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by cti BIOTECH VISIONARY SCIENCE

Basic cancer spheroids & 3D bioprinted micro-tumors for pharmaceutical and research and development

Micro-tumors: power for preclinical research

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>90 % of Failure

Almost all drug candidate won’t reach the patient bedside because of failed clinical testing.

Lack of predictive models

Many in vitro models don’t reflect properly the complexity of Human biology.

Excessive cost and delay

Tradionally used models are expensive and timely, and they don't offer enough in the way of predictions.

A predictive scientific approach

3D tissue bioengineering preserving tissue architecture and cellular microenvironment: improving the transposability of results to in vivo conditions.

Inter-individual diversity

Multi-donor access: assesses robustness and variations in responses, including sub-populations

Personalized medicine with patient derived models.

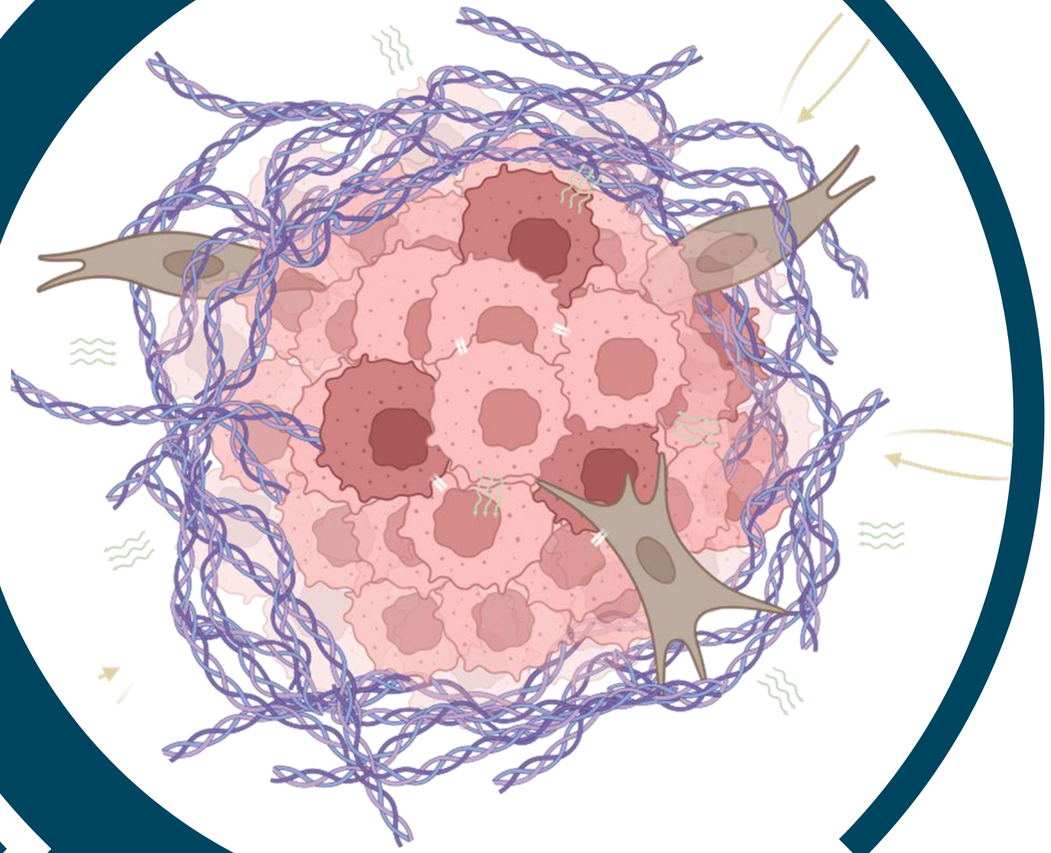
Cost effectiveness

With a direct contribution to reducing animal testing and adopting NAMs + valorisation of human tissue from surgery (upcyling of surgery wastes).

