Syngene

Putting Science to Work

Integrated Oncology Solutions

In Vivo models | Translational assays | Advanced bio-imaging

Accelerate oncology innovation with Syngene

Syngene offers a fully integrated platform for oncology drug development, combining cutting-edge preclinical models with advanced analytical capabilities to enable smarter and faster decision-making.

Our comprehensive portfolio includes CDX models for targeted therapy validation, syngeneic immuno-oncology models for immune response insights, humanized mice for translational immunotherapy studies, patient-derived xenografts (PDX) for clinical relevance, and 3D organoids for complex tumor modeling.

These complementary models enable end-to-end evaluation of efficacy, mechanism of action, and translational relevance, supporting confident progression of oncology programs from early discovery through IND-enabling stages.

700+ preclinical studies delivered to date

90+ fully validated oncology models

20+ cancer indications covered

80+ oncology studies conducted annually

Integrated *in vivo* oncology: From insight to impact

Our holistic approach accelerates decision-making and enhances clinical translatability, enabling rapid and efficient preclinical screening of novel cancer therapeutics. By assessing anticancer activity with validated models, we ensure a smooth transition from discovery to clinical development.

- Reduce attrition by validating mechanisms early in clinically relevant models
- Enhance decision-making with integrated efficacy and biomarker data
- Accelerate IND-enabling studies with streamlined workflows
- De-risk global development programs through regional insights

These outcomes are enabled by a tightly integrated in vivo strategy that connects efficacy, biomarkers, and translational science ensuring seamless progression from bench research to bedside impact.

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Seamless bench-to-bedside translation

Integrated translational assays
Leverage high-dimensional flow cytometry for immune profiling—$CD4^+$, $CD8^+$ T cells, Tregs, Teff, Tcm, NK cells, activated NKs, dendritic cells, and macrophages—paired with PK/PD readouts to align efficacy with mechanism of action.

Multi-model integration
Followed up with 3D organoids, validate in matched PDX, and cross-confirm in CDX, syngeneic, or humanized immune models to generate clinically relevant insights for higher translatability.

Advanced *in vivo* bioimaging
Track biodistribution, tumor progression, and metastasis in real time using bioluminescence, fluorescence (2D/3D optical tomography), and micro-CT imaging

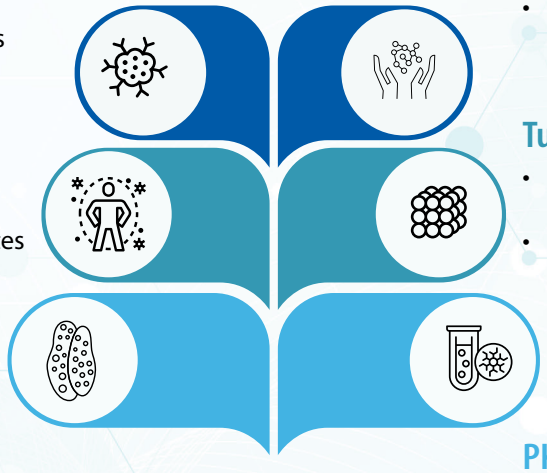
Data you can trust
Achieve reproducibility and reduce variability with consistent engraftment and well-characterized *in vivo* kinetics across model platforms.

Syngene's *in vivo* oncology services

Tumor re-challenge experiments
- Survival and median survival days determination
- Durable antitumor responses

Immune profiling
- Proliferation markers
- Phosphorylation markers
- Tumor infiltrating lymphocytes (TILs)
- Immune activation markers
- T cell exhaustion markers

Tumor efficacy
- Tumor volume measurements
- % tumor growth inhibition



MTD determination
- Body weight changes
- Clinical signs and tolerability

Tumor growth kinetics
- Optimal cell density determination for tumor model
- CDX, PDX, and syngeneic growth kinetics

PK/PD and biodistribution studies
- Plasma & Tumor PK
- PD markers by Western blot, qPCR, ELISA, and IHC
- *In Vivo* bio-distribution through IVIS imaging

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Syngene's validated oncology models overview

SubQ Xenograft

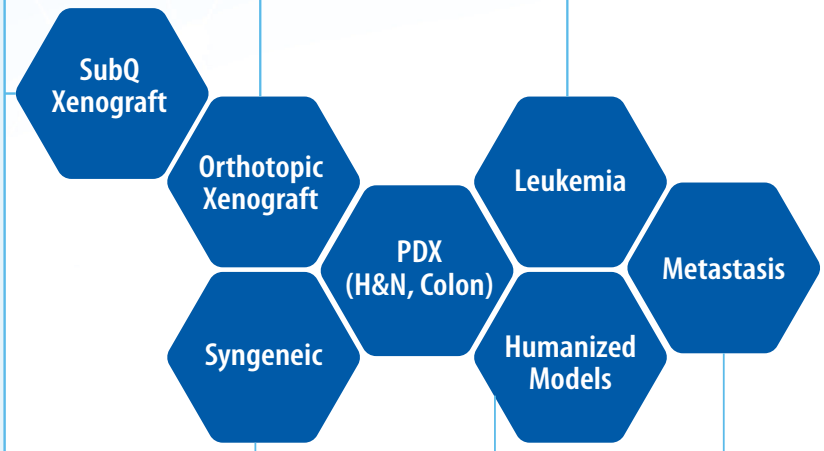
Brain:	U87-MG, U251
Breast:	MCF-7, MDA-MB-231, MDA-MB-453, MDA-MB-468, HCC70, T47D
Bladder:	T24, 5637, TCCSUP, KMBC-2
Colon:	HT29, HCT116, DLD1, SW480,SW948, COLO-205, T84, LS174T, LS1034
Epidermoid:	A431
Angiosarcoma:	SVR
Gastric:	N-87
Head & Neck:	CAL-27, HEp-2
Hematopoietic:	BaF3
Lung:	A549, H1975, NCI-H460, NCI-H1373 NCI-H441, NCI-H23, PC-9, SHP-77, NCI-H82, NCI-H358
Liver:	HepG2, SNU-398, JHH-7
Melanoma:	A375
Multiple myeloma:	NCI-H929, MM.15, U-266
Kidney:	ACHN
Pancreas:	BX-PC3, MIA PaCa-2, AsPC-1
Prostate:	DU145, PC-3, LNCaP, VCaP, 22Rv1
Ovary:	SKOV-3, PA-1, OVCAR-3, OV-90
Osteosarcoma:	SJSA-1
Retinoblastoma:	Y79,NCC-RbC-51
Medulloblastoma:	D283

