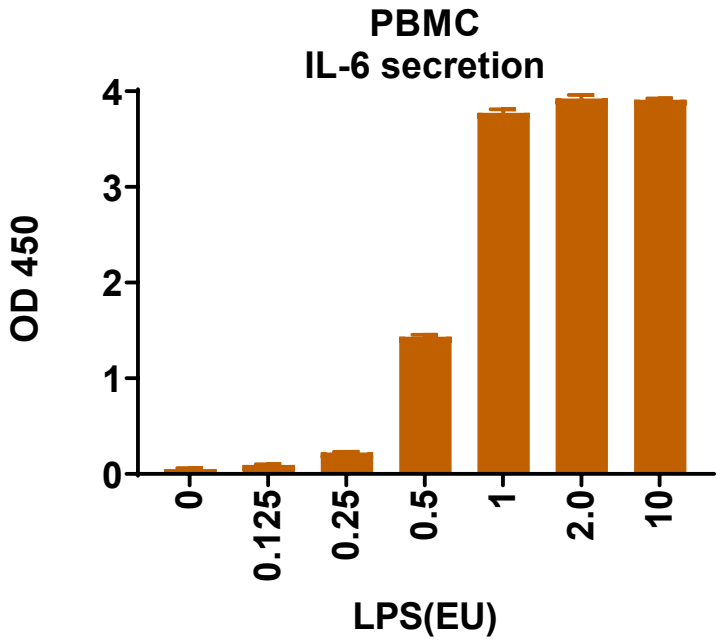


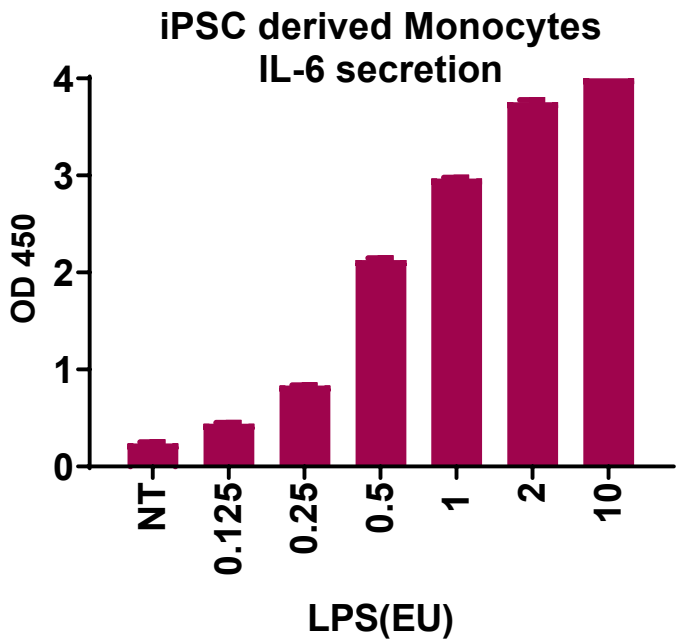




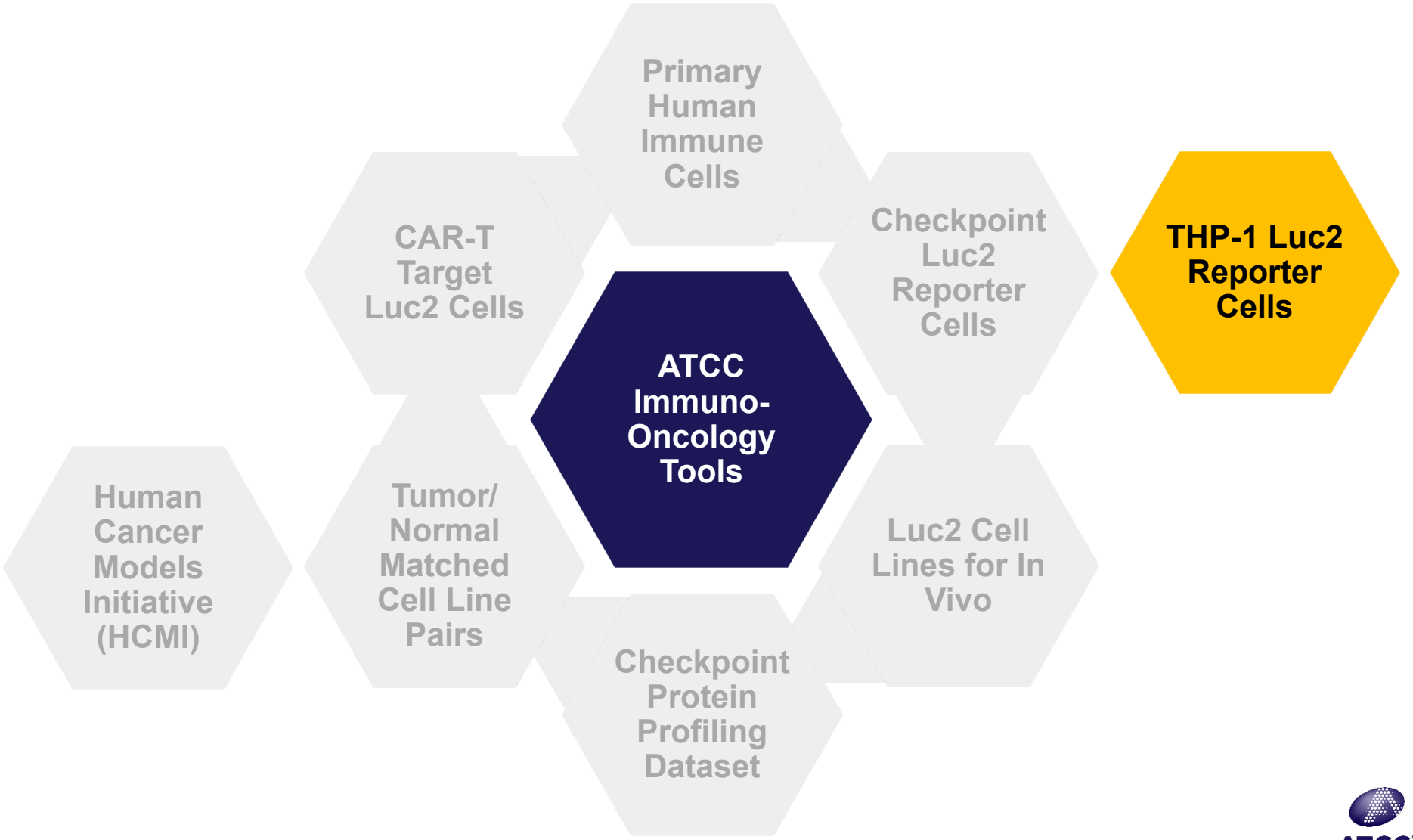








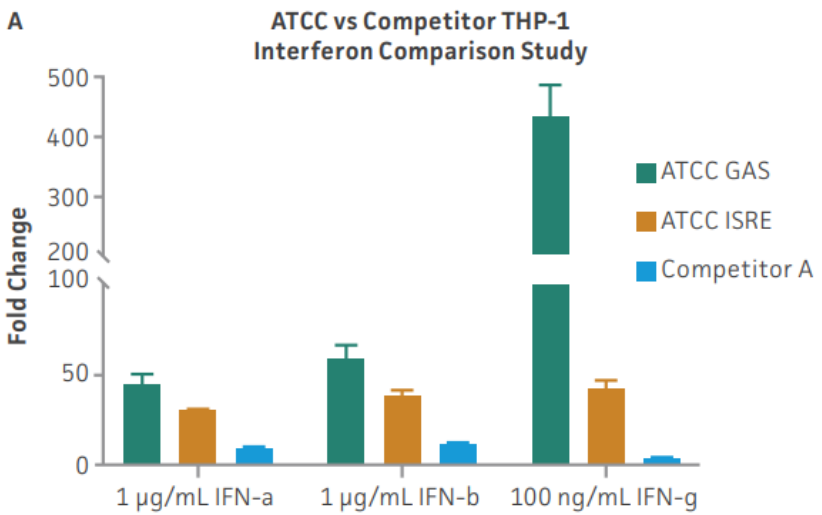
ATCC Immuno-oncology Tools

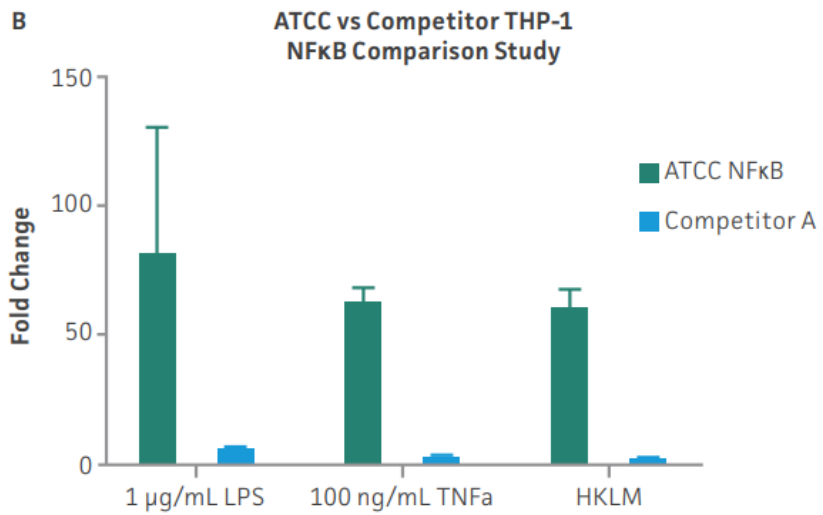


THP-1 Luciferase Reporter Cells

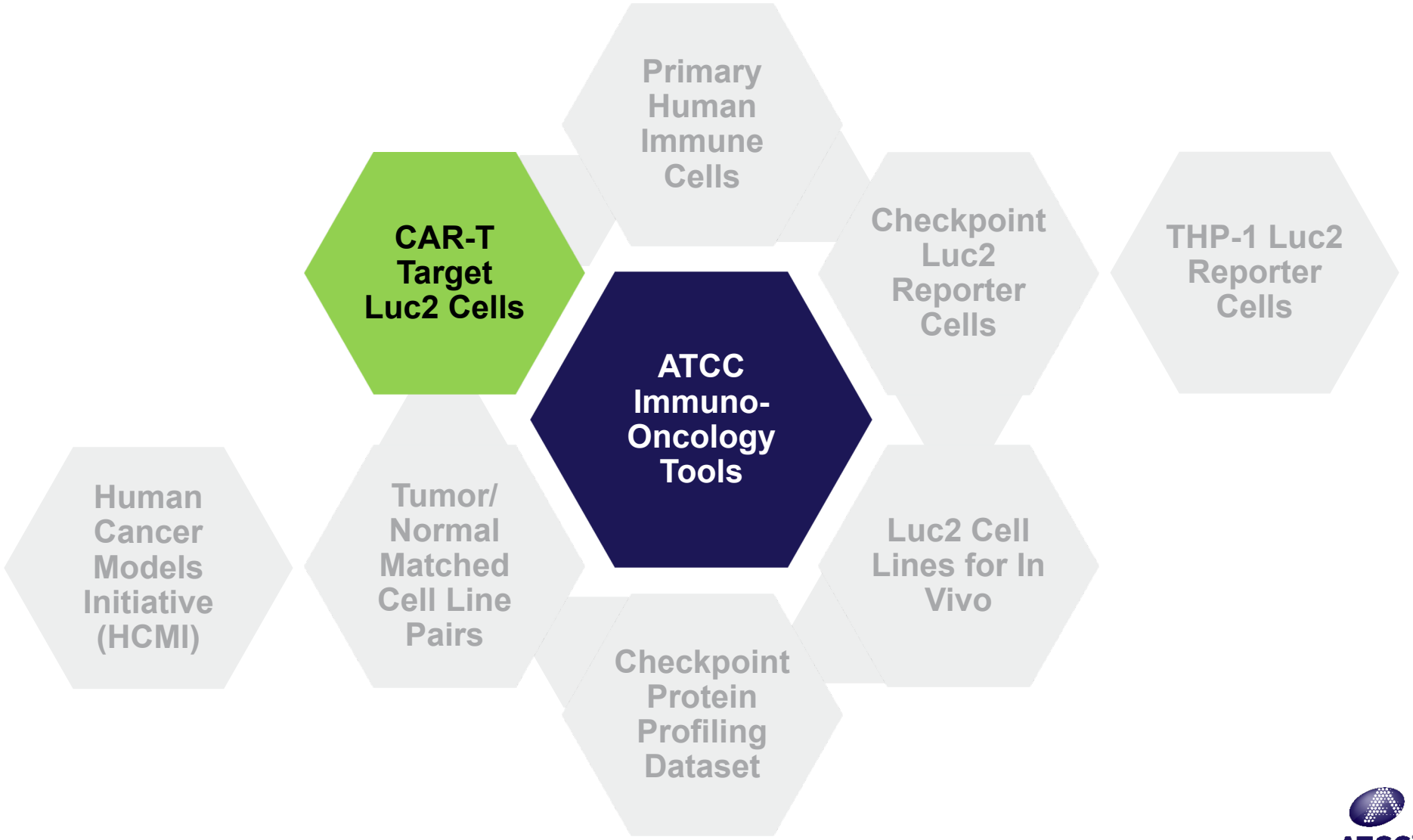
- Originate from a human monocyte-like line
- Naturally expresses pattern-recognition and cytokine receptors
- Luciferase reporter provides a straightforward, means to measure biological processes through bioluminescence measurements
- Allows broad application in:
  - Drug development,
  - Cell signaling pathway research
  - Safety evaluation for new drugs