Basic vs 3D Bioprinted micro-tumors

Basic micro-tumors

- High flexibility in the development
- Well described in literature
- Competitive cost rate per micro-tumor



3D bioprinted micro-tumors

- Spatially controlled pluricellular 3D culture
- Innovative testing approach
- High reliability and reproductibility

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Biosourcing Human-Derived Materials for Custom micro-tumors

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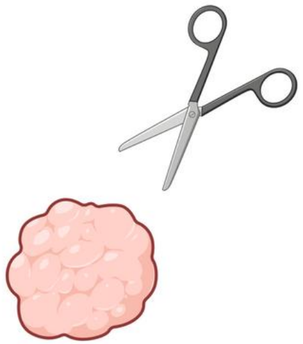
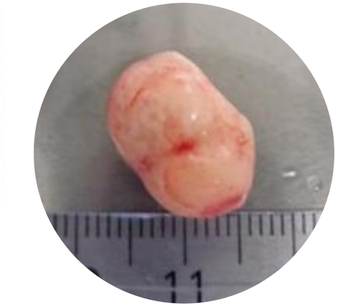
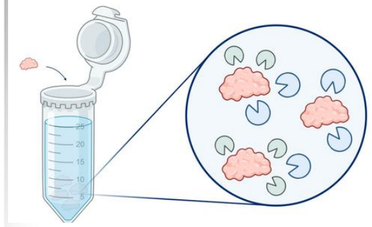
Cancer Selection