Orthotopic Xenograft

Breast:	MDA-MB-231
Colon:	HT29, HCT116
Lung:	A549, PC-9
Pancreas:	BX-PC3, MIA PaCa-2
Bladder:	T24, UMC-1,RT-112, UMC14
Brain:	U87-MG

Leukemia

CML:	K562 HEL
AML:	KG-1, MV4-11, Kasumi-3
	Burkitt's lymphoma: RAJI
	B cell lymphoma: Daudi, NALM6, Jeko-1, REH, HBL-1



Syngeneic

Melanoma:	B16F10
Lung:	LLC
Breast:	4T1, E3, EMT-6
Colon:	CT-26, MC-38
Bladder:	NBT-II

Metastasis

CML:	K562
Melanoma:	B16F10
Lung:	A549, PC 9

Humanized Models

(huNOG-EXL)

Prostate: PC-3 B2M, DKO, human PBMNCs or T cell engrafted

- Authenticated cell lines - STR Typed & Mycoplasma tested
- Customized based on need
- Modeled in various mouse strains (Athymic Nude, SCID, NOD-SCID, NOD-SCID gamma, NSG-B2m, NSG-DKO, huNOG-EXL, Balb/c Nude, Balb/c, C57BL/6, Athymic Nude rat)

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Evidence that drives decisions

Syngene's integrated oncology solutions are backed by case studies that demonstrate the power of our platforms across three core pillars:

In Vivo Models: Translational Relevance at Every Stage

- CDX models deliver rapid efficacy ranking and mechanism-of-action insights for early-stage screening.
- Syngeneic models enable immune-oncology evaluations in a fully immunocompetent, native tumor microenvironment.
- Humanized mouse systems confirm translatable immune engagement for advanced biologics and cell therapies.
- Organoid and PDX models offer patient-relevant precision for high-throughput screening and co-clinical validation.

Translational Assays: Mechanism Meets Measurement

- Translational Assays: Mechanism Meets Measurement

Advanced Bioimaging: See What Matters

- Bioluminescence and fluorescence imaging (2D/3D optical tomography) combined with micro-CT enables real-time visualization of tumor growth, metastasis, and therapeutic biodistribution.

Explore our case studies to see how these platforms accelerate decision-making and de-risk your oncology development programs.

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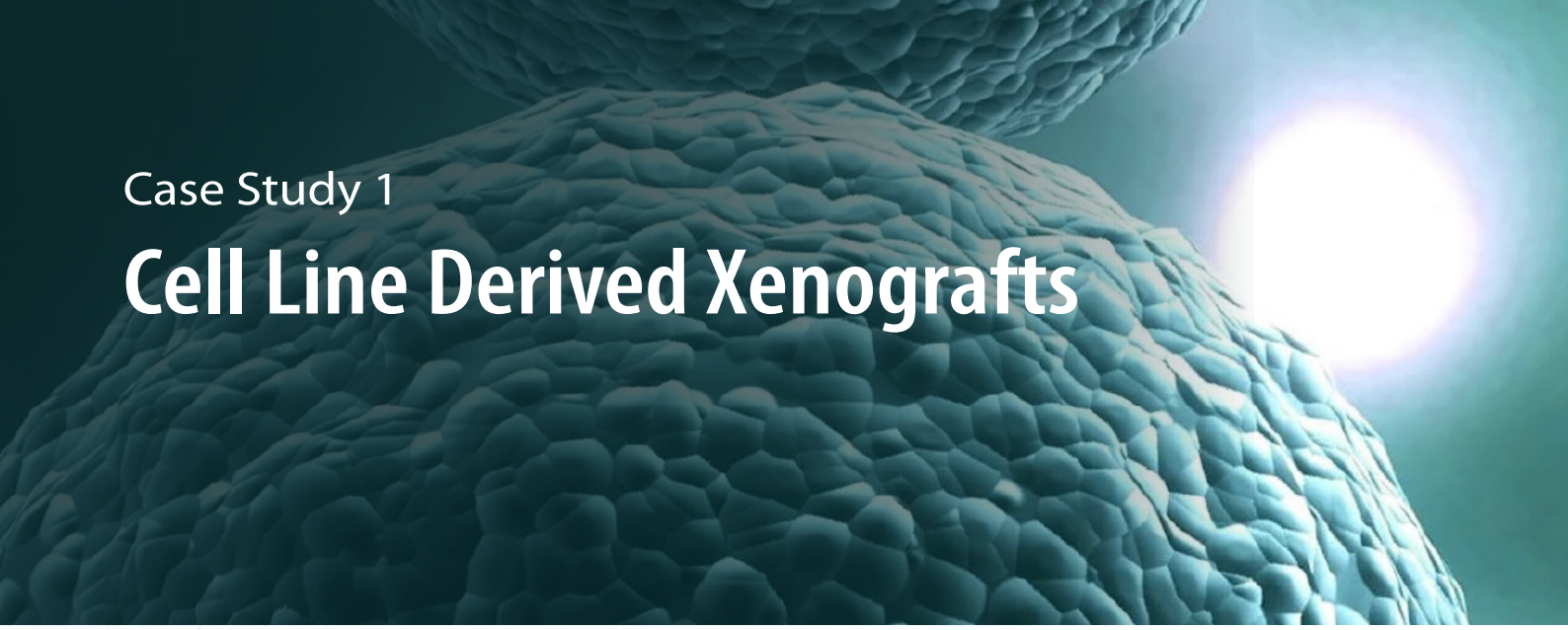


