ISSRDC

Encapsulate: Automated Biochips for Personalized Cancer Screening in Microgravity

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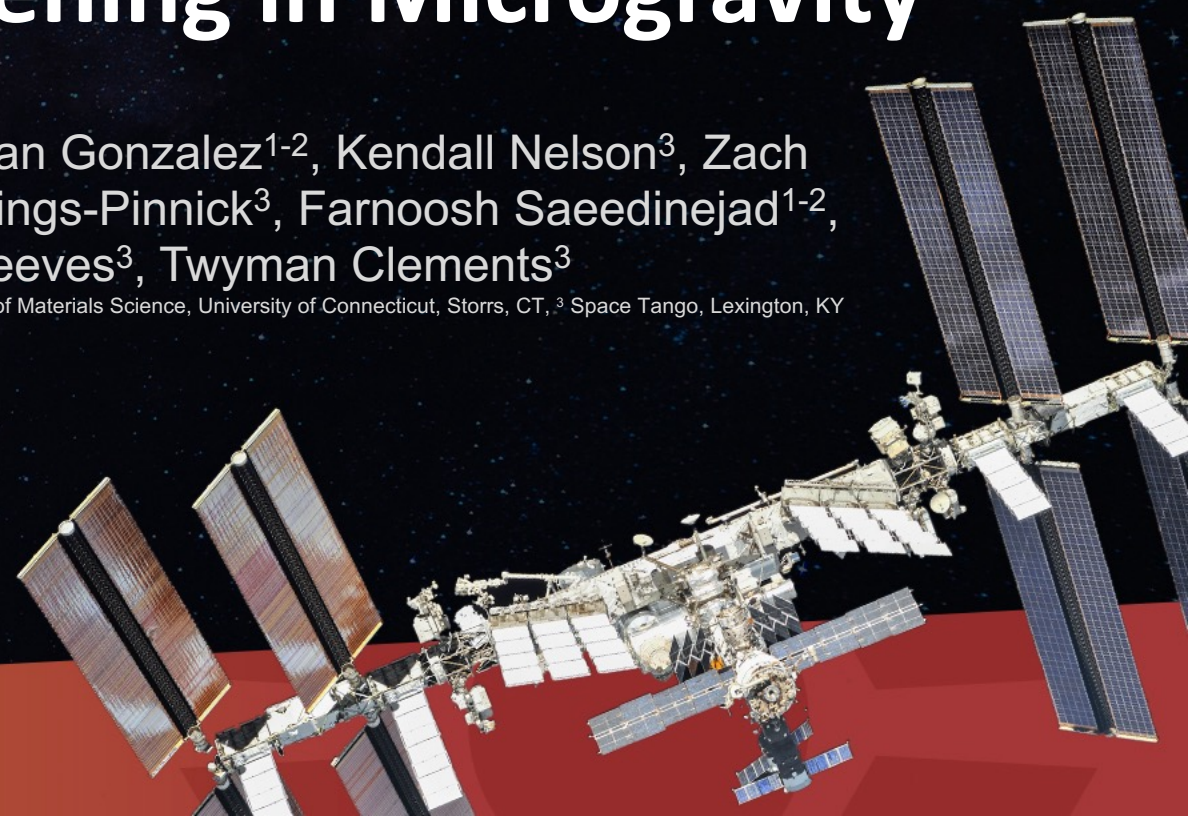

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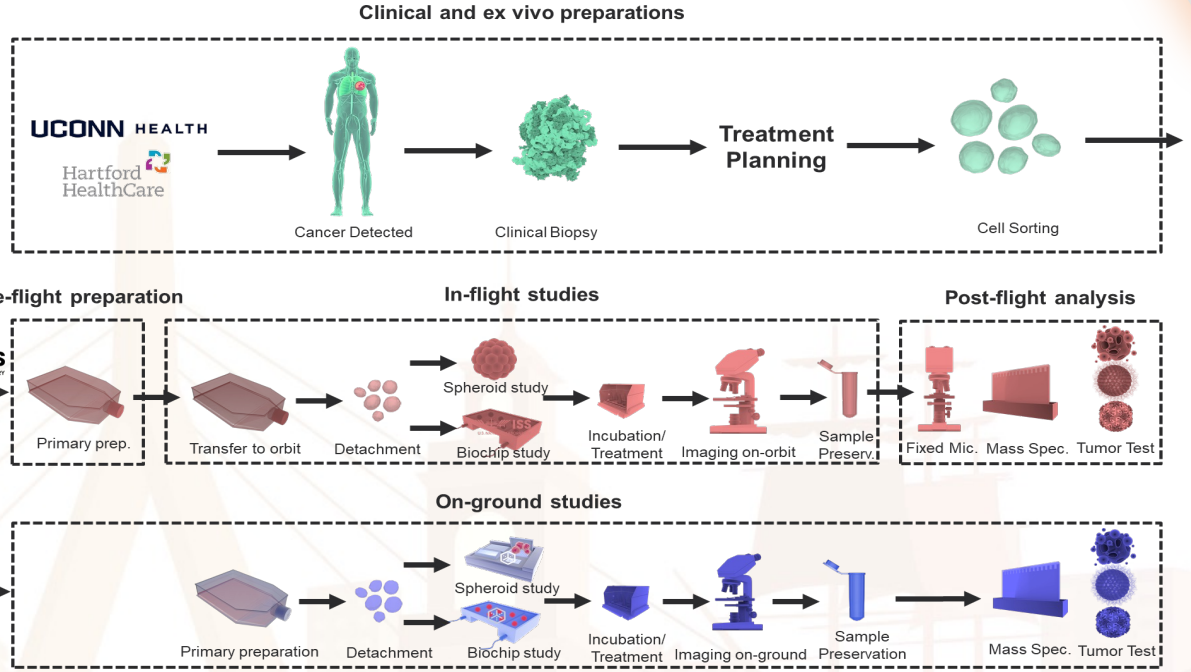


Problem

The conventional process of decision-making has **deficiencies**

Majority of chemotherapy cycles are both ineffective and toxic.