Designation	ATCC® No.	Signaling Pathway	Function
THP-1 NF-kB-Luc2	TIB-202-NF-kB-Luc2™	NF-κB	Pivotal mediator of inflammatory response
THP-1 GAS-Luc2	TIB-202-GAS-Luc2™	JAK-STAT (Type II)	Initiates immune cell activation and recruitment
THP-1 AP-1-Luc2	TIB-202-AP-1-Luc2™	MAPK/ERK	Regulates innate and adaptive immune response
THP-1 CRE-Luc2	TIB-202-CRE-Luc2™	cAMP/PKA	Inflammatory mediator/phagocytosis modulator
THP-1 ISRE-Luc2	TIB-202-ISRE-Luc2™	JAK-STAT (Type I)	Initiates immune cell activation and recruitment
THP-1 NFAT-Luc2	TIB-202-NFAT-Luc2™	Calcineurin-NFAT	Mediates adaptive T cell activation



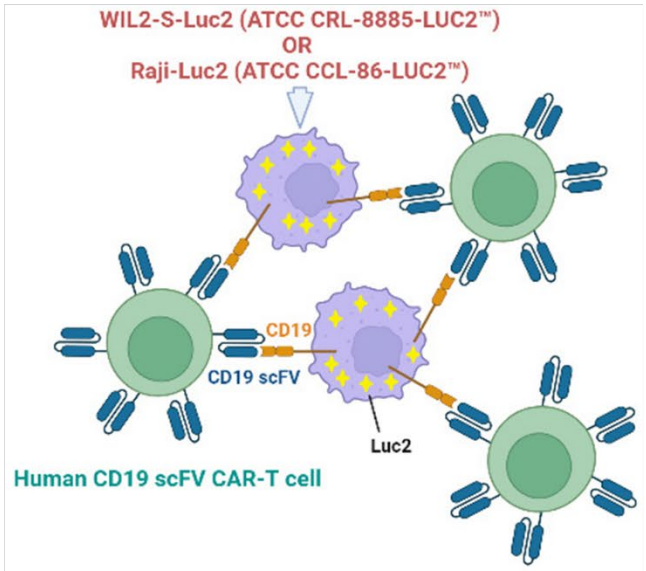


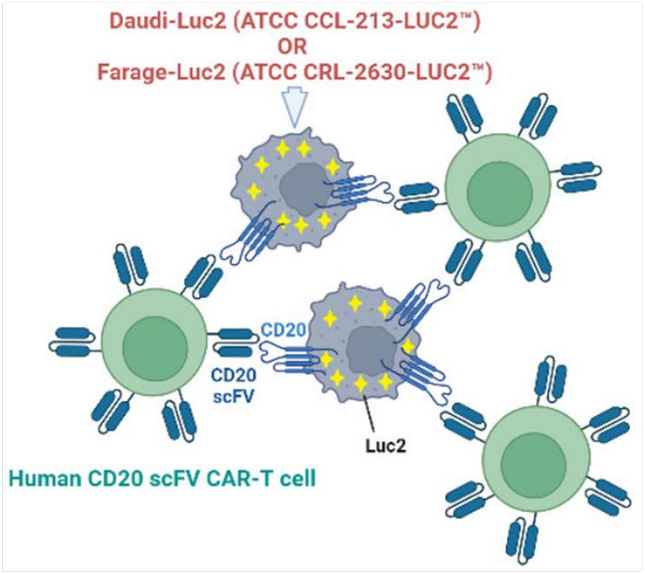
ATCC Immuno-oncology Tools

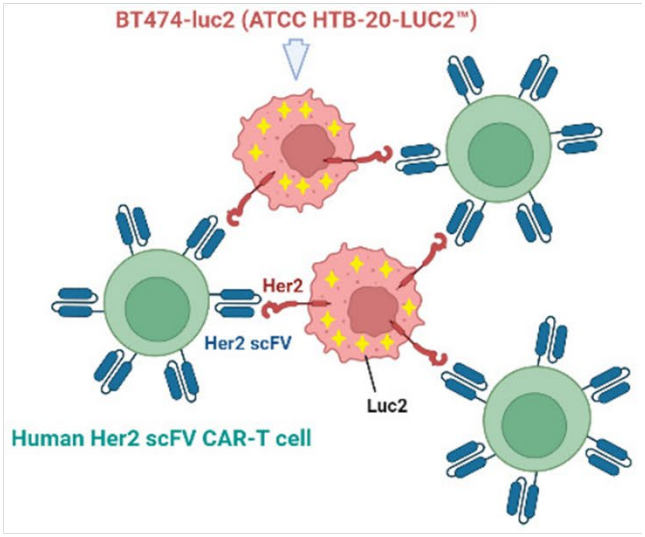


CAR-T Target Reporters

Chimeric Antigen Receptor T (CAR-T) Cells

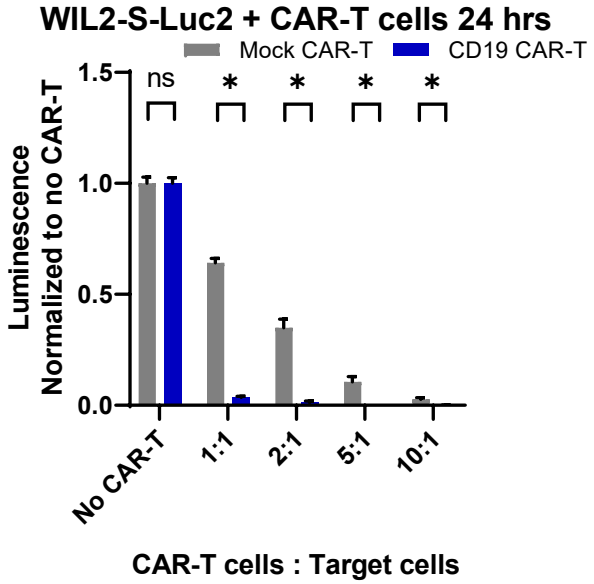


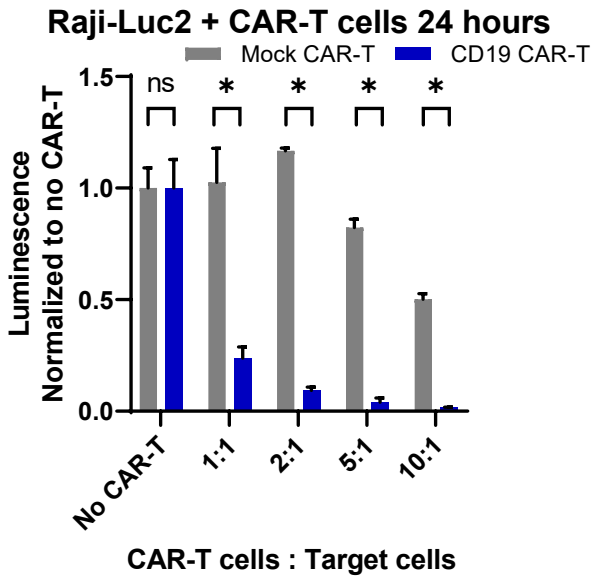


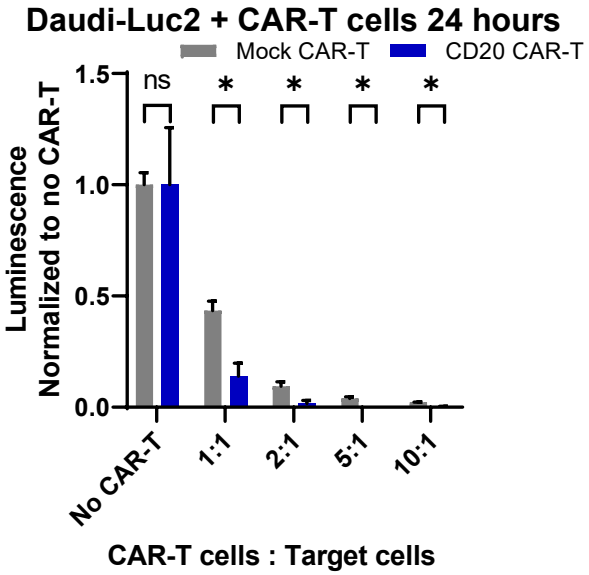


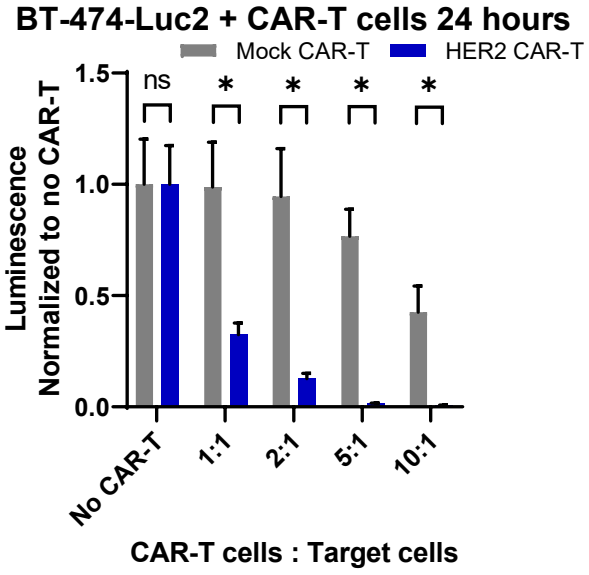
Luciferase Cell Line	ATCC® No.	Tissue/Disease	Target
WIL2-S-Luc2	CRL-8885-Luc2™	B Lymphoblastoid cell	CD19
Raji-Luc2	CCL-86-Luc2™	Burkitt's lymphoma	CD19
Daudi-Luc2	CCL-213-Luc2™	Burkitt's lymphoma	CD20
Farage-Luc2	CRL-2630-Luc2™	Lymphoma	CD20
BT-474-Luc2	HTB-20-Luc2™	Breast ductal carcinoma	HER2