Case Study 1

Cell Line Derived Xenografts

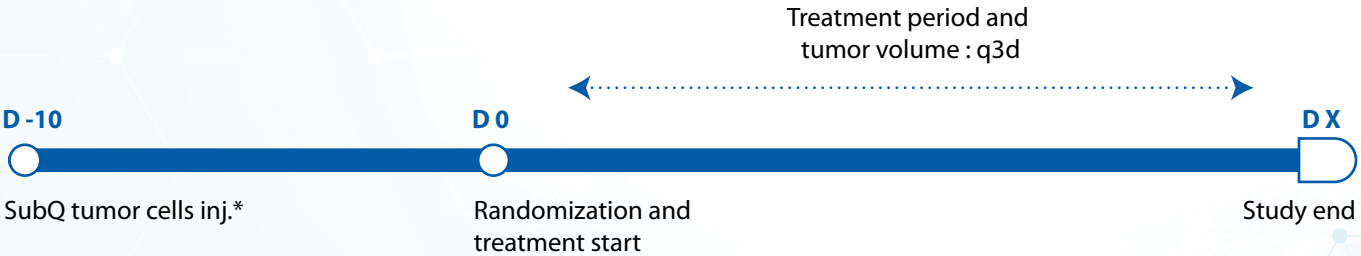
Syngene provides validated cell line derived xenograft (CDX) models, enabling rapid preclinical testing of cancer therapeutics

Our CDX platform include both subcutaneous and orthotopic models in various immunocompromised mice strains:
Athymic Nude | SCID | NOD SCID Gamma | huNOG-EXL | NSG-B2m | NSG-DKO

Key Attributes

- Broad-range of human cancer cells for various tumor types (300+ cell lines available, 90+ cell lines validated for tumor growth kinetics and performed efficacy studies)
- Authenticated cell lines – STR based DNA profiled & mycoplasma tested
- Highly reproducible growth kinetics
- Customized as per the client research requirements

Study Design



*2-3weeks to in life phase

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End Points of the Studies

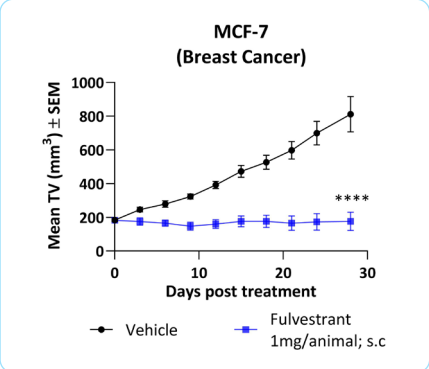
Primary readouts

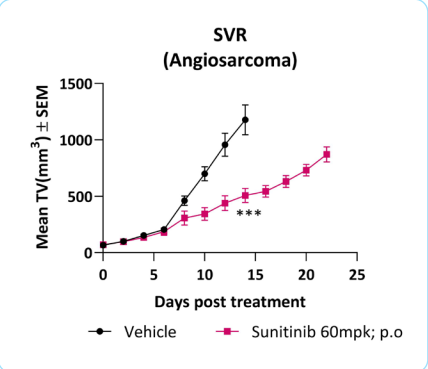
- Tumor volume using digital Vernier caliper
- Body weight
- Clinical signs & Tolerability (MTD)
- Survival
- PD markers & PK (optional)

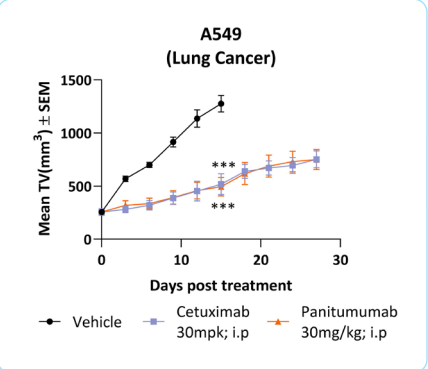
Derived readouts: (data not shown)

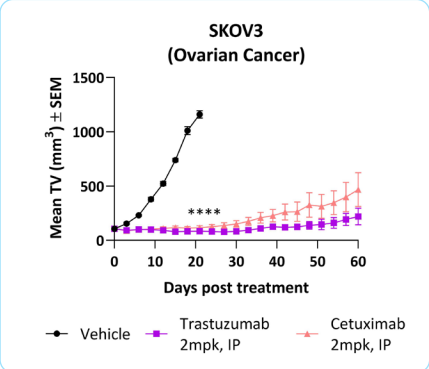
- % Tumor growth inhibition (%TGI)
- % Body weight change from basal
- Median survival days

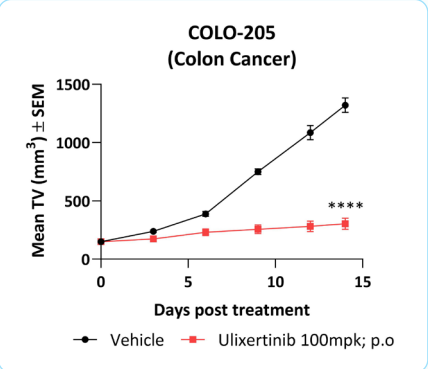
Results and Graphs

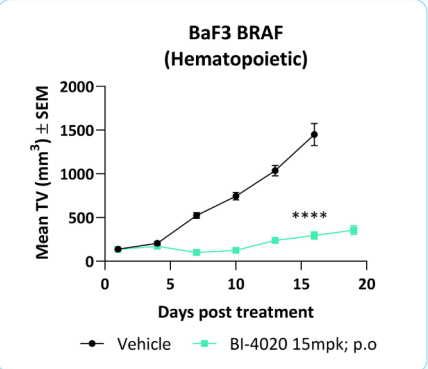












****=p<0.001 & ****p<0.0001 vs respective Vehicle*

Summary and Conclusion

- Various *KRAS, BRCA* and *BRAF* mutated CDX models are available
- Syngene's CDX platform facilitates cost-effective evaluation of investigational cancer therapies, enabling comprehensive analysis of efficacy, tolerability, pharmacokinetics/pharmacodynamics, and mechanisms of action