Ineffective chemotherapy cycles

On average ~**6 cycles**, **15 months**, and **$150K-500K in chemotherapy-related costs** [1,2]

Progressively lower chances for treatment

Ineffective treatment cycles = increased risks of
drug resistance ↑
metastasis ↑
cancer progression ↑ [3,4]

Unsuccessful treatment costs are unbearable

With unsuccessful round, cancer patients are **147%** more likely to require emergency, **75%** more to re-hospitalization, and **3X** more costs [5].

25% fatality rate due to chemotherapy toxicity

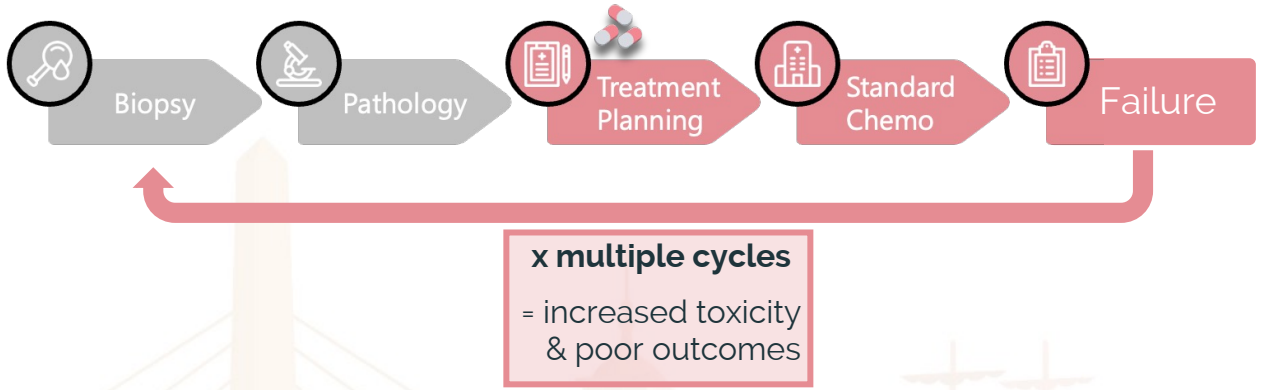
Only due to side effects of chemotherapy, and **not cancer progression** [6].

1 Lancet Oncol, 20.6 (2019): 769-780.
2 Cancer Research UK, https://shorturl.at/wzGKV
3 Cancer Res 79.18 (2019): 4567–4576.
4 Adv Pharm Bull. 7.3 (2017): 339-348.
5 Emergency Cancer Care, 1.1 (2022): 4.
6 UK National Confidential Enquiry into Patient Outcome and Death

What if

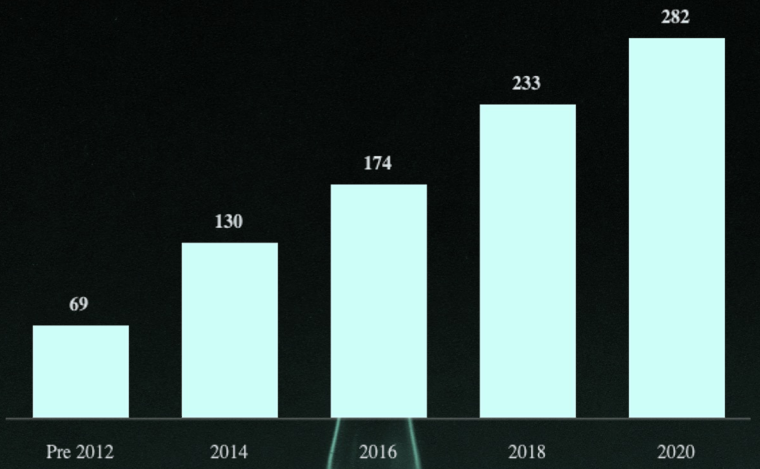
Multiple cycles = increased mortality, poor outcomes.

Treatment planning is an **iterative, trial and error**, and **sequential** process



This could be anticipated with a **functional assay**

There is an increase in the number of **approved drugs**



Precision diagnostics for personalized cancer therapy

Solution: **Encapsulate**

We create **therapeutic response profiles** of patients for oncologists to administer life-saving treatments