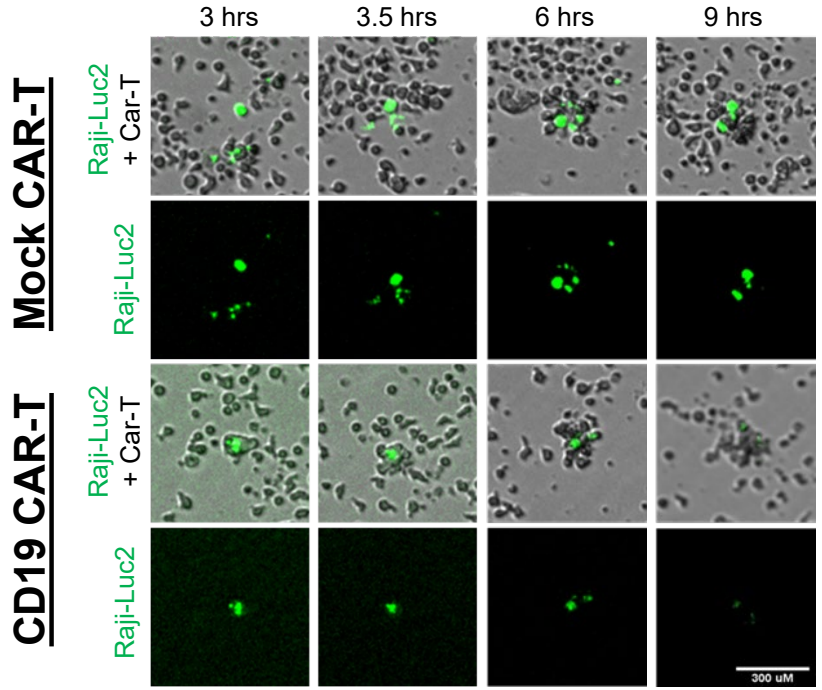
CAR-T Target Reporters

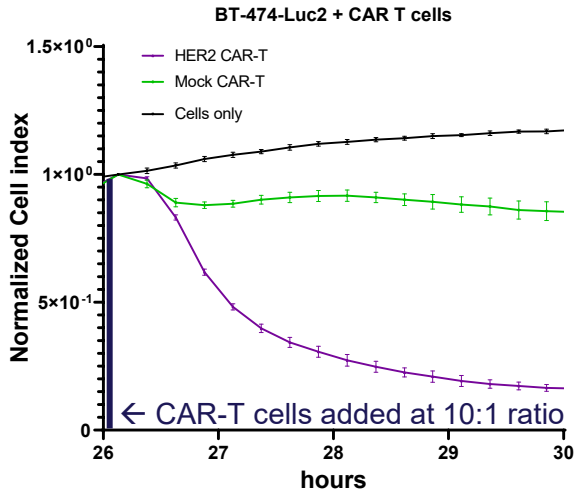






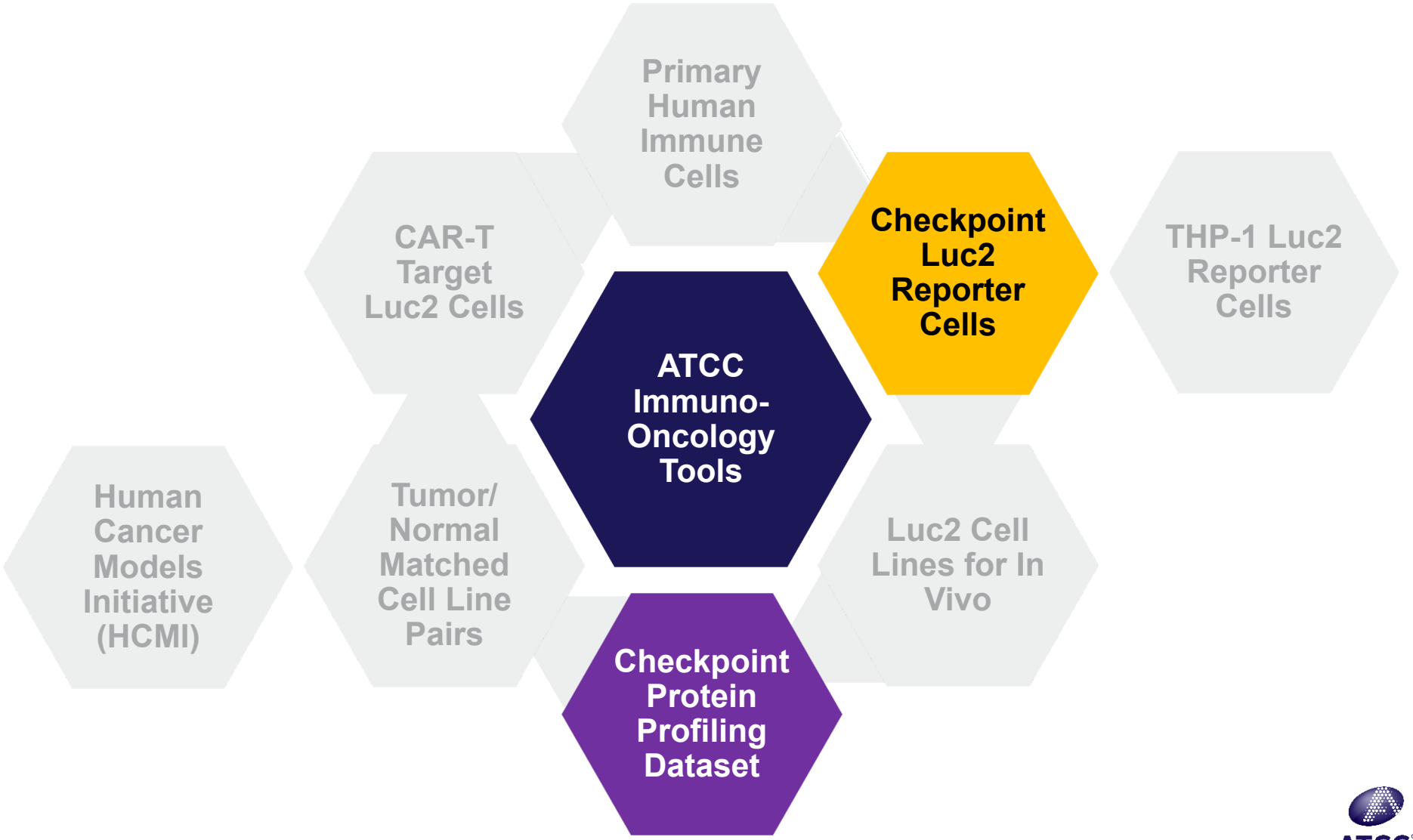






ATCC

ATCC Immuno-oncology Tools



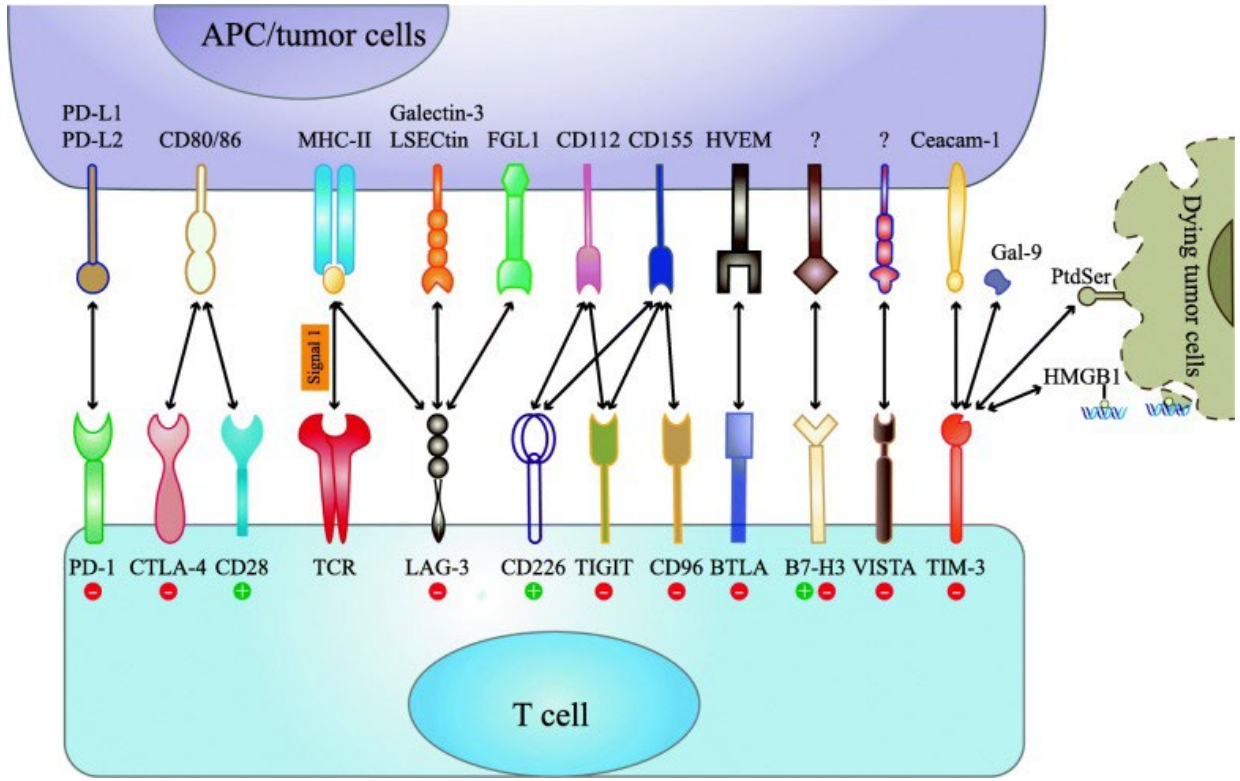
Checkpoint Molecule Profiling in Tumor and Immune Cells

- Investigated immune checkpoint inhibitor expression levels
  - Across 54 tumor cell lines
  - Across 11 primary and continuous immunological cells (data not shown)
  - By flow cytometry
  - +/- IFNγ
- From this screen we identified several cell lines:
  - High expression of ligands
  - High expression of co-stimulatory molecules
- High expressers:
  - HCC827
  - MG-63
  - NCI-H1650
  - SUP-T1 [VB] (not shown)
  - Loucy (not shown)

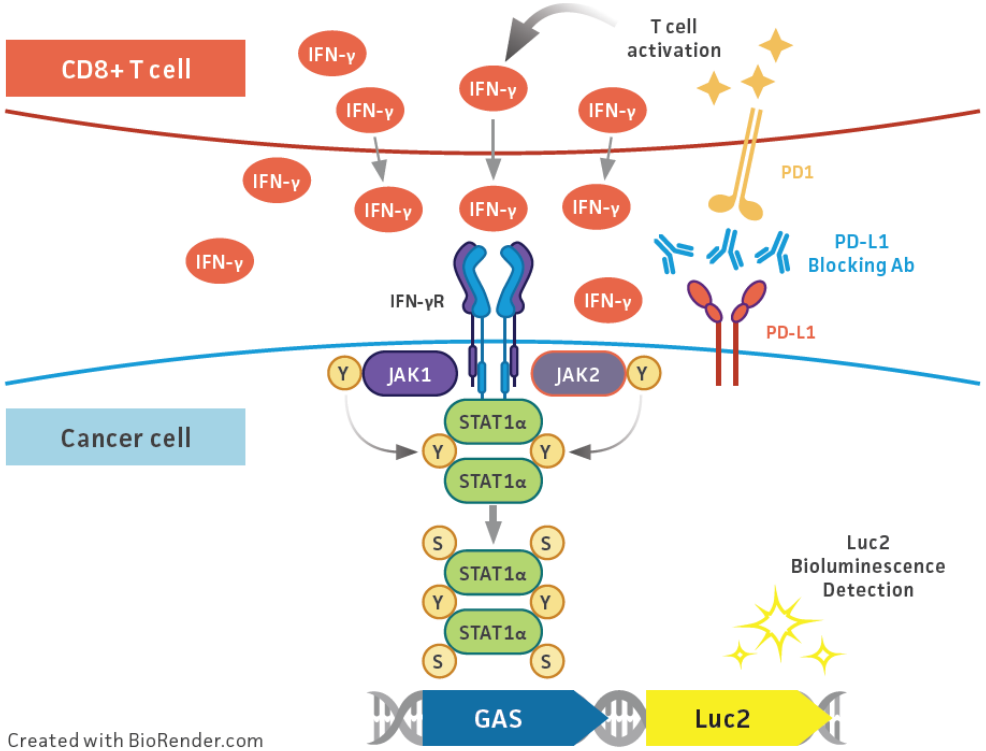
"-": without IFNγ
"+": with IFNγ

			HLA typing		Inhibitory checkpoint molecule ligands										Co-stimulatory checkpoint molecule ligands									
Cancer type	Cell lines	ATCC catalog #	HLA class I	HLA class II	PD-L1 -	PD-L1 +	PD-L2 -	PD-L2 +	B7-H3 -	B7-H3 +	B7-H4 -	B7-H4 +	HVEM -	HVEM +	4-1BBL -	4-1BBL +	ICOS-L -	ICOS-L +	CD155 -	CD155 +	CD80 -	CD80 +	CD86 -	CD86 +
Bladder cancer	5637	HTB-9	+	-	52096	143325	49	2594	60004	52945	0	0	1593	1783	3085	2831	1322	1464	68780	85293	2092	3069	1909	1993
	HT-1197	CRL-1473	+	-	40740	45360.5	1368	6891.5	21853	16451	0	0	1785	2838	0	1852	1682	1837	105114	127213	4220	6126	2120	2878
	HT-1376	CRL-1472	+	-	27135	51493	1692	8578	74667.5	66185	0	0	365	1790	0	0	3440	6322	36478	44828	4293	4179	1233	1707
	RT4	HTB-2	+	-	0	5054	52	518	143148	139442	0	42	717	1602	2395	2961.5	5676	7754	40953	48452	883	1097	1482	1954
	TCCSUP	HTB-5	-	+	30543	48394	4325	9664	131058	123270	930	822	526	1422	3016	3758	315	366	271088	282653	3912	3573	3917	3933
Brain cancer	SK-N-BE(2)	CRL-2271	+	-	245	6837	0	258	15903	17884	156	123	262	237	626	528	228	240	5236	6395	452	350	923	778
	U-87 MG	HTB-14	+		321	2990	249	246	73474	72722	338	263	4718	3312	2804	3010	339	454	30877	33809	2926	2597	2080	1968
	U-87 MG-Luc2	HTB-14-LUC2	+	-	15061	40367	0	0	29967	29009	1508	1374	487	706	1717	1370	141	219	36063	43417	1851	1491	984	753
Breast cancer	AU565	CRL-2351	+	-	2428	11013	0	0	9476	8169	3514	2925	307	831	1289	841	633	856	37017	35953	983	1027	433	454
	BT-20	HTB-19	+	-	6082	17072	886	4614	44830	44507	711	761	0	0	7297	8831	300	136	203815	235198	8916	9398	1172	1244
	DU4475	HTB-123	+	-	1912	3232	1082	3774	59238	54996	1941	1317	4014	4293	8298	6525	0	0	36382	32343	8865	6426	2523	1278
	HCC38	CRL-2314	+	-	13009	126059	3097	16705	220234	208819	2300	1565	6396	7267	1912	3050	1525	1855	132767	134741	5751	4437	2143	1906
	MCF7	HTB-22	+	-	53	1802	0	0	46613	42793	4324	2944	2197	1972	4821	4165	1583	2402	23280	22977	5720	4584	2867	2424
	MCF7-Luc2	HTB-22-LUC2	+	-	0	3116	0	2793	56518	53829	575	936	1331	1723	3902	5935	465	1037	20258	22678	1724	5297	1215	2149
	MDA-MB-231	HTB-26	+	-	11359	20492	986	1880	12979	11668	149	125	456	1031	531	777	14	37	38583	53188	563	428	346	234
	MDA-MB-468	HTB-132	+	-	221	5046	115	380	16180	16342	806	575	140	438	740	769	401	747	36560	43422	475	464	308	290
	T-47D	HTB-133	+	-	72	6355	0	0	32581	24851	828	594	597	703	3140	1990	859	683	39364	37651	3038	2166	1620	1325
Bone cancer	HOS	CRL-1543	-	+	13031	41473	2927	9075	60530	61277	289	305	211	552	1127	1210	0	0	99713	124829	841	815	443	400
	MG-63	CRL-1427	-	+	0	7362	0	0	84745	79181	443	819	368	730	4326	4901	0	0	303805	268365	2894	6552	1339	2968
	Saos-2	HTB-85	+	-	6082	32705	0	0	7455	7136	332	329	897	1244	2525	1975	0	0	58992	70813	1726	1733	1644	1525
	U-2 OS	HTB-96	+	-	5929	36019	290	5915	63080	64082	548	333	830	1152	2321	2660	784	778	112962	124648	2554	1174	3008	3045
Colon cancer	Caco-2 [Caco2]	HTB-37	+	-	0	471	0	0	32201	30175	1315	1209	1900	1817	4255	5817	1060	661	44423	39942	6756	4849	4146	3170
	HCT-15	CCL-225	-	+	474	3790	35	0	12896	12520	137	94	513	947	369	251	0	21	33045	34475	411	140	441	335
	LoVo	CCL-229	-	+	468	17697	0	0	20338	19572	347	346	975	2481	1581	1647	775	1080	24870	36144	903	1271	1044	1010
Head & Neck cancer	A-253	HTB-41	+	-	2070	16019	123	3176	43926	41341	18	0	45	477	1431	2558	3380	3887	67935	83057	3303	3051	731	985
	FaDu	HTB-43	+	-	2733	37007	205	13372	39475	31090	0	0	138	855	1640	0	3643	4161	60462	62858	2728	2720	1904	1951
	FaDu-Luc2	HTB-43-LUC2	+	-	6965	29601	0	0	24921	20048	269	333	421	448	1159	1591	484	557	35527	40460	1019	1334	2147	2183
Liver cancer	C3A [HepG2/C3A]	CRL-10741	+	-	0	2114	0	2698	18098	16938	441	453	1362	2682	1243	2171	394	511	54751	59271	1729	1914	1136	1100
	SK-HEP-1	HTB-52	+	-	2428	11013	0	0	9476	8169	3514	2925	307	831	1289	841	633	856	37017	35953	983	1027	433	454
Lung cancer	A549	CCL-185	+	-	1512	9611	0	2476	34719	33139	0	0	764	752	943	1345	2547	3209	87047	88786	719	1227	810	1078
	Calu-1	HTB-54	+	-	53834	114947	3528	10080	18438	19072	588	604	921	2119	2993	3444	0	0	94510	114947	3240	3268	1210	1254
	NCI-H1650 [H-1650, H1650]	CRL-5883	+	-	3491	15369	1050	5615	127539	134041	1738	1422	263	476	8605	9501	0	0	353964	391949	9642	7584	1455	916
	NCI-H226 [H226]	CRL-5826	-	+	49391	145367	10744	24379	73920	101793	640	767	0	672	2378	2758	3006	2629	136158	229665	2143	2477	1202	897
	NCI-H441 [H441]	HTB-174	+	-	13424	34487	359	1782	34363	32832	887	1044	383	829	2762	2540	246	260	59151	73580	2841	3133	3440	3250
	NCI-H460 [H460]	HTB-177	+	-	7193	19574	921	2778	55359	49738	885	1089	0	742	2375	3040	189	615	78046	86814	2342	3040	3792	3223
	HCC827	CRL-2868	+	-	9795	60468	3725	8477	41249	47178	1817	1721	879	0	3726	3399	162	0	58497	105562	5176	7123	2222	1917
	NCI-H1299	CRL-5803	+	-	278	3436.5	0	92	37817	36029.5	0	0	0	0	2768	3391	2961	4373	196936	184904	3765	3790	909	662
	NCI-H1975 [H-1975, H1975]	CRL-5908	+	-	2483	23446.5	490	4677	70850.5	62007	0	0	368	1729	227	208	535	1455	168919	175547	3665	4409	1160	1412
	NCI-H596 [H596]	HTB-178	+	-	18669	40780	1275	3245	84320	77592	0	0	0	275	0	0	3410.58	3890	255616	311989	5243	2880	1349	1078
Melanoma	A-375 [A375]	CRL-1619	+	-	1255	27782	0	433	52579.5	40340.5	0	0	566	1127	0	0	755	544	30126	37903	3133	2863	1237	1077
	A375-KRAS	CRL-1619IG-1	+	-	40740	45360.5	1368	6891.5	21853	16451	0	0	1785	2838	0	1852	1682	1837	105114	127213	4220	6126	2120	2878
	A375-KRAS-Luc2	CRL-1619IG-1-LUC2	+	-	109294	117180	0	966	12826	13191	735	816	0	60	3526	3450	0	0	128469	160467	4777	5130	1723	1784
	RPMI-7951	HTB-66	+	-	10228.5	26724	2662	8763	65180	80081	0	0	523	1646	0	0	1930	1297	66083	91229	883	1097	1482	1954
	SH-4	CRL-7724	+	-	1291	12124	0	0	54015.5	44758.5	0	68	2556	3350	108	2006	1142	760	66235	65168	3429	4481	932	1507
	SK-MEL-24	HTB-71	-	+	400	17538	1000.5	750	26932	17136.5	27	60	236	1187	2903	3177	6613	5316	45197	75332	888	826	2945	2605
Ovarian cancer	ES-2	CRL-1978	+	-	57764	89033	718	5906	11970	11255	405	390	1161	1368	2730	1971	188	0	92087	122142	1453	1620	3210	3510
Pancreas cancer	AsPC-1	CRL-1682	-	+	0	6325	155	2800	28044	26743	297	397	1147	2666	1415	1444	310	546	32180	49052	825	1290	3033	3095
	PANC-1	CRL-1469	+	-	1049	0	0	0	20419	21694	421	473	1276	976	2031	2093	331	196	33618	34518	2265	2625	2005	1878
	PANC 10.05	CRL-2547	+	-	27818	43052	1359	4174	15027	17384	0	0	996	1402	1802	3716	847	857	40464	48360	2628	4485	1485	2323
Prostate cancer	PC-3	CRL-1435	-	+	18303	47222	346	2725	31886	29497	641	230	203	1704	5474	2108	0	0	91370	122713	2503	0	555	0
	PC-3-Luc2	CRL-1435-LUC2	+	-	20083	30374	0	0	18686	19516	411	497	823	1387	2871	2989	217	0	57153	83352	1924	2850	3223	3412
Skin cancer	A-431	CRL-1555	+	-	13020	37809	1660	6635	64875	61082	996	1792	2656	5120	2623	4203	1369	1757	130495	152286	2297	2824	1078	893
	A-431-Luc2	CRL-1555-LUC2	+	-	2868	41277	688	3235	14291	12967	458	463	446	1021	845	942	0	10	39458	41452	618	709	528	573
Uterine cancer	HEC-1-A	HTB-112	+	-	0	0	0	0	23302	21501	337	373	418	449	1401	1471	199	136	46400	41305	2300	1860	628	722