Demonstarted expertise in screening diverse therapeutic modalities, including small molecules, biologics, antibody-drug conjugates (ADCs), and proteolysis-targeting chimeras (PROTACs)

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Case Study 2

Syngeneic Model Platform for Immuno-Oncology

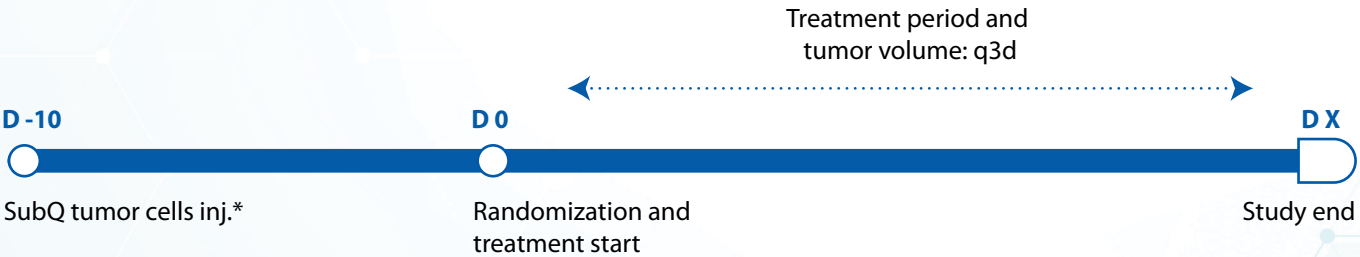
Syngene's syngeneic model platform provides rapid preclinical testing of immune response mechanisms and evaluating the efficacy of immunotherapeutics

Our syngeneic IO platform include both subcutaneous and orthotopic models in immunecompetent mice for the following cancer types:
Breast | Colon | Melanoma | Lung | Bladder

Key Attributes

- Well experienced with immune checkpoint inhibitors (ICIs) screening (alone and in combination)
- Well equipped flow cytometry for immune profiling
- Highly reproducible growth kinetics
- Models available with subcutaneous, orthotopic and metastatic tumor studies
- Supports testing of small molecule as well as antibody based immunotherapeutic's efficacy and their PK/PD relationships

Study Design



*1-2weeks to in life phase

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End Points of the Studies

Primary readouts

- Tumor volume using digital Vernier caliper
- Body weight
- Clinical signs & tolerability (MTD)
- Survival
- PD markers & PK (optional)
- Immune profiling (%CD4, CD8, Tregs, Teff, Tcm, %NK, activated NK, DCs and macrophages)

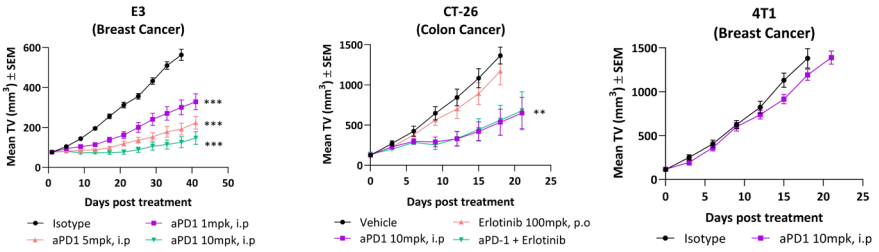
Derived readouts: (data not shown)

- % Tumor growth inhibition (%TGI)
- % Body weight change from basal
- Median survival days

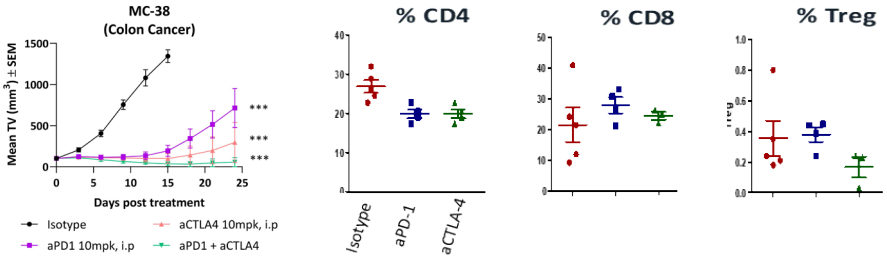
Results and Graphs

RED: Maximum Response
BLACK: Minimum Response

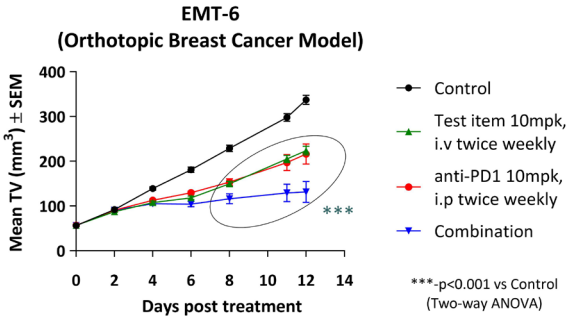
A)
Differential responses to aPD-1 in HOT vs COLD tumors