nCapsule

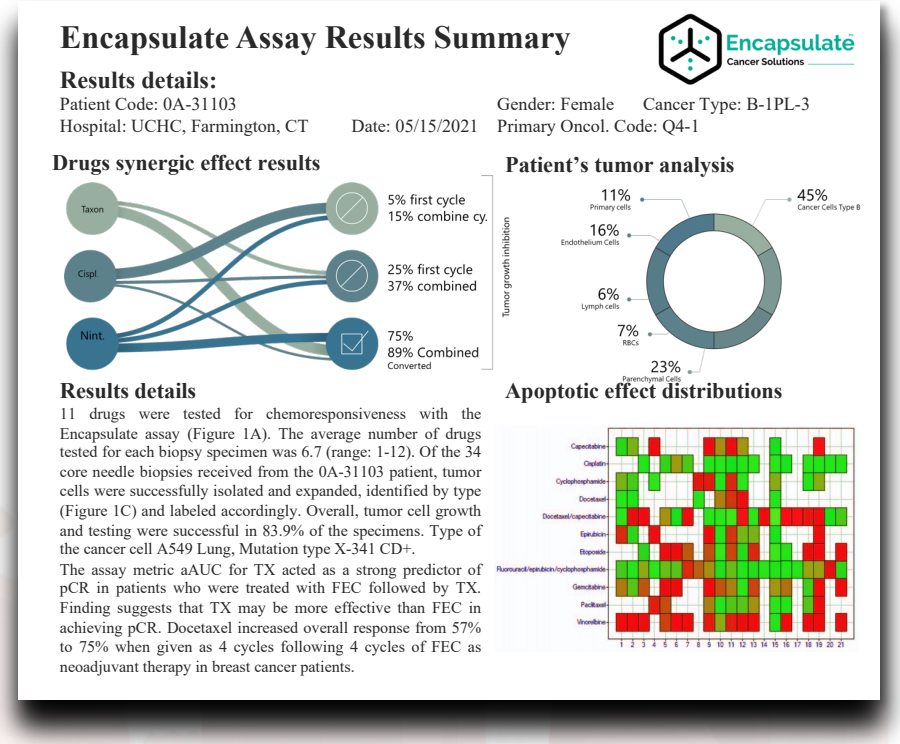
The **biochip** grows patients' cancer cells **as microtumors** outside the body.

nCapsulizer

Our **automation system**

nVision

The **report** provides analytical insights **to oncologists** on patients' response profile to potential treatments.



Encapsulate Assay Results Summary

Encapsulate Cancer Solutions

Results details:

Patient Code: 0A-31103 Gender: Female Cancer Type: B-1PL-3

Hospital: UCHC, Farmington, CT Date: 05/15/2021 Primary Oncol. Code: Q4-1

Drugs synergic effect results

Taxon

Cispl

Nint.

5% first cycle
15% combine cy.

25% first cycle
37% combined

75%
89% Combined
Converted

Tumor growth inhibition

Patient's tumor analysis

11% Primary cells

45% Cancer Cells Type B

16% Endothelium Cells

6% Lymph cells

7% RBCs

23% Parenchymal Cells

Results details

11 drugs were tested for chemoresponsiveness with the Encapsulate assay (Figure 1A). The average number of drugs tested for each biopsy specimen was 6.7 (range: 1-12). Of the 34 core needle biopsies received from the 0A-31103 patient, tumor cells were successfully isolated and expanded, identified by type (Figure 1C) and labeled accordingly. Overall, tumor cell growth and testing were successful in 83.9% of the specimens. Type of the cancer cell A549 Lung, Mutation type X-341 CD+.

The assay metric aAUC for TX acted as a strong predictor of pCR in patients who were treated with FEC followed by TX. Finding suggests that TX may be more effective than FEC in achieving pCR. Docetaxel increased overall response from 57% to 75% when given as 4 cycles following 4 cycles of FEC as neoadjuvant therapy in breast cancer patients.

Apoptotic effect distributions

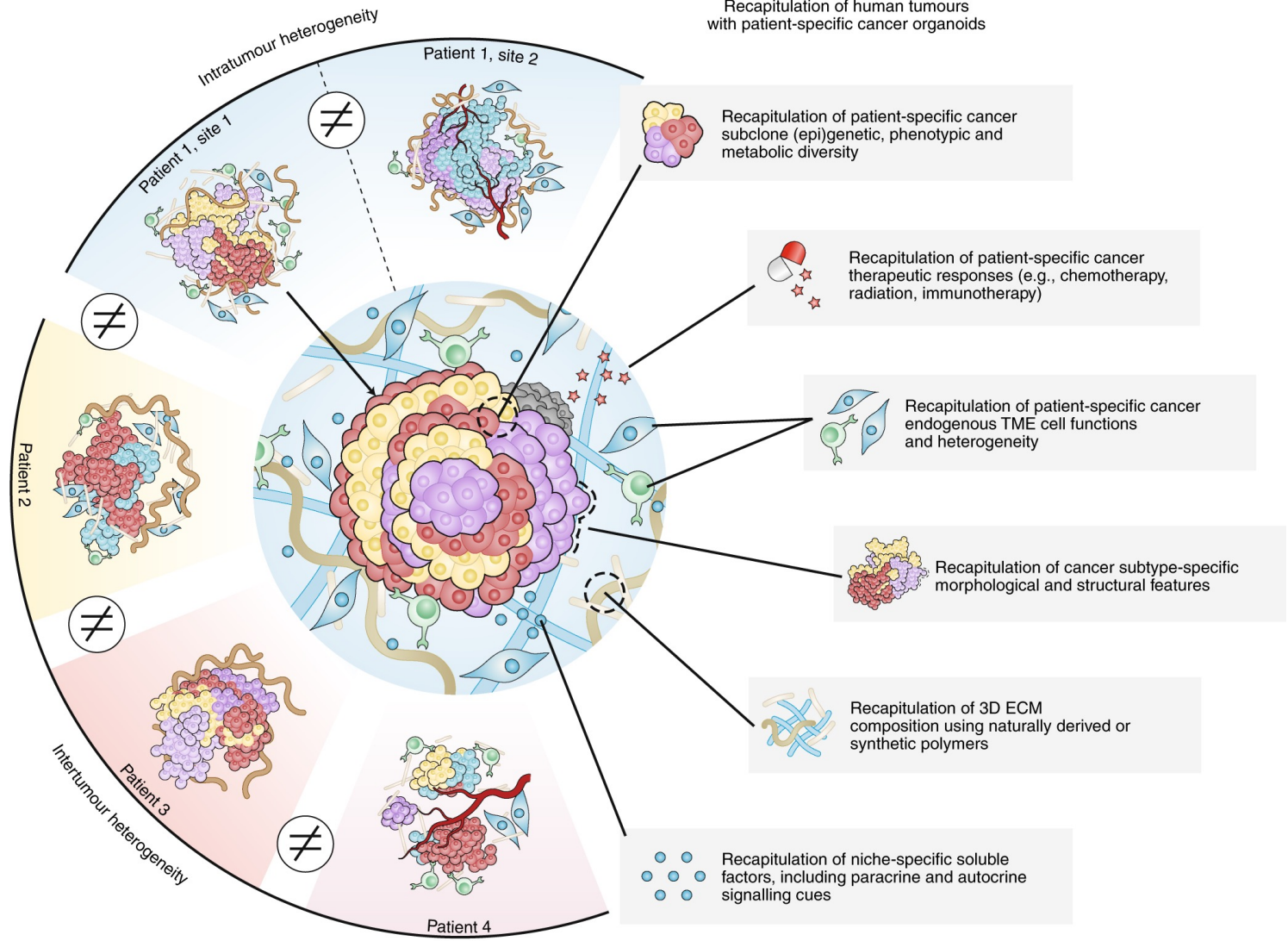
Capecitabine
Cisplatin
Cyclophosphamide
Docetaxel
Docetaxel/capecitabine
Epirubicin
Etoposide
Fluorouracil/epirubicin/cyclophosphamide
Gemcitabine
Paclitaxel
Vinorelbine