Patient or PDX Tumor

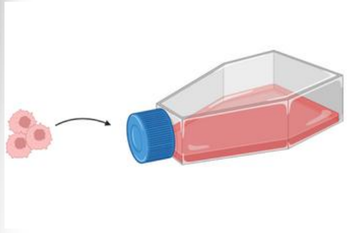


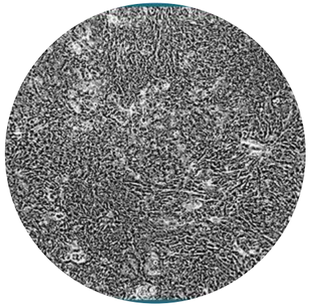


Cell dissociation

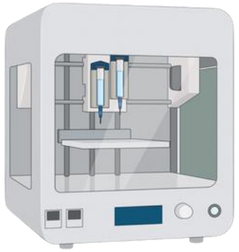


Isolated cells in culture

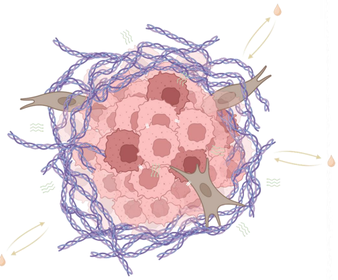


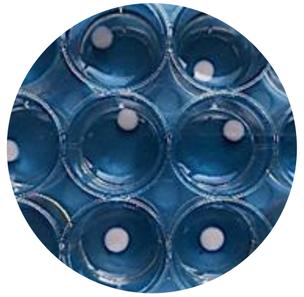


micro-tumors printing



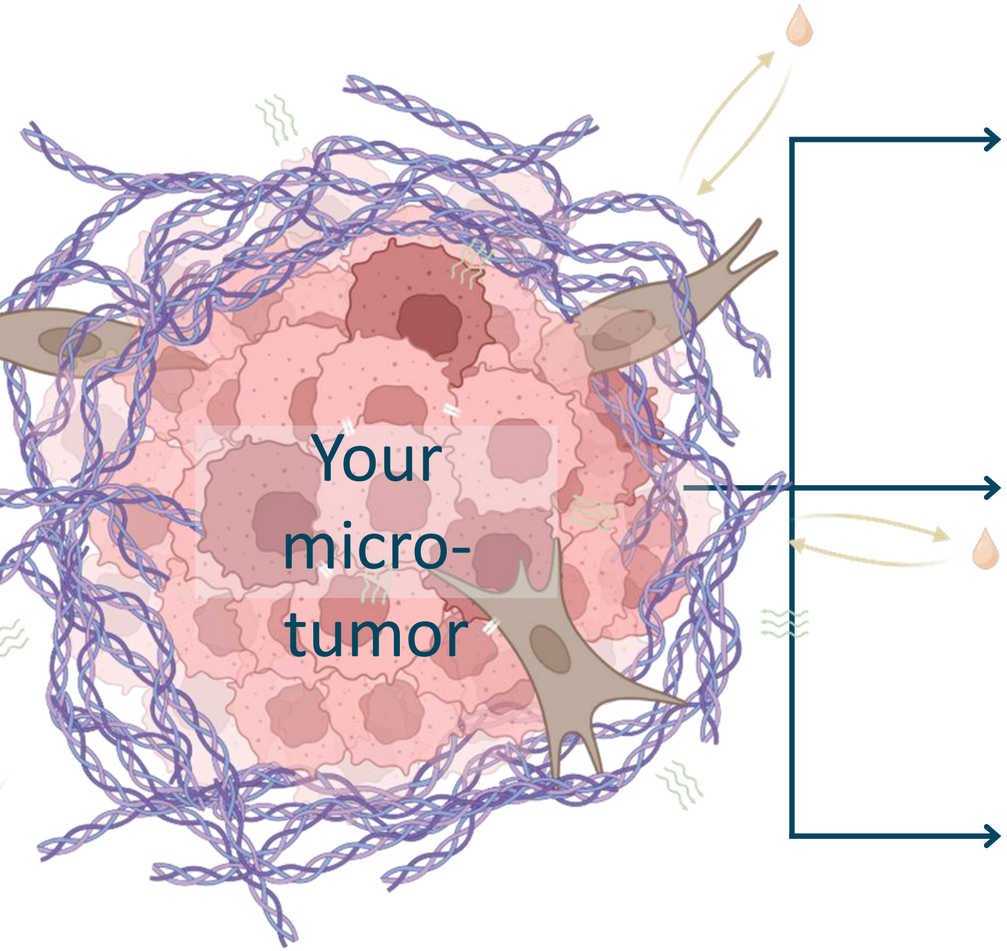
Mature micro-tumors





Drug testing

Custom micro-tumors



Choose you cancer type:

Breast, pancreas, ovary, liver, lung, lypmhoma, prostate, colon, other

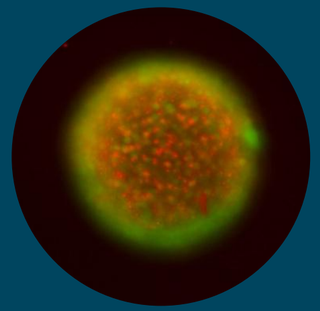
Choose your cell type:

Patient derived or PDX derived, or cell line upon request

Choose your method:

Basic micro-tumors or 3D bioprinted

micro-tumor Characteristics



Culture timeline

Delivered ready-to-use to your laboratory.

Start testing right away your drug candidate or molecule of interest

Viability

Depending on your objectives, you might want a longer-term model. Some of our models have been used for up to 6 months in culture (McGuckin et al., Cancer 2023)

Testing

Depending on your choice of model, stress can be applied and/or any drugs or compound to evaluate the therapy capacity and efficacy

Our team is well-versed in assisting clients with the development of testing protocols.

Contact us at: ctipharma@ctibiotech.com

micro-tumor Kit Utilization

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1. Open the package and place the micro-tumors under a culture hood

2. Change the medium using the bottle pre-heated to 37°C

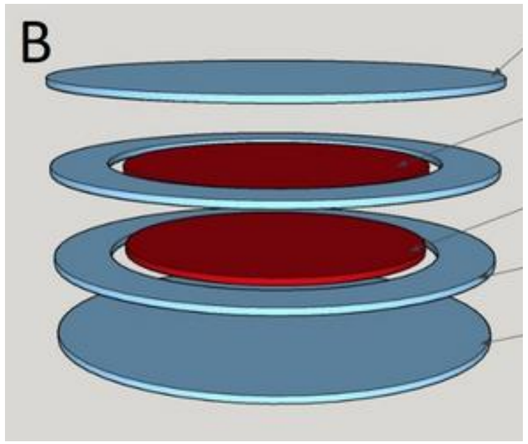
3. Allow the models to acclimatize for 24 to 48 hours in an incubator (37°C & 5% CO2)

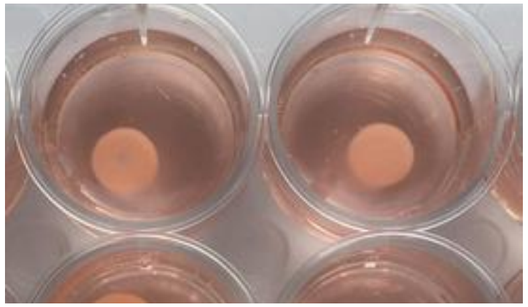
4. Apply your molecules and observe the effect thanks to adapted readouts