B)
Tumor efficacy & TIL profiling in MC38



C)
Tumor efficacy in orthotopic EMT-6



***p<0.01, ***p<0.001 & ****p<0.0001 vs respective vehicle/isotype*

Summary and Conclusion

- Syngene's syngeneic platform accelerates the discovery of cancer immunotherapies by enabling rapid, cost-efficient evaluation of single agents and combination treatments. It delivers deep insights into efficacy, synergy, immune biomarkers, and long-term outcomes like rechallenge and survival empowering smarter, faster therapeutic development

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Case Study 3

Humanized Mouse Platform

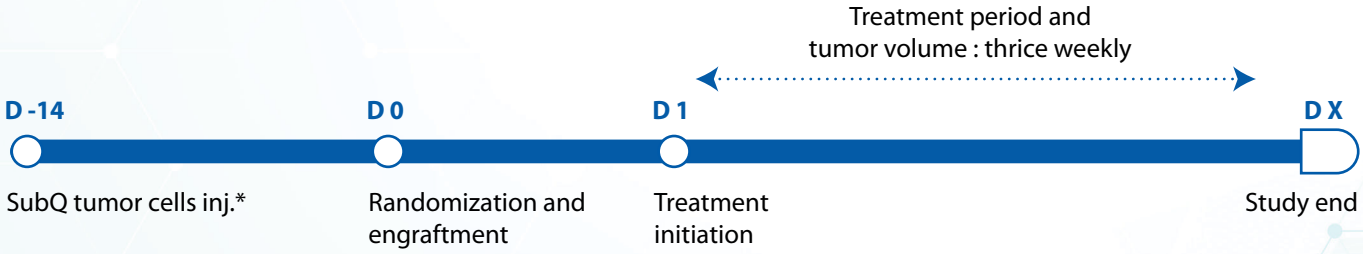
Syngene's humanized mouse platform supports testing of humanized immune system (HIS) on cancer cells growth *in vivo* and identifying novel immunotherapeutics

Our humanized mouse platform includes hCD34+ cells engrafted, hPBMCs engrafted and expanded hT cells engrafted immunocompromised mice models:
huNOG | huNOG-EXL | NSG | NSG-B2M | NSG-DKO| NSG-SGM3-IL15

Key Attributes

- Well experienced with wide range of therapeutics applicability in humanized mouse models
  - Antibody based therapeutics (mAbs, BiSAbs, BiTEs etc.,)
  - Refining therapeutic solutions to chemotherapy, ICIs, NK cell therapy and cytokine therapy
- Well experienced with hPBMCs/ T cells/ activated or expanded T cells transfer
- Highly consistent engraftments with less variability
- Models available for immuno-oncology and GvHD studies

Study Design for Engraftment Models



***2-3weeks to in life phase**

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End Points of the Studies

Primary readouts

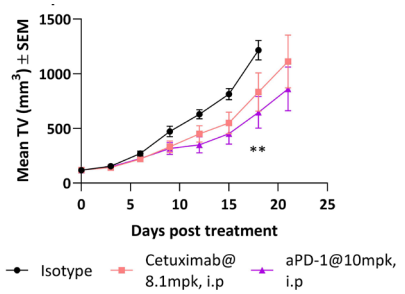
- Tumor volume using digital Vernier caliper
- Body weight
- Clinical signs & Tolerability (MTD)
- Survival
- Engraftment status of PBMCs (optional)
- Immune profiling (%CD4, CD8, Tregs, Teff, Tcm, %NK, activated NK, DCs and macrophages)

Derived readouts: (data not shown)

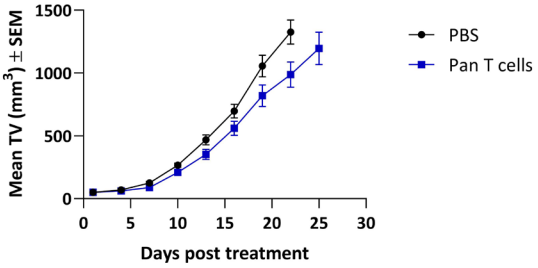
- % Tumor growth inhibition (%TGI)
- % Body weight change from basal
- Median survival days

Results and Graphs

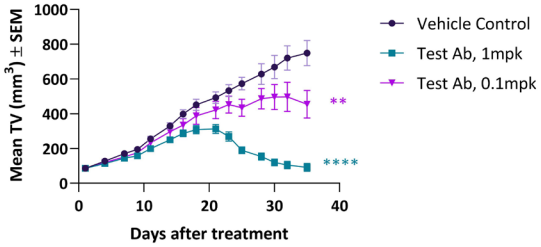
Efficacy in subcutaneous PC-3 prostate cancer model in huNOG-EXL



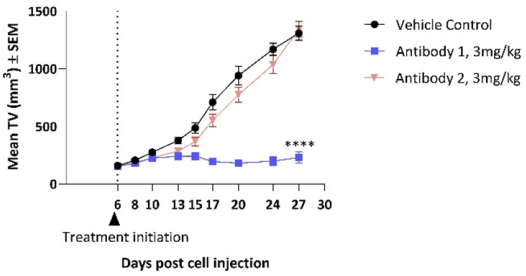
Efficacy in subcutaneous SHP-77 lung cancer model in NSG mice with T cells engraftment



Efficacy in subcutaneous OVCAR-3 ovarian cancer model in NSG mice with hPBMCs engraftment



Efficacy in subcutaneous DLD-1 colon cancer model in NSG mice with human expanded T cells engraftment



***p<0.01 & ****p<0.0001 vs respective vehicle/isotype*

Summary and Conclusion

- Syngene's humanized mouse platform, built on robust engraftment models, empowers *in vivo* exploration of immune response mechanisms, tumor-immune interactions, and the therapeutic potential of investigational cancer immunotherapeutics