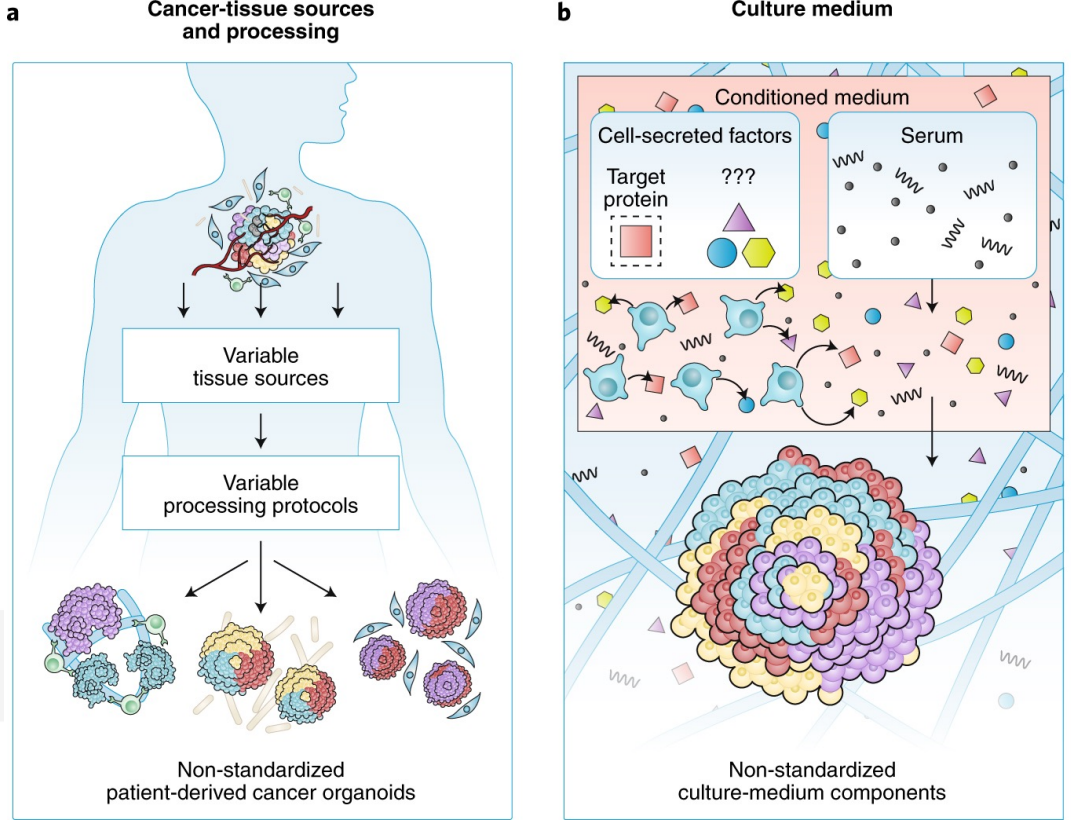
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