Checkpoint Luciferase Reporter Cells

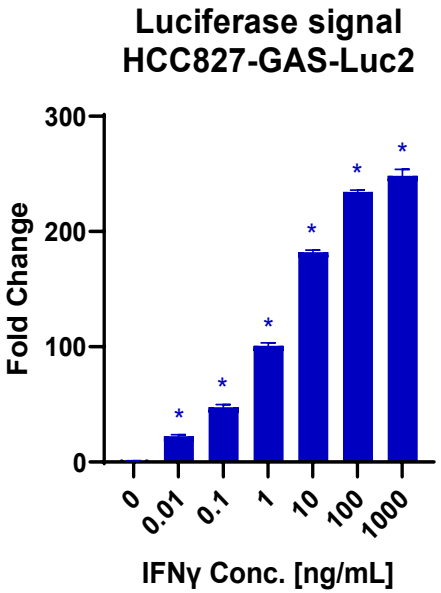


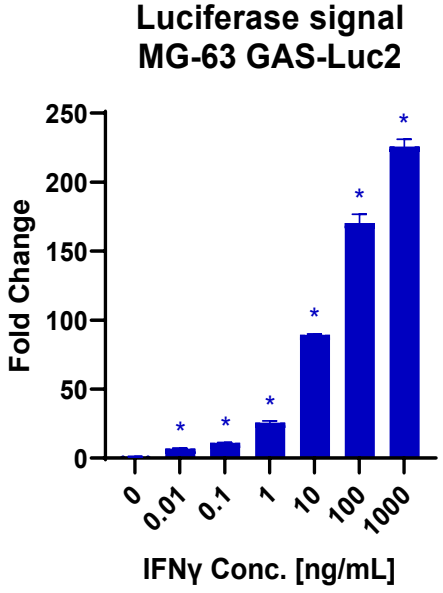
Qin S, Xu L, Yi M, Yu S, Wu K, Luo S. Novel immune checkpoint targets: moving beyond PD-1 and CTLA-4. Mol Cancer. 2019 Nov 6;18(1):155. doi: 10.1186/s12943-019-1091-2. PMID: 31690319

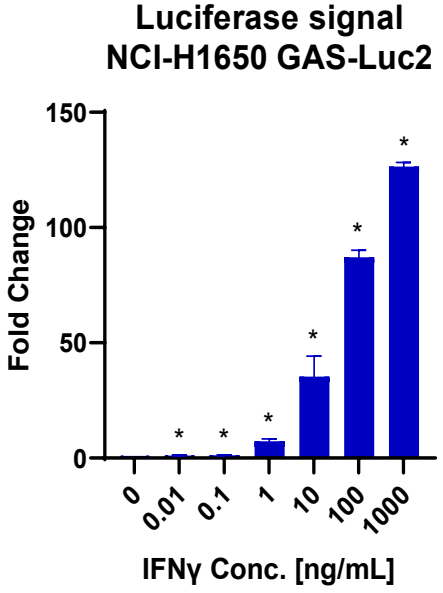


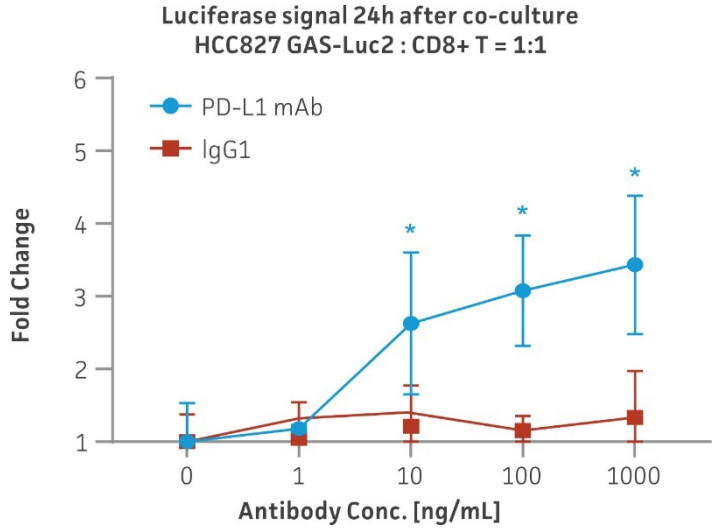
Designation	ATCC® No.	Biomarker	Status
HCC827-GAS-Luc2	CRL-2868-GAS-LUC2™	PD-L1	Available
MG-63-GAS-Luc2	CRL-1427-GAS-LUC2™	CD-155	Available
NCI-H1650-GAS-Luc2	CRL-5883-GAS-LUC2™	B7-H3	Available
SUP-T1 [VB]-NFAT-Luc2	CRL-1942-NFAT-LUC2™	PD-1	Coming soon
Loucy-NFAT-Luc2	CRL-2629-NFAT-LUC2™	CD96/TACTILE	Coming Soon