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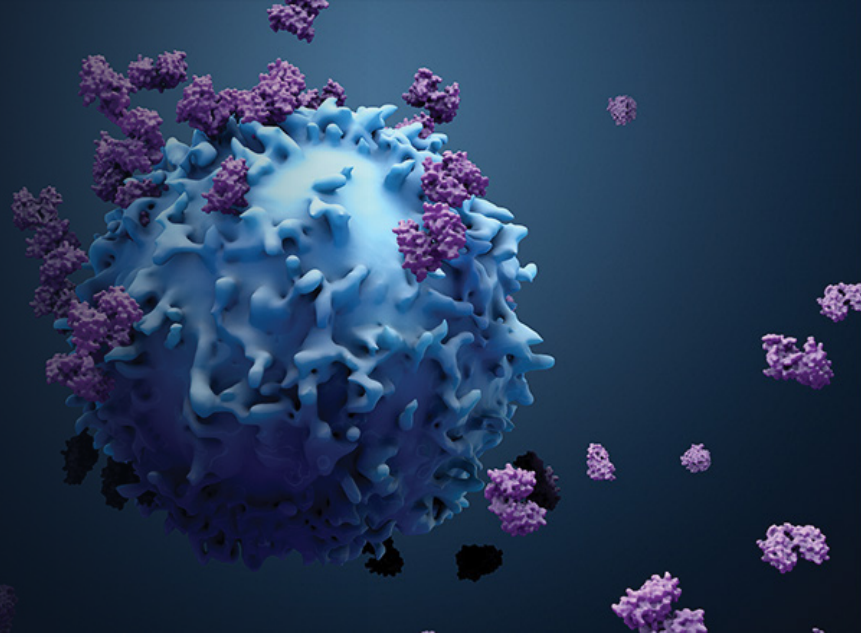
Case Study 4

In Vivo Imaging



Syngene's advanced *in vivo* imaging system offers tracking of *in situ* tumor growth and biodistribution of antibody therapeutics

Our bio-imaging platform include 2D and 3D bioluminescence and fluorescence optical tomography along with micro-CT modalities for:
F-Luc tagged | GFP, RFP, NIR labelled cells or antibodies | F-Luc-mRNA nanoparticles

Key Attributes

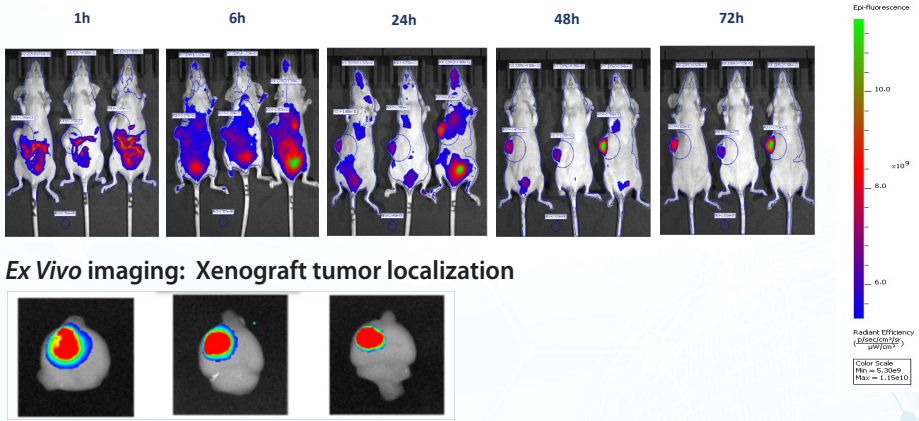
- *In Vivo* imaging to assess disease development and organ/tissue specific biodistribution
- Advanced ultra-sensitive CCD camera for broad spectral range (visible to NIR light)
- High resolution, fast imaging and high throughput capacity (up to 10mice & 2rats)
- 3D BLI/FLI scanning modes enable 3D-localization and accurate reconstruction and deep tissue signal detection
- Pairing of 3D optical datasets with system's CT provides biologically relevant and anatomically accurate interpretation of imaging results

IVIS Instrument

Revvity spectrum CT2

In Vivo Fluorescence Imaging

Bio-distribution of Alexa Fluor 647 labelled antibody in nude mice with xenograft



***Ex Vivo* imaging: Xenograft tumor localization**

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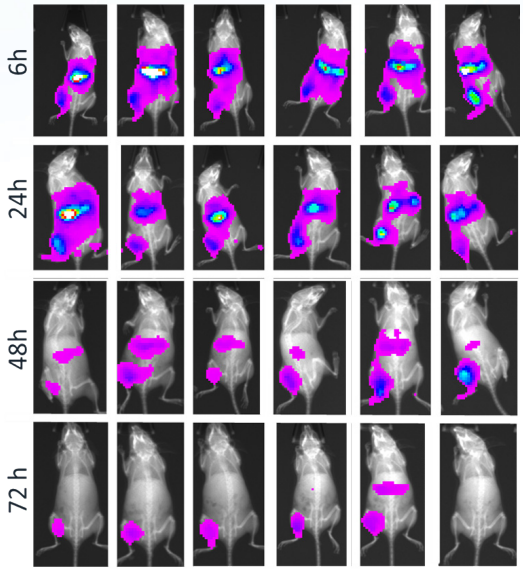
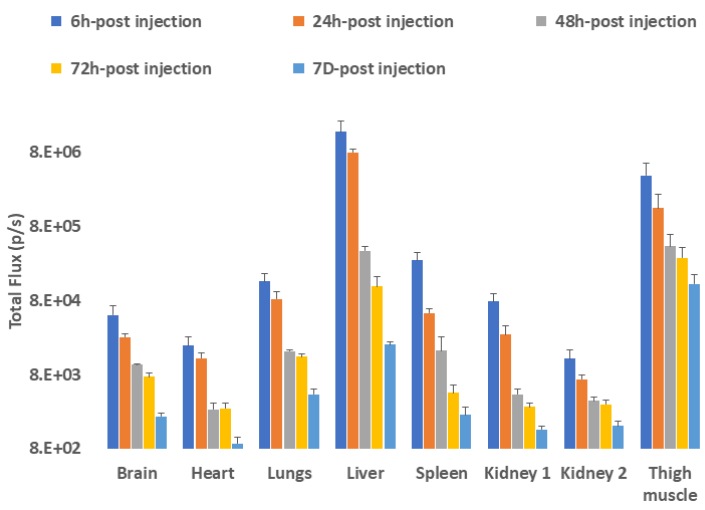
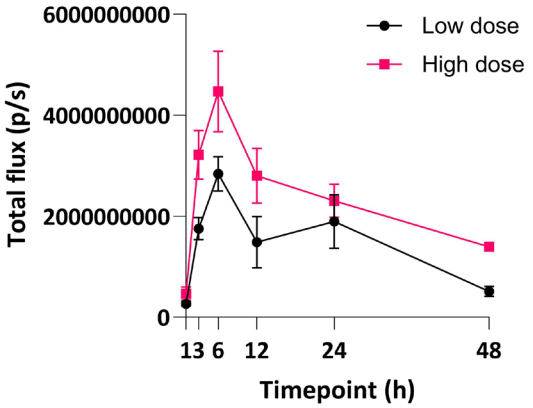
Bioluminescence Imaging