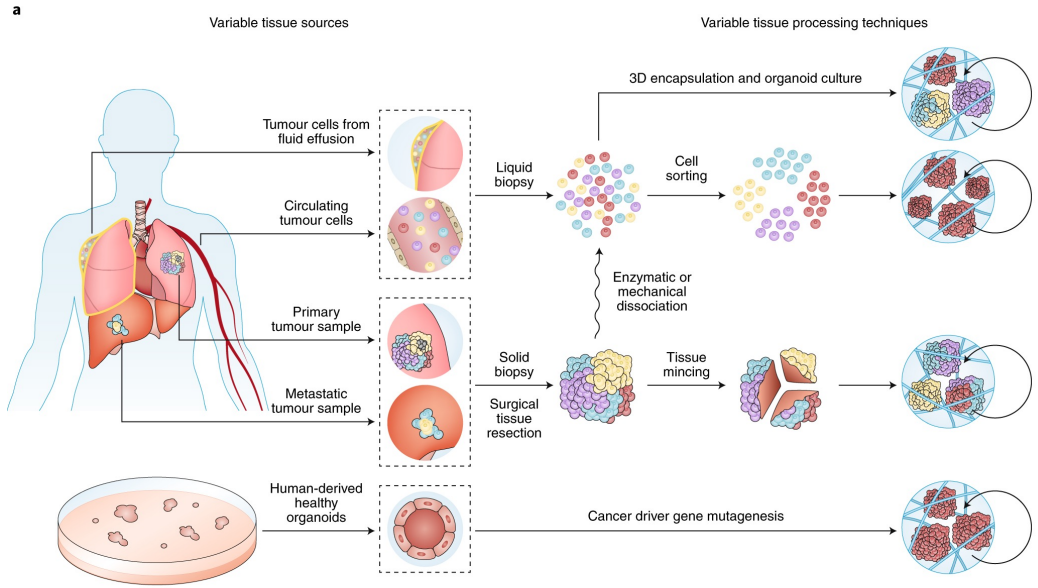
Issued Patent: #PCT/US2020037370

ISSRDC

Purpose	Transformative precision oncology systems to determine the most effective cancer treatment plan for each patient
Products Application Readiness Level	**nCapsule** Best Treatment Clinically Proved **nWell** High throughput Data Clinically Proved **nDoser** Best Dose In Clinical Tests **nVasive** Ultimate tumor fate InSPA/NASA **nCapsulizer** Fully Automated InSPA/NASA
A Unique Technology with significant Value Propositions	With our multigel technology, cancer cells are embedded among the natural stromal cells. All microtumors have hypoxic cores that retains resistant cells, and predefined boundaries provides a clear baseline for tumor invasion measurements. Tumor-on-a-chip with multi-gel design Heterogeneous Spheroids with hypoxic core Bioreactor with cyclic flow, controlled CO_2 & humidity Pre-defined shape, size, x-y-z coordination, & automated
Markets	**Clinical Tool**: Simple regulatory process with CMS/CLIA clearance | CPT Codes are established Significant social and financial impact in the nation | $19B+ market | Primary focus: Colon & Pancreas **Pharmaceutical Tool**: Encapsulate owns a comprehensive biobank is ready for clinical trial predictions No regulatory is required | Faster revenue generation path | $7B+ market **Medical Device**: Class II FDA Approval required Larger market with a nationwide and international expansion through partnership with chain labs **Research Tool**: Sales as a research tool, through licensing/direct sales, Space cancer research | Academic laboratories | Private biotech companies