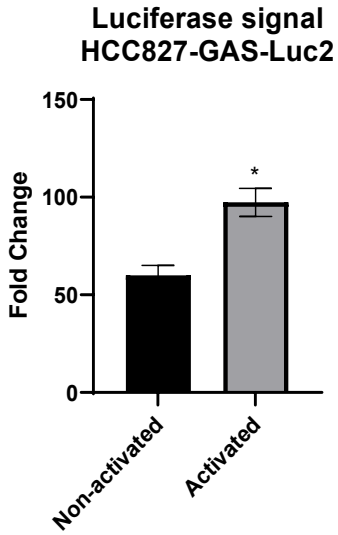
Checkpoint Luciferase Reporter Cells

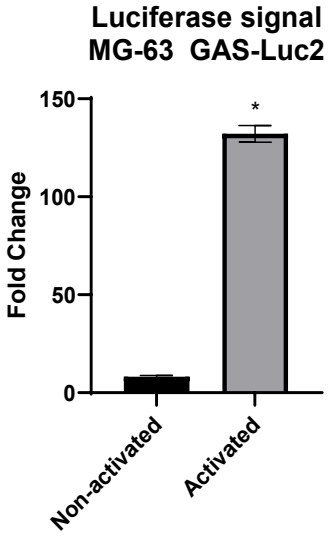


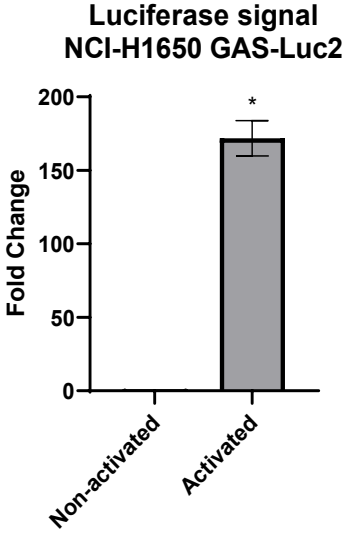


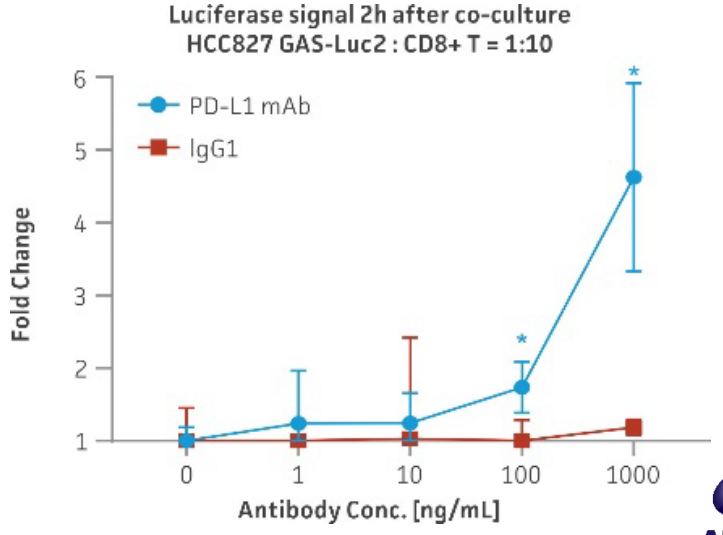




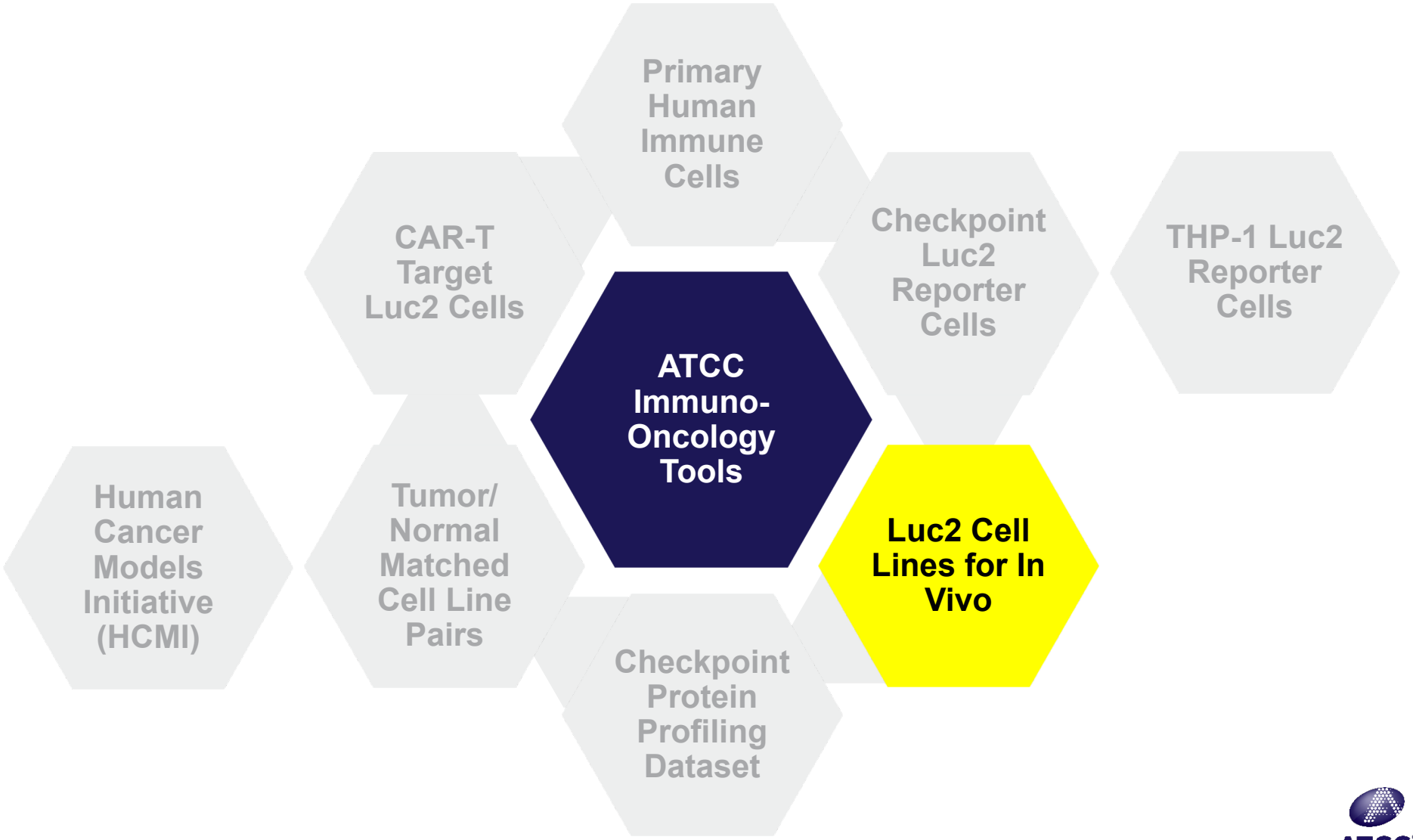








ATCC Immuno-oncology Tools

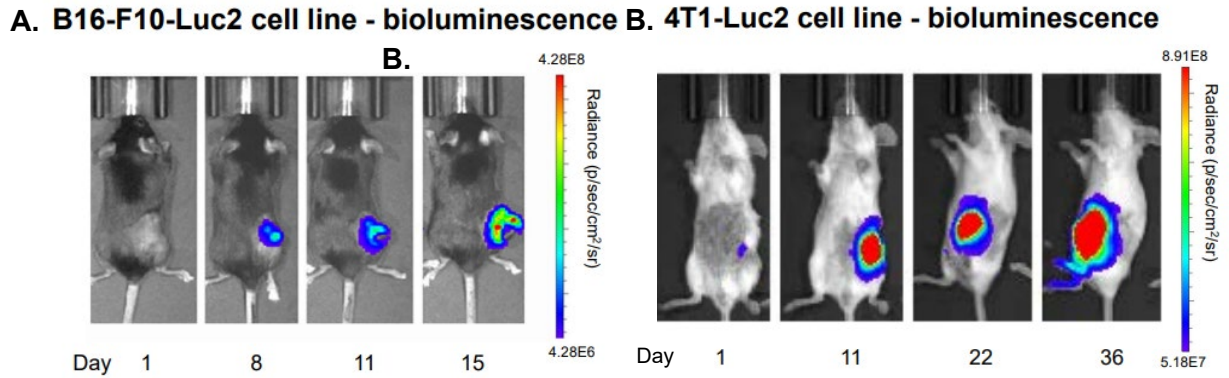


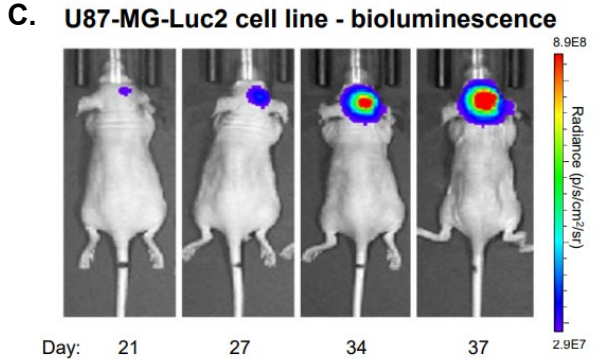
ATCC Luciferase Labeled Cell Lines

- We offer a growing portfolio of commonly used tumorigenic human or mouse tumor cell lines with fluorescent or luciferase labels
- Developed by single cell cloning
- Extensively validated for
  - Cell growth
  - Stable and robust expression of reporter
- Reporter cell lines provide new versatile tools for in vitro luminescent assays and in vivo live animal bioluminescent imaging (IVIS)

Parental cell line	ATCC® No.	Species	Tissue/disease	Photons/ cell/sec*	*In vivo* model
B16-F1	CRL-6323™	Mouse	Melanoma	336,669	Syngeneic
B16-F10	CRL-6475™	Mouse	Melanoma	207,727	Syngeneic
4T1	CRL-2539™	Mouse	Breast cancer	2,564,375	Syngeneic
EL4	TIB-39™	Mouse	Lymphoma	277,331	Syngeneic
LL/2 (LLC1)	CRL-1642™	Mouse	Lung cancer	29,104	Syngeneic
A549	CCL-185™	Human	Lung cancer	22,325,000	Xenograft
EML4-ALK A549	CCL-185IG™	Human	Lung cancer	19,356,250	Xenograft
A375	CRL-1619™	Human	Melanoma	491,308	Xenograft
KRAS G13D A375	CRL-1619IG-1™	Human	Melanoma	347,619	Xenograft
NRAS Q61K A375	CRL-1619IG-2™	Human	Melanoma	1,192,822	Xenograft
A-431	CRL-1555™	Human	Epidermoid carcinoma	603,085	Xenograft
TF-1	CRL-2003™	Human	Leukemia	112,759	Xenograft
IDH2 mutant TF-1	CRL-2003IG™	Human	Leukemia	64,768	Xenograft
HL-60	CCL-240™	Human	Leukemia	123,330	Xenograft
U-87 MG	HTB-14™	Human	Glioblastoma	8,601,250	Xenograft
IDH1 mutant U-87MG	HTB-14IG™	Human	Glioblastoma	8,165,625	Xenograft
HT-1080	CCL-121™	Human	Fibrosarcoma	2,125,000	Xenograft
HCT 116	CCL-247™	Human	Colon cancer	2,770,000	Xenograft
PANC-1	CRL-1469™	Human	Pancreatic cancer	2,175,533	Xenograft
PC-3	CRL-1435™	Human	Prostate cancer	397,640	Xenograft
LNCaP clone FGC	CRL-1740™	Human	Prostate cancer	1,187,513	Xenograft

* The *in vitro* bioluminescence (photons/cell/sec) was quantified by Xenogen IVIS Spectrum (subject to imaging and cell culture condition).



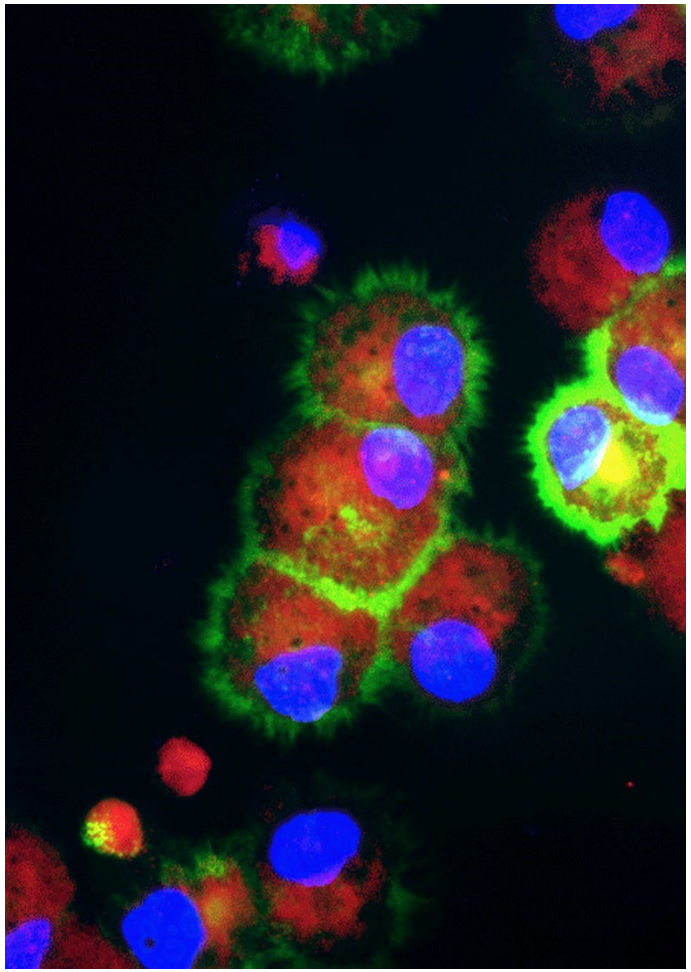


A. B16-F10-Luc2 cells (CRL-6475-LUC2™) (1x106) were subjected to subcutaneous injection into the dorsal region near the thigh of C57BL/6J mice. **B.** 4T1-Luc2 cells (CRL-2539-LUC2™) were injected into the mammary fat pad of BALB/cfC3H mice. **C.** U-87 MG-Luc2 (HTB-14-LUC2™) cells (4x105) were subjected to intracranial injection into the brain of nude mice Tumor growth was monitored using a Xenogen IVIS® Spectrum. In vivo bioluminescence imaging demonstrated the establishment of the model and the progression of tumors.

Summary of IO portfolio

- Direction of IO Portfolio
- Primary and iPSC-derived Primary Cells
- THP-1 Luciferase Reporter Cells
- CAR-T Target Reporter Cells
- Checkpoint Inhibitor Cell Lines
- In vivo luciferase models

www.atcc.org/immuno-oncology



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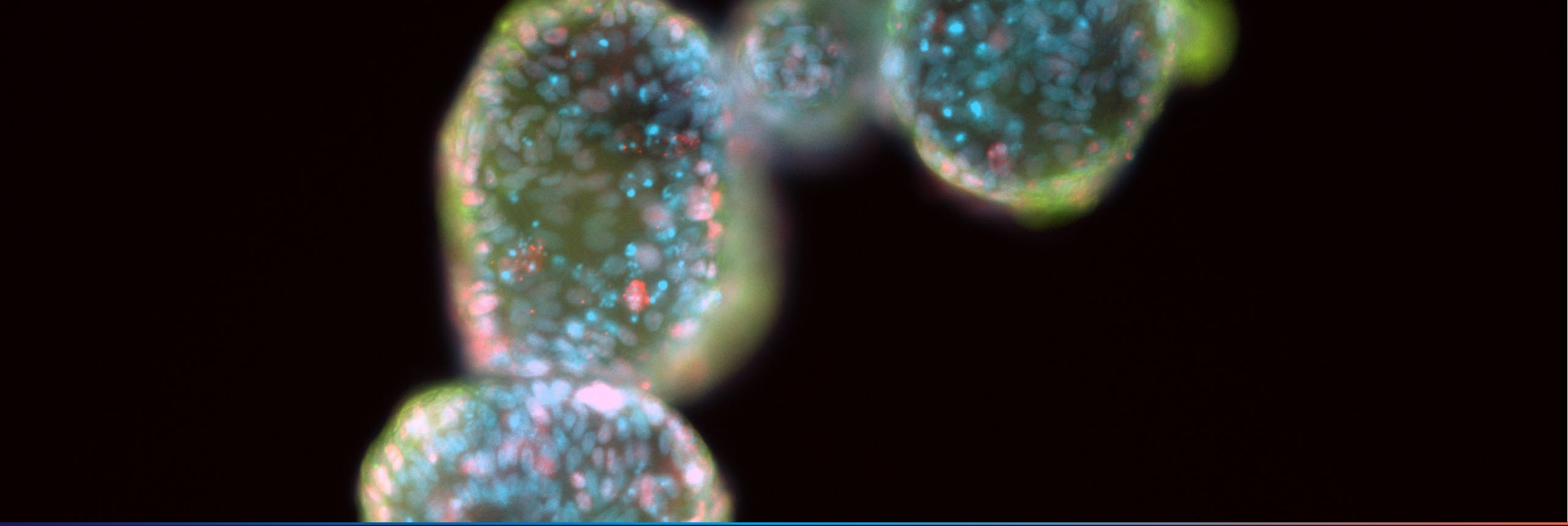


Human Cancer Models Initiative (HCMI)