***In Vivo* and *ex vivo* kinetics of F-Luc mRNA injected intramuscular in mice**





Dose dependent Biodistribution (injection site)



Summary and Conclusion

- Our advanced bio-imaging platform, powered by Spectrum CT2, facilitates in-depth analysis of biodistribution and kinetics of tagged antibodies and nanoparticle mRNA, as well as real-time monitoring of *in situ* tumor progression in orthotopic and metastatic models
- Facilitates longitudinal studies, allowing repeated imaging over time, which reduces variability and number of animals

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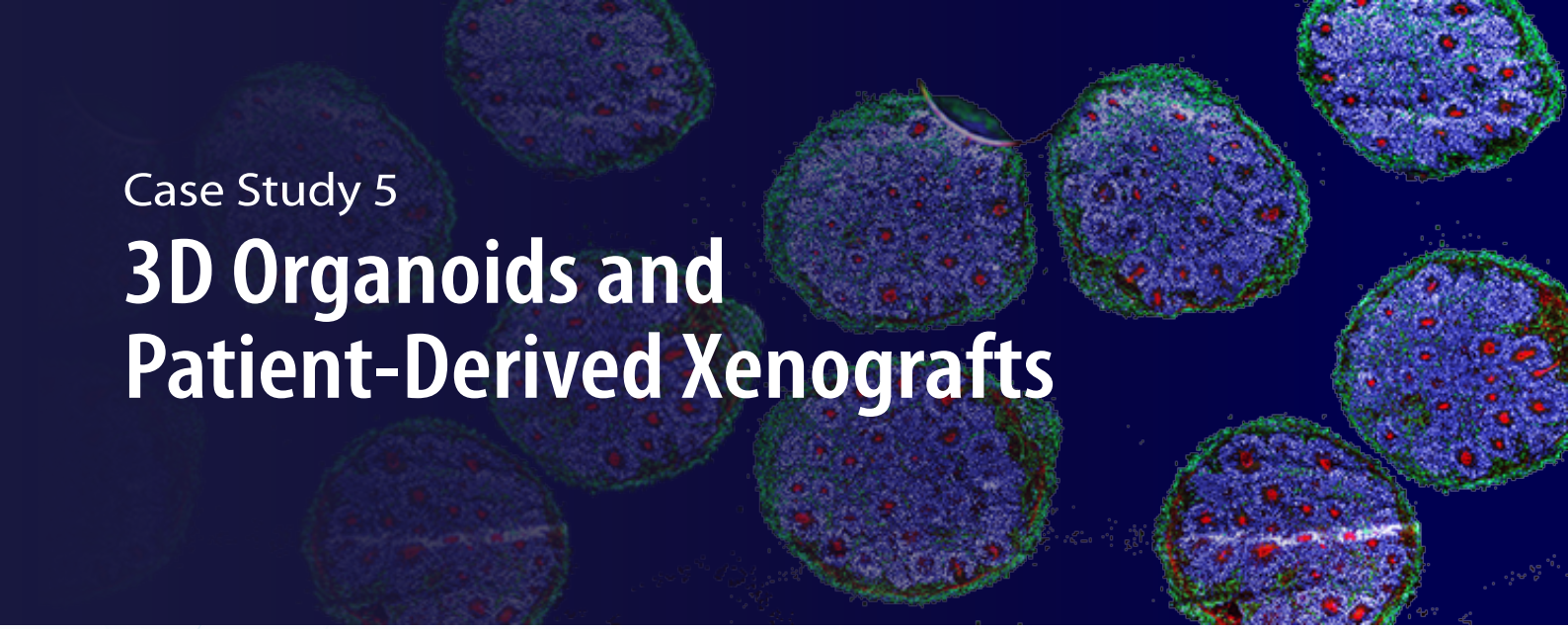


Case Study 5

3D Organoids and Patient-Derived Xenografts

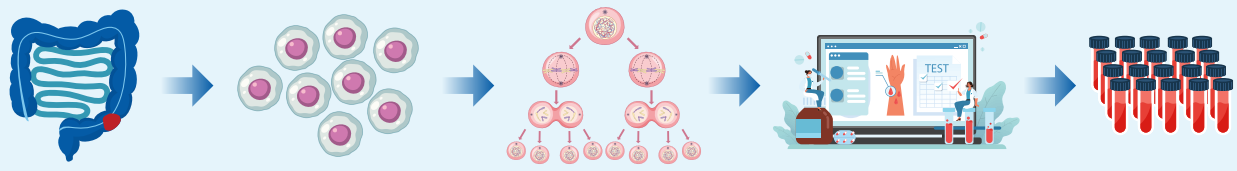
Syngene's integrated 3D organoids – PDX workflow allow rapid screening of compounds in organoids, validating hits in corresponding PDX models, and accelerating path to clinical success using this translatable model with human patient derieved tissues