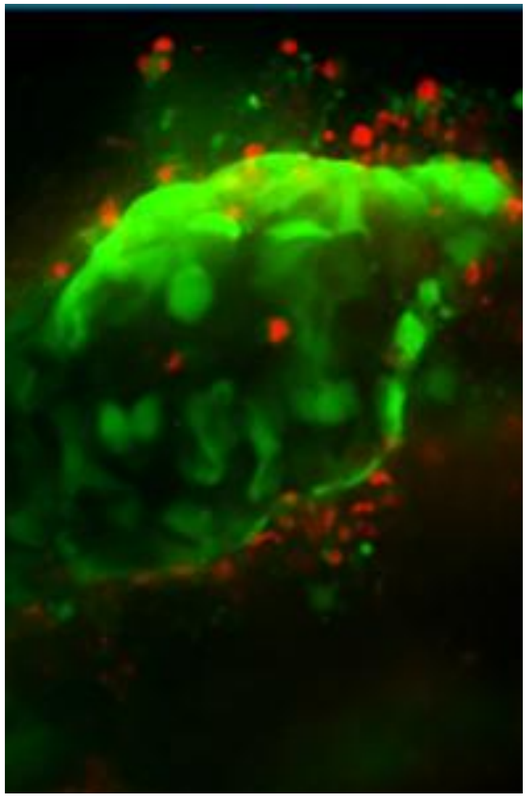
Case Study 1

Colorectal cancer hepatic metastasis modeling by advanced 3D bioprinting allows demonstration of oncolytic viral chemotherapeutic delivery. Colin McGuckin et al., 2025, Cancer

Complex models of cancer are not easy to make, but we must try, to find out if drugs, or advanced therapies like viruses and antibodies, or even targeted immune system cells, can reach the cancer where it actually is.
We use next-level 3D bioprinting, to mimic this with colorectal cancer and even show that an advanced cancer virus therapy could reach the cancer cells.
3D tumor formation, was achieved by 15 days with significant in-situ micro-tumors. Cultivation could continue for 80 days allowing long-term evaluation, formation of necrotic cores and re-metastatic events. 5-FU infusion was dose responsive. Oncolytic virus loaded with non-toxic pre-chemotherapeutic did not target the hepatocytes but did penetrate colorectal tumors.







Case Study 2

Micro-tumor and 3D bioprinted primary cancer tissues for chemotherapeutic testing reveals method and cell type matters for success. Colin McGuckin et al., 2025, Poster presented at ASCB-CellBio2025