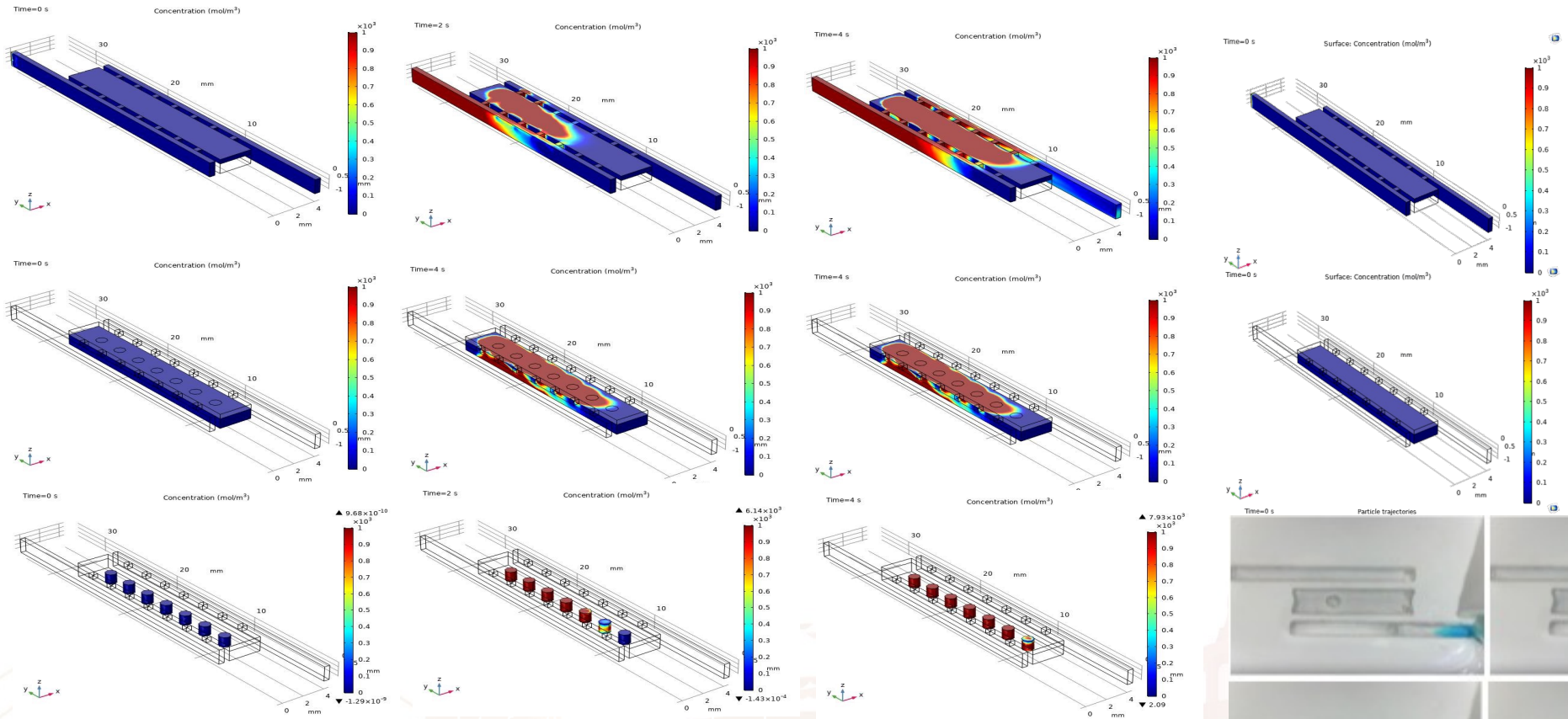






Bauer L. LeSavage et al, Nature Materials, 2022

Mass Transfer and Diffusion Simulations



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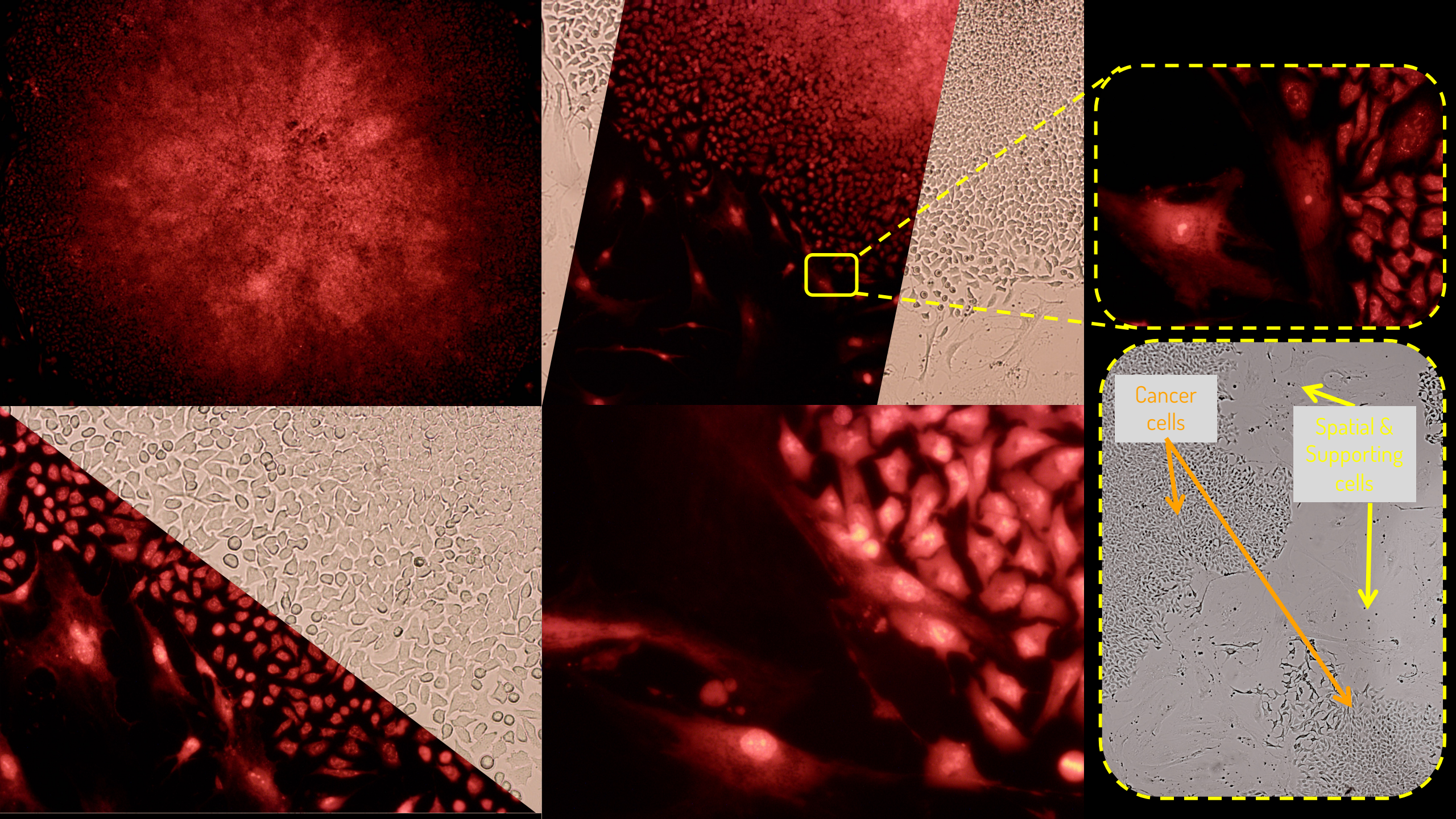
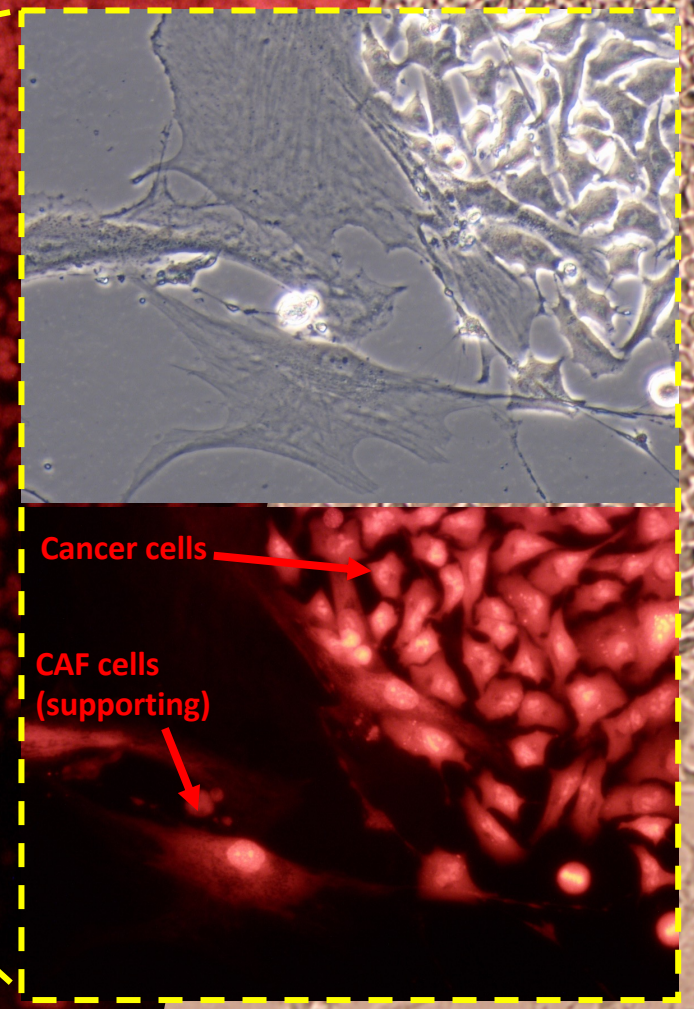