ATCC

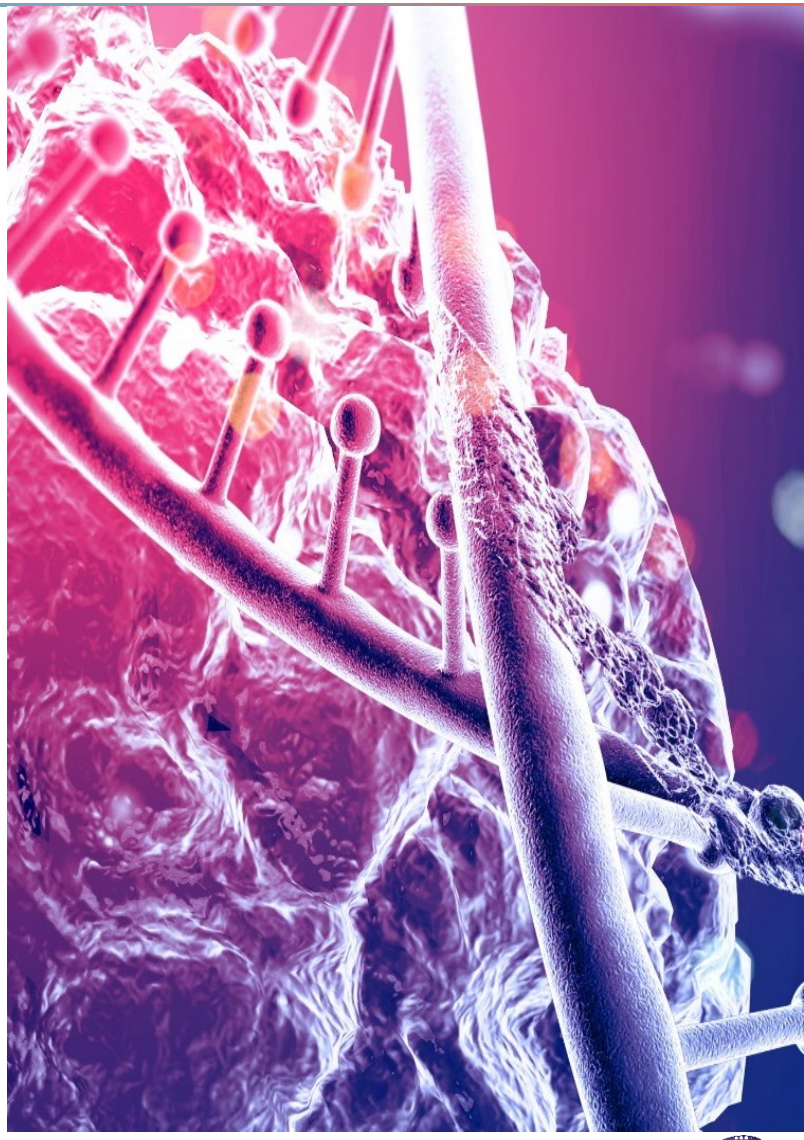
Patient-derived models from the HCMI

James Clinton, PhD
Lead Scientist, ATCC

James Clinton is a Lead Scientist and group leader in ATCC's department for Cell Biology R&D and Microphsyiological Systems. His team focuses on primary cells and advanced, physiologically relevant culture systems using novel technologies. His Advanced Cell Models team works on the development and commercialization of in vitro models utilizing primary and induced pluripotent stem cells, as well as exploring emerging culture techniques such as 3-D organoids and co-culture approaches.

The Human Cancer Models Initiative (HCMI)

- The HCMI is an international consortium tasked with generating 1,000 new patient-derived, next-generation cancer models (NGCMs).
- NGCMs are well-characterized and associated with a variety of clinical and molecular data.
- NGCMs are derived from patients with diverse backgrounds, disease stages, genetic backgrounds, ages, sex, treatment histories, clinical tumor diagnoses and clinical tumor stage.
- NGCMs utilize advanced culture methods that permit a diverse array of tumor tissues to be derived, propagated, cryopreserved and recovered.



HCMI founders and members

NIH NATIONAL CANCER INSTITUTE

CANCER RESEARCH UK

CSH Cold Spring Harbor Laboratory

wellcome sanger institute

HUB ORGANOIDS

BROAD INSTITUTE

Hubrecht Institute
Developmental Biology and Stem Cell Research

Cornell University

UNIVERSITÀ di VERONA

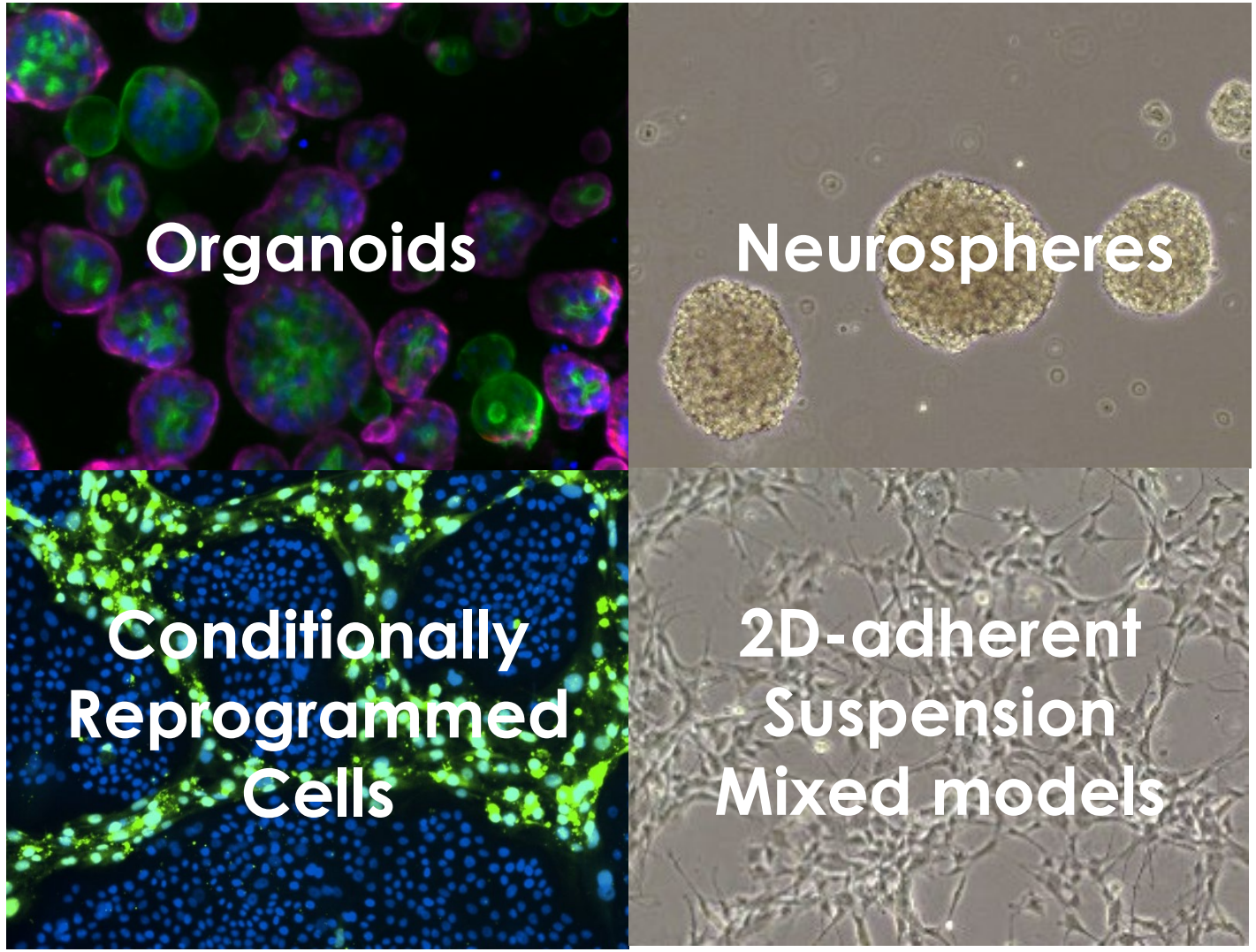
Stanford University

HCMI Supporting centers

- Nationwide Children's Hospital
- University of North Carolina
- Information Management Systems
- Frederick National Laboratory for Cancer Research, Leidos Biomedical Research, Inc.

ATCC

Next-generation cancer models



Derivation

- All from primary patient tissues

Molecular characterization

- 15X whole genome sequencing
- 150X whole exome sequencing
- 120 million read RNA-sequencing
- Infinium MethylationEPIC DNA Array

Clinical data

- Standardized case report forms
- Patient demographics
- Disease diagnosis, treatment and outcome information

ATCC: Supporting the HCMI since 2016

Authentication and quality control testing

Manufacturing and cell bank generation

HCMI model information resource

Distribution of models through the ATCC catalog

ATCC®

Authentication and quality control testing

Standard testing performed on all HCMI models

- STR (short-tandem repeat) analysis
- CO1 (Cytochrome Oxidase C1) testing
- Mycoplasma contamination detection
- Sterility testing (BACT/ALERT® 3D)
- Human virus panel (HIV, HepB, HPV, EBV, and CMV)

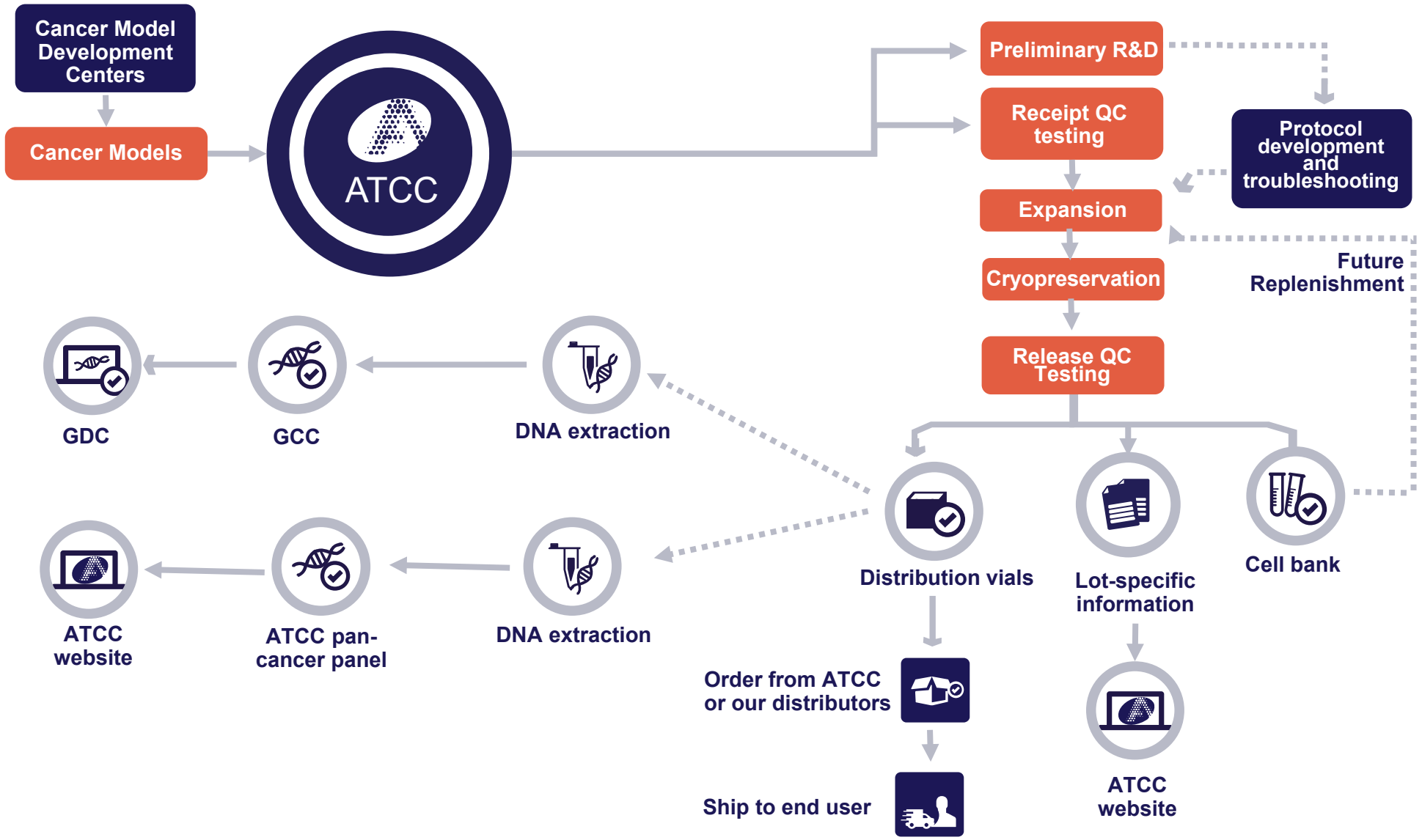
ISO 9001:2015 Certification for quality management system

- Demonstrates commitment to quality products, customer service, and continued improvement