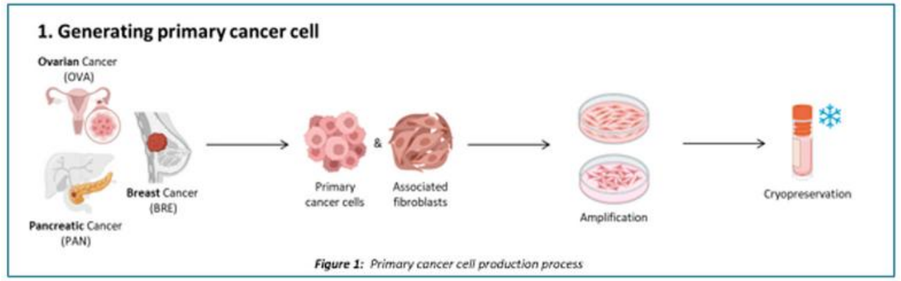


Figure 1: *Primary cancer cell production process*

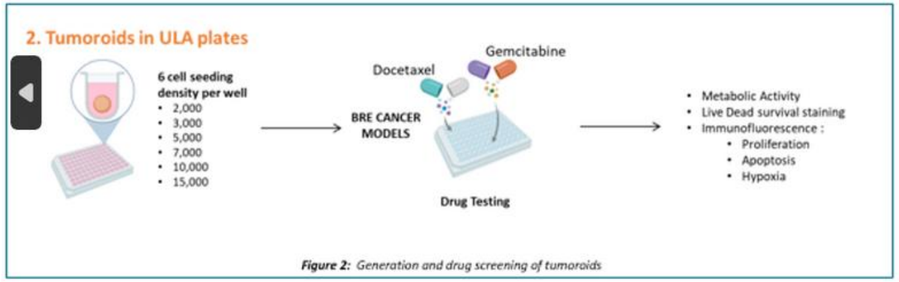


Figure 2: *Generation and drug screening of tumoroids*

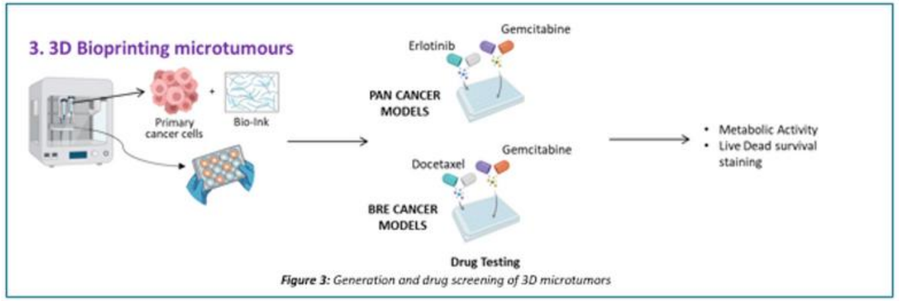


Figure 3: *Generation and drug screening of 3D microtumors*

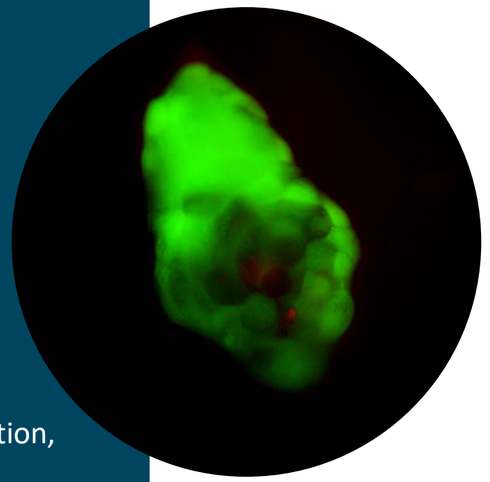
We evaluated the feasibility of generating primary ovarian, breast, and pancreatic cancer micro-tumors using ultralow-attachment (ULA) culture and complementary 3D bioprinting approaches/models.

Key results:

➤ All models displayed a hypoxic core and hypoxia levels were comparable across conditions.

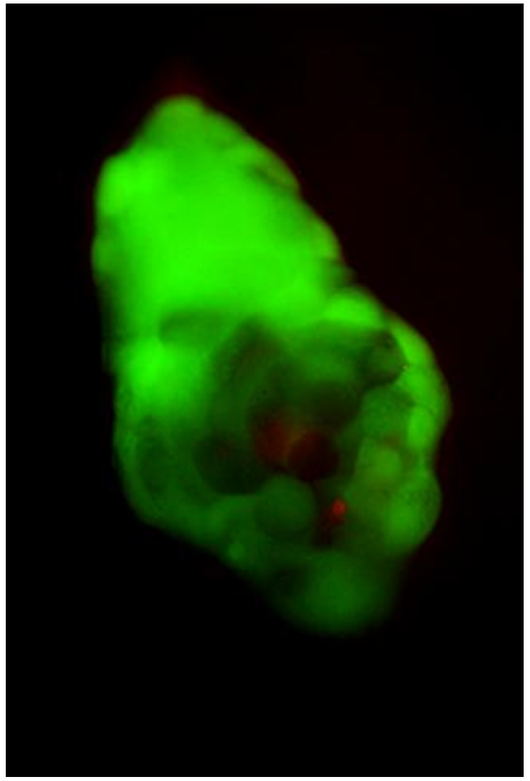
➤ After 48 h, Gemcitabine and Docetaxel caused a dose-dependent reduction in metabolic activity.

Patient-derived 3D cancer models mimic key tumour features and remain viable for weeks. It allows testing of drug efficacy, penetration, and resistance, overcoming limits of cell lines and animal models, bridging the gap between in vitro and in vivo studies, advancing personalized medicine.



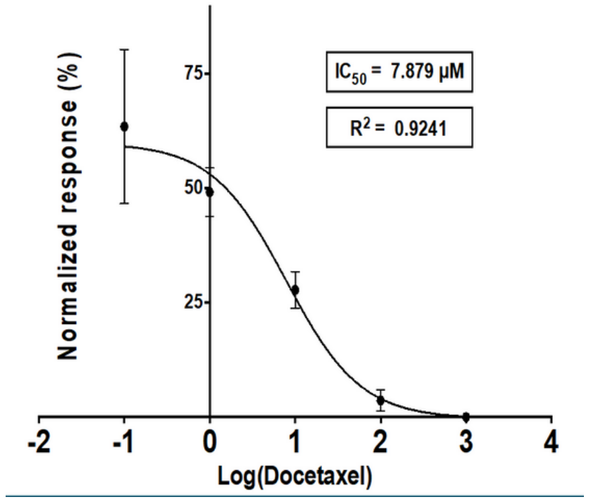
Case Study 3

3D Bioprinted models of Breast cancer: BRE-547 (Unpublished)



After 48 hours of treatment, both Gemcitabine and Docetaxel induced a clear, dose-dependent reduction in metabolic activity compared to non-treated spheroids. The strongest decrease was observed at the highest concentrations. Lower concentrations resulted in a moderate but consistent decline, confirming aconcentration-dependent cytotoxic response

Our models reproduce the main histological features of patient tumors, including proliferative areas, necrotic cores, and the expression of relevant biomarkers. Drug penetration, efficacy, and resistance can be monitored over several weeks, enabling the evaluation of different therapeutic classes such as chemotherapeutics, targeted therapies, or immunotherapies. These patient-derived 3D cancer models are standardized and reproducible systems.



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