Cancer cells
Spatial & Supporting cells

- Our optimized protocol for tumor dissociation, along with our optimized enzymatic cocktail enable us to preserve high cell viability and grow patients' specimens in their innate biological status.

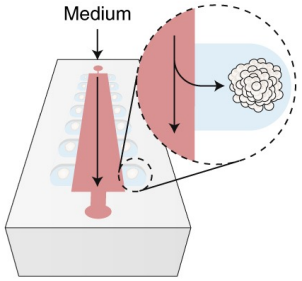
- In long-term studies (50 days+), the cells can create their own natural tumors in our system.

- Heterogeneous tumor cells reorient themselves with a cancerous core surrounded by supporting stromal-like cells.

Patient tumor grown in a microtumor form, labeled by our NanoNest® fluorescence tag (pre-chemo).

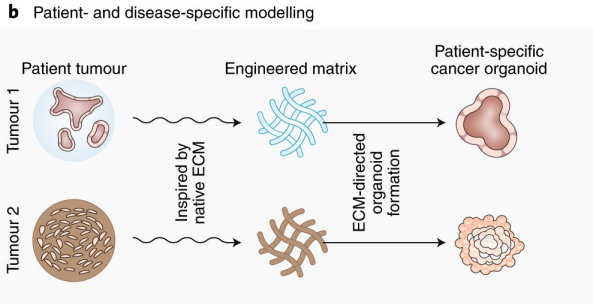


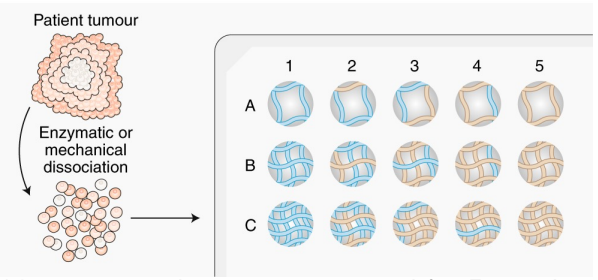
Encapsulate
Cancer Solutions



Organoid-on-a-chip and microwell culture

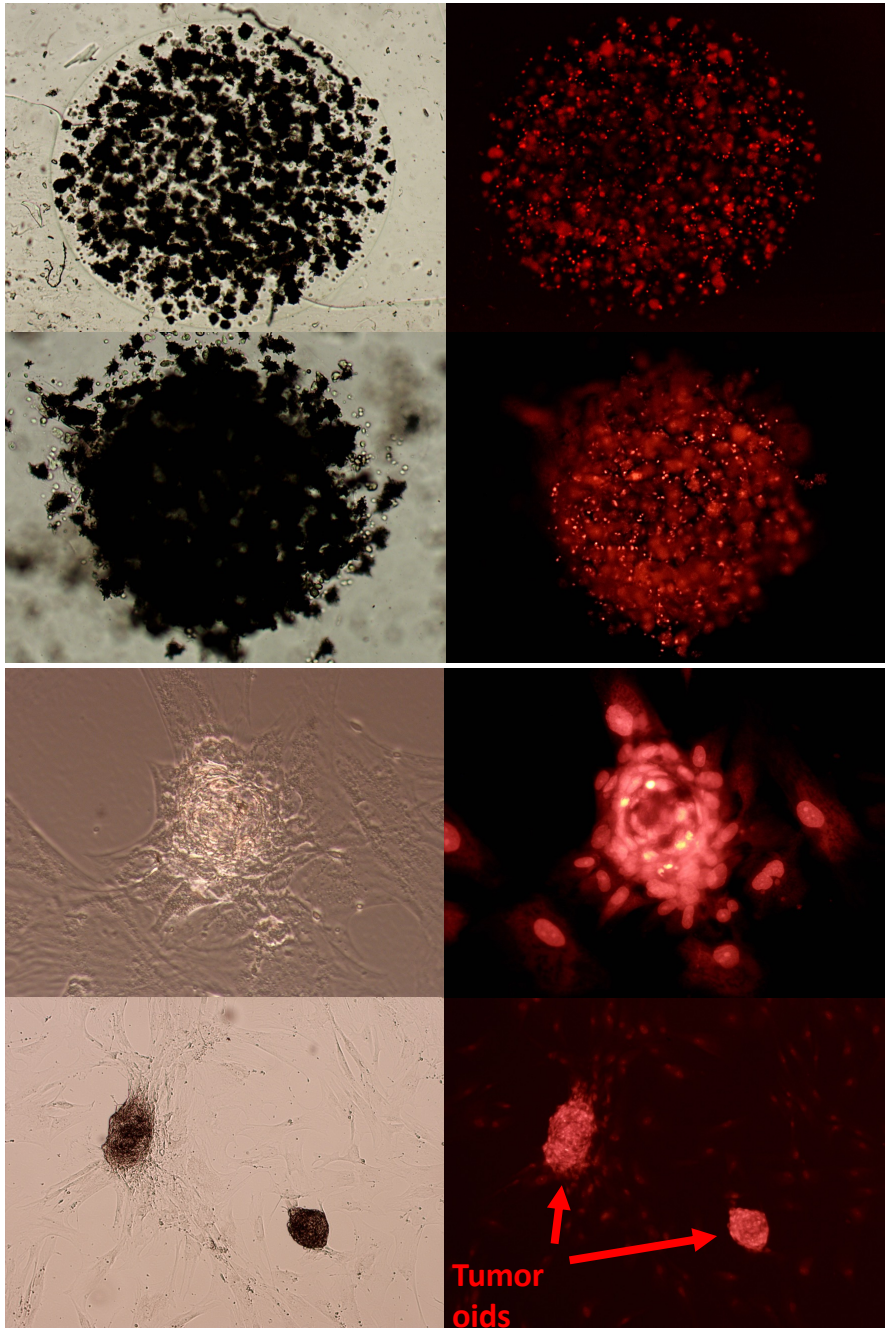
- Enhances control of nutrient transport to organoids
- Enables standardization of organoid size
- Enables modular assay and cell-type integration