ISO/IEC 17025:2017 Accreditation for testing

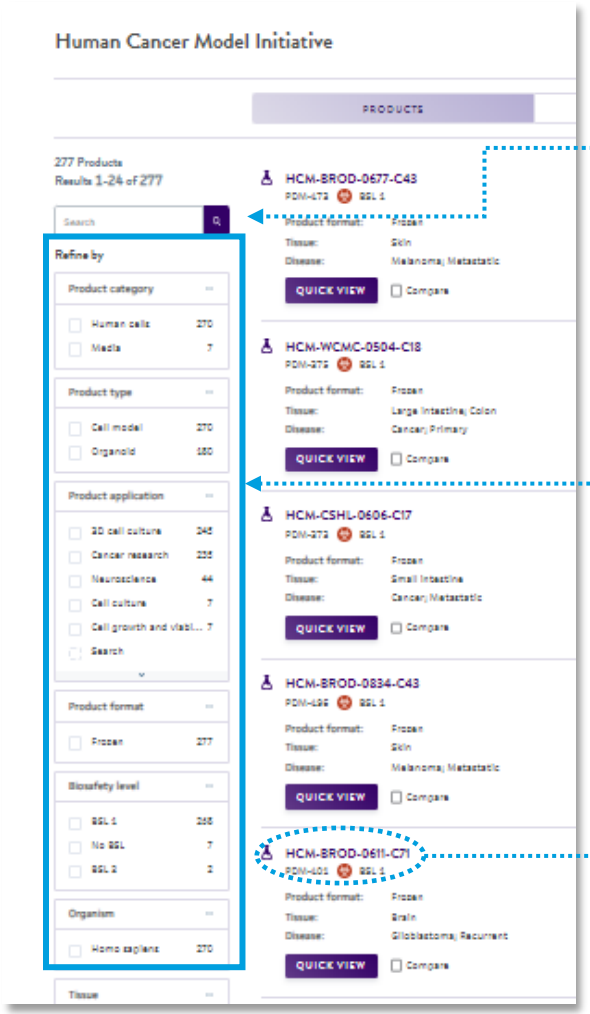
- Applies to all ATCC cultures, derivatives, and bioproducts tested in our laboratories

Manufacturing and cell bank generation



HCMI model information resource

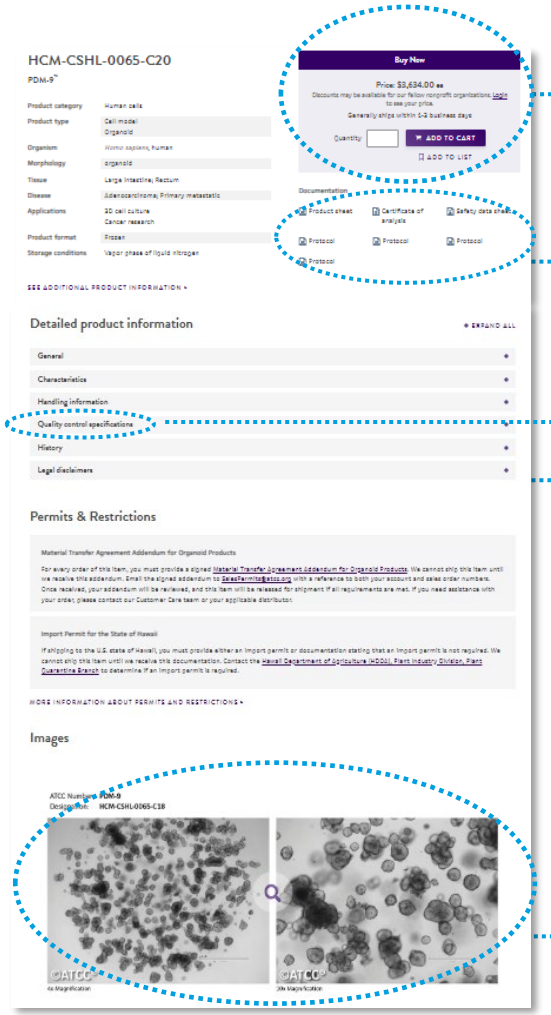
HCMI Landing page atcc.org/hcmi



Search

Filtering options

HCMI model-specific product page



Purchase model

Model resources and protocols, lot-specific information

QC testing specifications

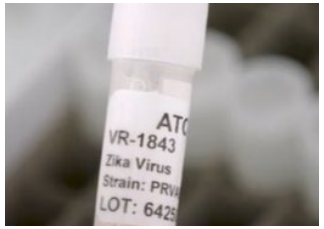
HCMI Searchable Catalog

GDC

Model images and other information

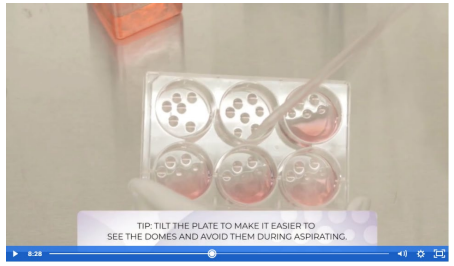
HCMI model information resource

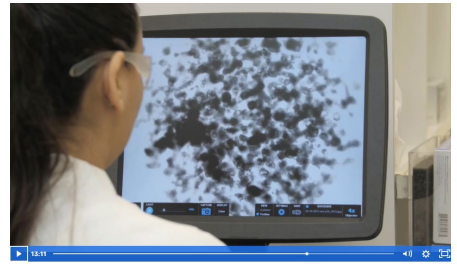
Validated companion reagents



- Seven HCMI model formulation-specific reagent kits
- Extracellular matrix
- Growth factor secreting cell lines

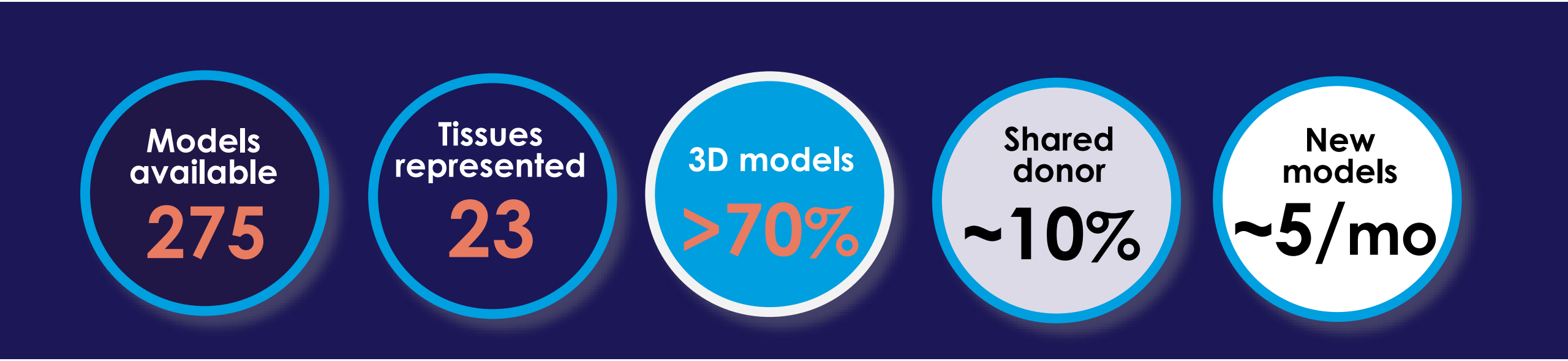
Video protocols, other educational resources





Also, application notes, webinars, poster presentations, and troubleshooting tips.

HCMI models in the ATCC catalog



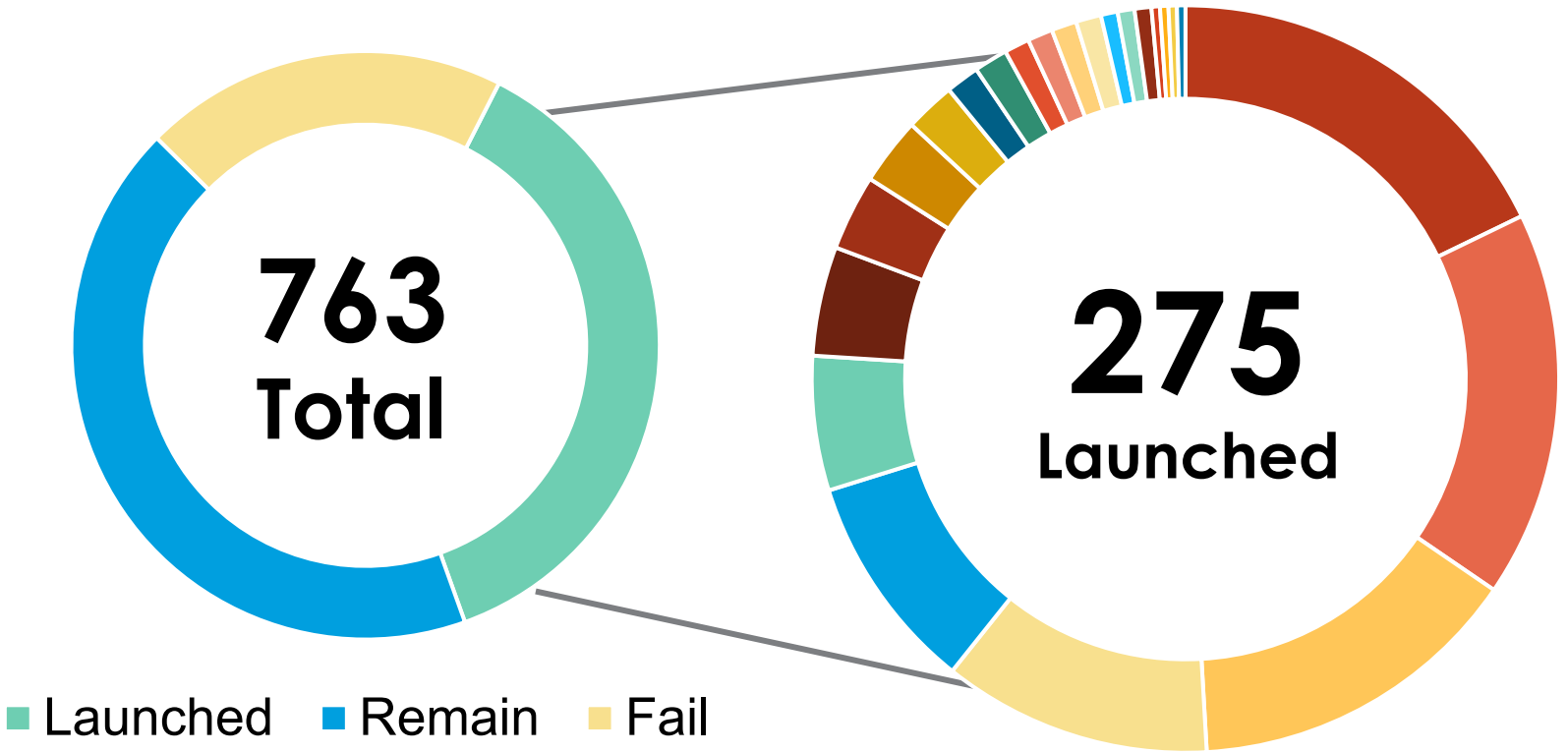
Recent releases

First head and neck cancer model
First desmoid tumor cell line

In the production pipeline

Additional lung, breast, endometrial, ovarian, kidney and first bladder models

HCMI portfolio model diversity



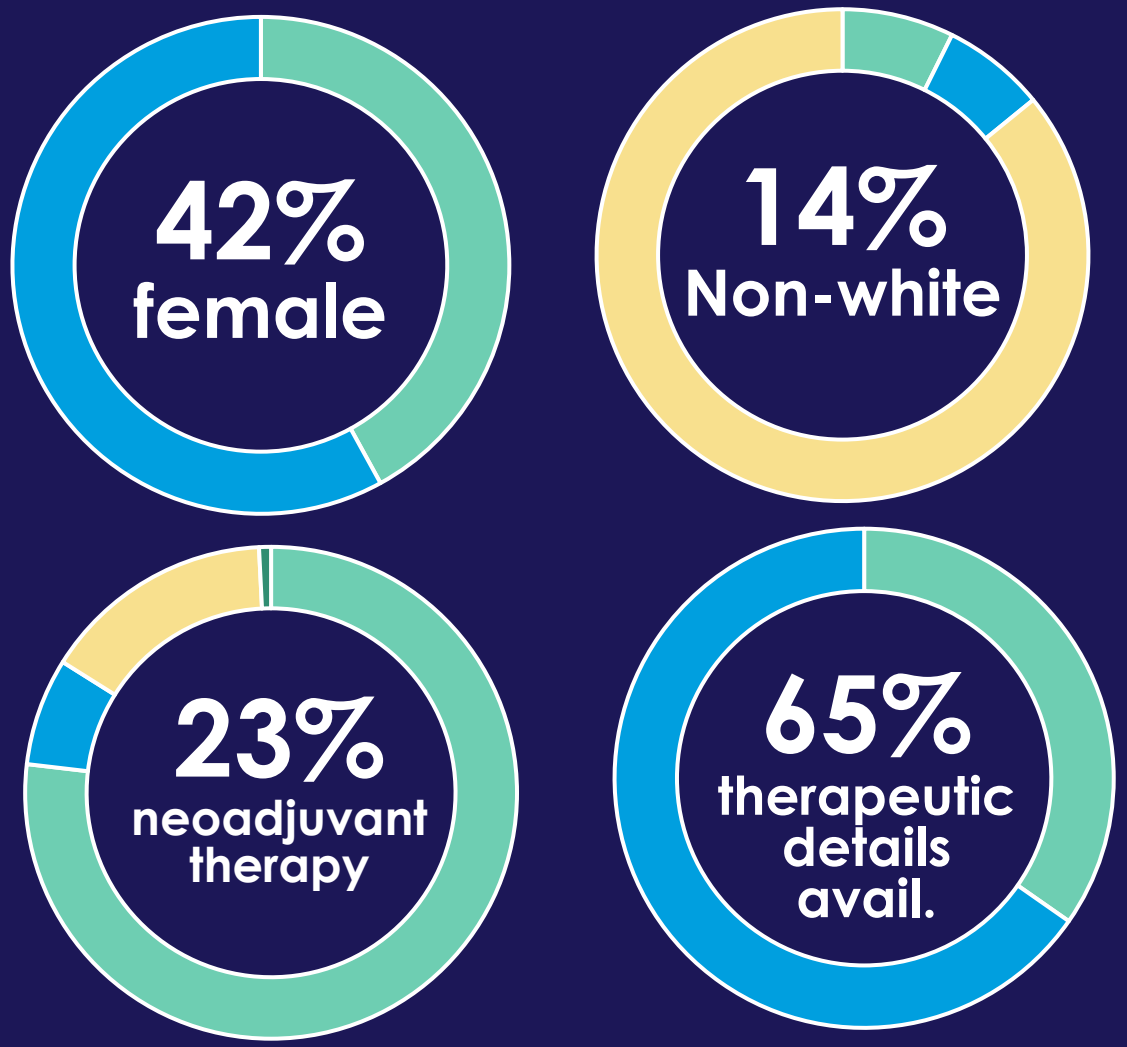
TOP 10 (80% of total)