Our Organoid-PDX platform include the following patient cancer types:
Colon | Ovarian | other tissues

Key Attributes

- Easy availability of patient tumor samples from Indian local hospitals
- Ready-to-use colon organoids and PDX models available from Indian population with
  - Patient demographic details, patient treatment history and TNM status
  - Genotyping details
  - Patient follow-up details
- 3D organoids are scalable and biobankable, making them suitable for high-throughput screening and long-term use. Normal human tissue organoids can also be generated for MOA studies
- Upon client's request, new patient tumor types can be acquired conveniently and validated swiftly

Workflow for Generation and Expansion of 3D Organoids and their Integration with PDX



Source tumor sample from hospital (Ethical approval, MoU)

Dissociate tumor tissue

Optimization and scaling up of organoids

Characterization and drug screening assays (Cytotoxicity assays)

Bio-banking

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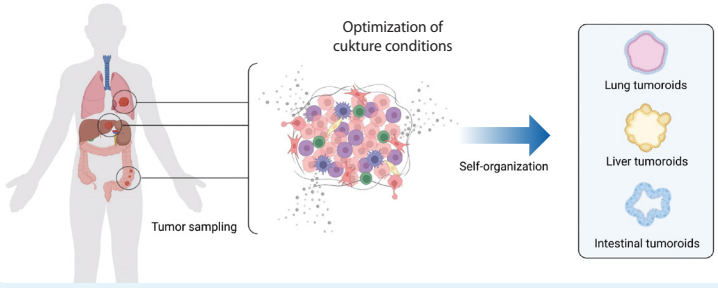
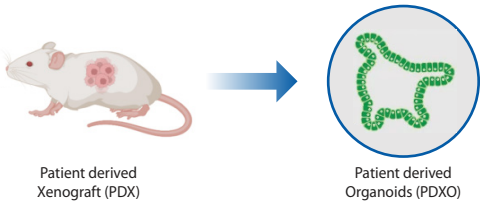
Patent derived organoids (PDOs)



PDX derived organiods (PDXOs)



Applications of 3D Organoids and PDX Models

3D Organoids

- Disease modelling
- High-throuput drug screening
- Precision medicine
- Toxicity profiling

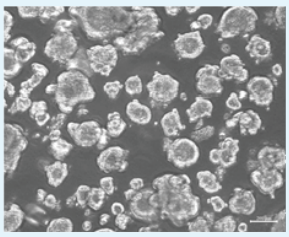
PDX models

- Preclinical drug testing
- Biomarker discovery
- Tumor biology research
- Co-clinical trials

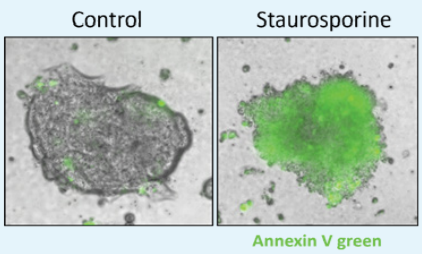
Results and Graphs

3D organoids exhibit distinct cytotoxic responses compared to 3D spheroids and 2D cell lines, enhancing the clinical relevance and predictive accuracy of drug efficacy assessments

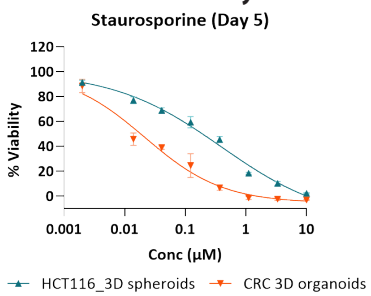
Oragnoid snapshot



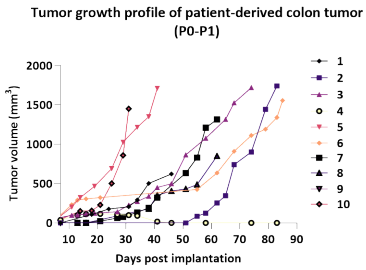
Drug-induced cell kill assay



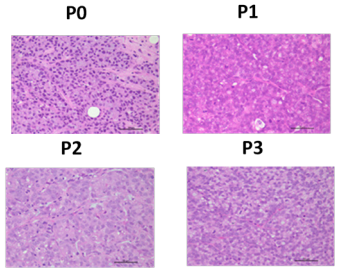
CTG-3D assay



Higher engraftment rate in Colorectal PDx (~80%) in NOD SCID Gamma (NSG) mice; Tumor cellularity, characteristics and differentiation status preserved across passages (P0 to P3)



Histological profile



Colorectal PDx fragments have been successfully maintained through passages P1 to P3, making the model ready for screening

Summary and Conclusion

- Syngene's organoids and PDX models offer additional translatablity for potential compounds against colorectal cancer. Our further efforts in characterization and expansion of these platforms would enhance translational innovation in oncology/immuno-oncology

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Syngene International Ltd. (BSE: 539268, NSE: SYNGENE, ISIN: INE398R01022) is an integrated research, development, and manufacturing services company serving the global pharmaceutical, biotechnology, nutrition, animal health, consumer goods, and specialty chemical sectors. Syngene's 6000+ scientists offer both skills and the capacity to deliver great science, robust data security, and quality manufacturing, at speed, to improve time-to-market and lower the cost of innovation. With a combination of dedicated research facilities for Baxter, and Bristol-Myers Squibb, as well as 2.2 million sq. ft of specialist discovery, development and manufacturing facilities, Syngene works with biotech companies pursuing leading-edge science as well as multinationals, including GSK, Zoetis, and Merck KGaA.

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