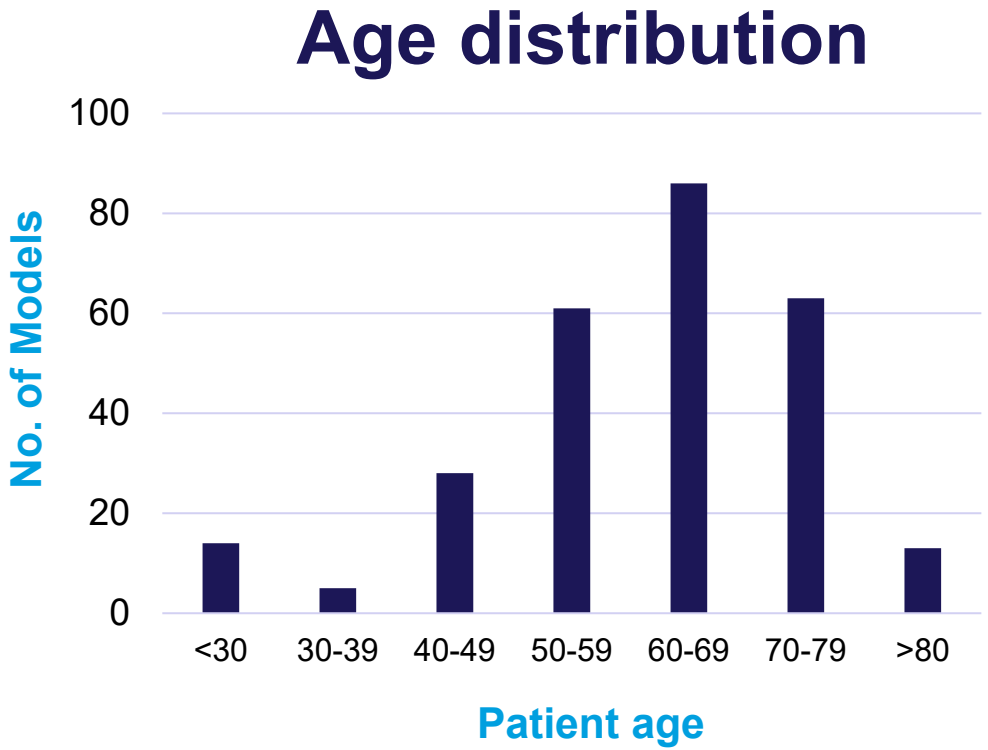
Brain	49
Pancreas	46
Colon	40
Esophagus	32
Skin	26
Rectum	16
Stomach	13
Connective tissue	9
Biliary tract	8
Lung	6

Collection includes models derived from rare adult and pediatric cancers such as rhabdomyosarcoma, leiomyosarcoma, Ewing sarcoma and Wilms tumor.

Complete list available at
atcc.org/hcmi

HCMI portfolio clinical and demographic characteristics

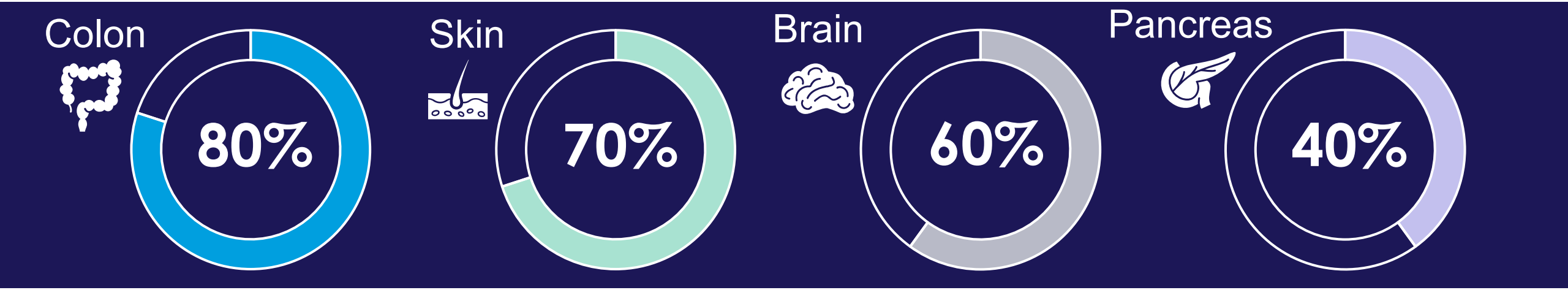




Increasing patient diversity of models is a goal for on-going model releases.

HCMI data aligns with patient genotypes

Top 10 frequently mutated genes vs. The Cancer Genome Atlas



Top 10 genes affected in the HCMI affected cases

APC	LRP1B
TP53	ZFHX4
KRAS	CSMD3
MUC16	ROBO2
FAT4	ALK

MUC16	GRIN2A
LRP1B	MECOM
CSMD3	FAT4
FAT3	DCC
FAM135B	COL1A1

PTEN	PIK3CA
TP53	CSMD3
EGFR	BCOR
CNTNAP2	NF1
PIK3CR1	FAT1

KRAS	MUC4
TP53	MUC16
SMAD4	KMT2D
CDKN2A	FAT3
ACVR2A	RHOH

Also, TP53, BRAF, NRAS, NF1

Canonical mutation | Matching mutation

Data as of 3/26/23

ATCC

Help us prioritize future HCMI model releases

Hundreds of models have not yet entered the ATCC HCMI manufacturing pipeline.

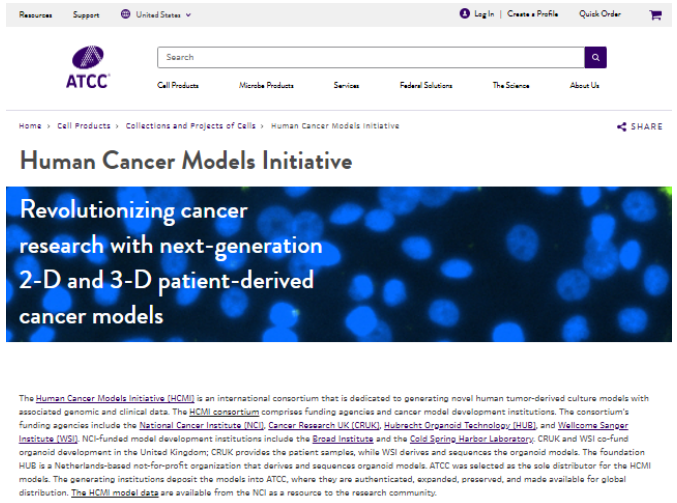
Browse and search unreleased HCMI models at ATCC

- Use the “Submit your Input” button on the HCMI Landing page
  - Direct link: www.atcc.org/hcmi-input
- Look for “Expansion Status” on the HCMI Searchable Catalog

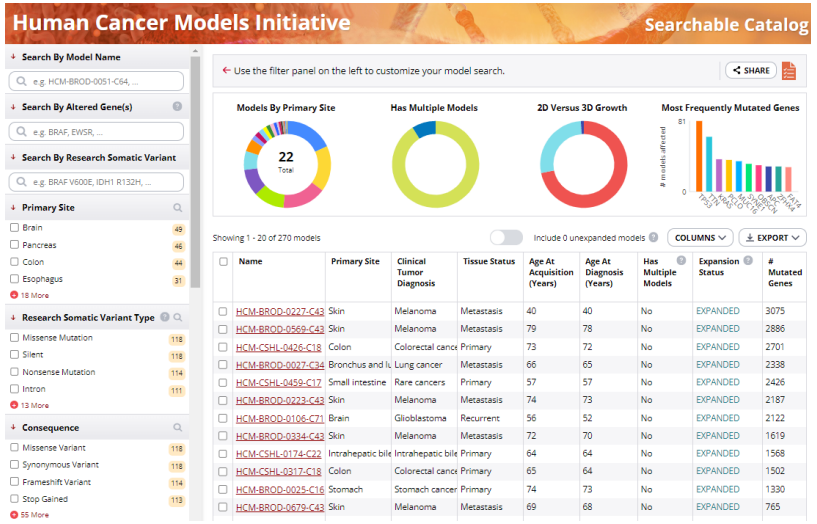
Email us which HCMI models are most relevant for your research

- Contact us at: hcmi@atcc.org

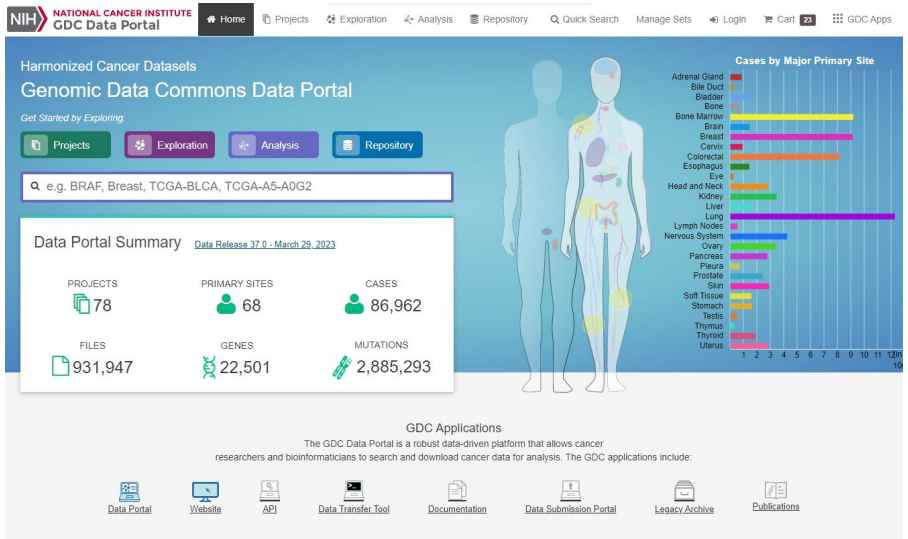
Resources to learn more about ATCC and the HCMI



HCMI Landing page
atcc.org/hcmi



HCMI Searchable Catalog
https://hcmi-searchable catalog.nci.nih.gov



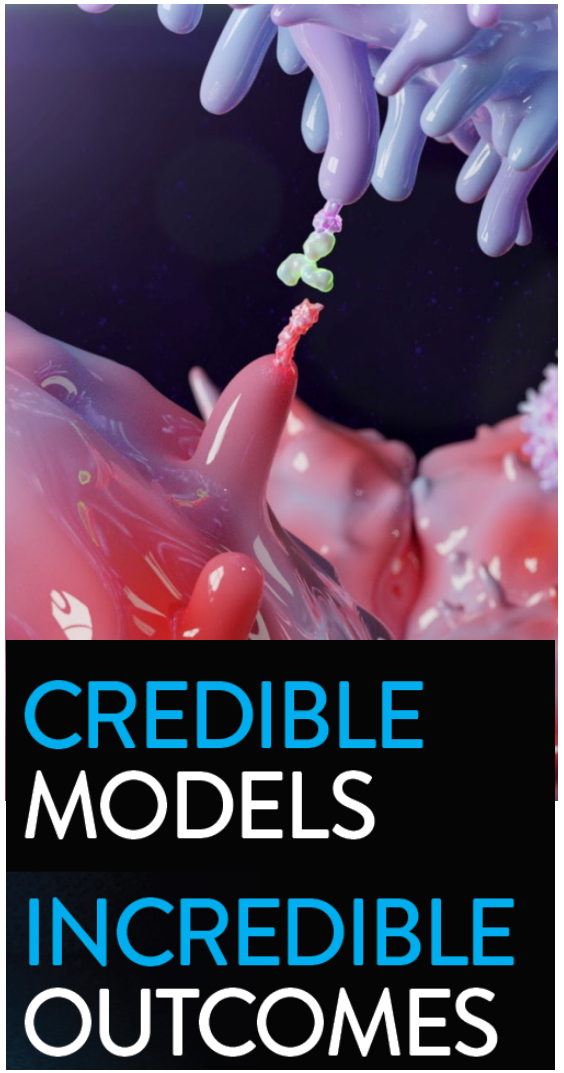
NCI Genomic Data Commons
https://portal.gdc.cancer.gov/projects/HCMI-CMDC

SESSION NIH03 - Human Cancer Models Initiative: A Resource of Next-generation Cancer Models and Data

Today at 2:30-3:30 PM in Room W314A

Summary and Resources

- ***ATCC is the comprehensive solution provider.***
- ATCC has a vast collection of **authenticated and characterized** bio-materials intrinsic to oncology research and drug discovery.
- We fully characterizes our **cell models** at the genome, proteome, and functional levels.
- We have an established R&D program focused on the development of the next generation of advanced cell models to streamline **oncology/immuno-oncology discovery** and drug screening platforms.
- We offer **exhaustive technical and application data** along with companion products with our cell models to support your experimental workflows.



https://www.atcc.org/coming-soon-products

ATCC®

New Products:

CAR-T Target Reporter-Labeled Tumor Cells

- Access CAR-T potency and efficacy
- High endogenous expression of CAR-T target antigens
- Available for CD19, CD20, and HER2

Checkpoint Luciferase Reporter Cells

- Enables screening of checkpoint inhibitor molecules
- Wide range of targets such as PD-L1/2, CD-155, B7-H3, and PD-1
- Luciferase will be expressed under the control of GAS or NFAT

Human Cancer Models Initiative (HCMI)

- 2-D and 3-D patient-derived models available
- Diverse genetic backgrounds of the same cancer types
- Culturing protocols and organoid growth kits