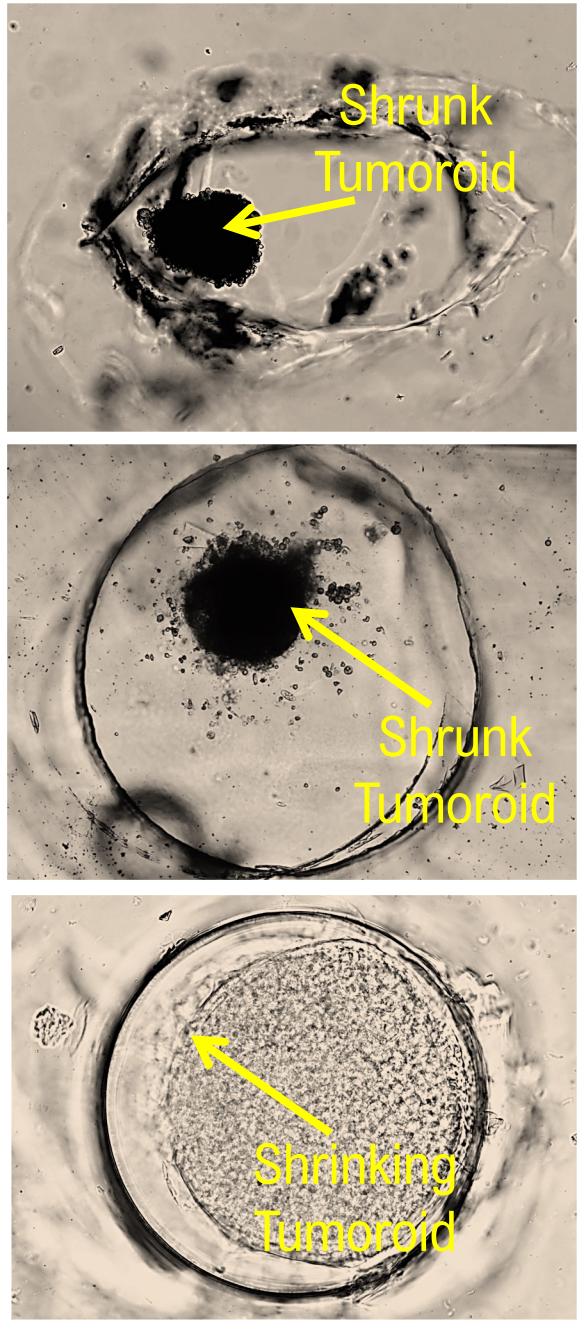


Next-generation cancer organoids, Bauer L. LeSavage et al, Nature Materials, 2022

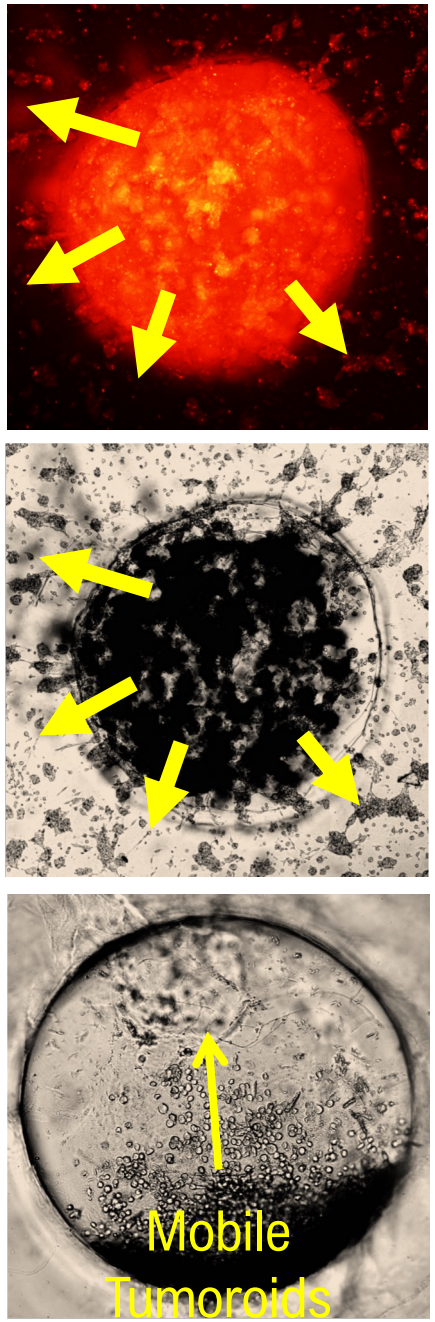
Bacteria Spheroids for antibiotic evaluation

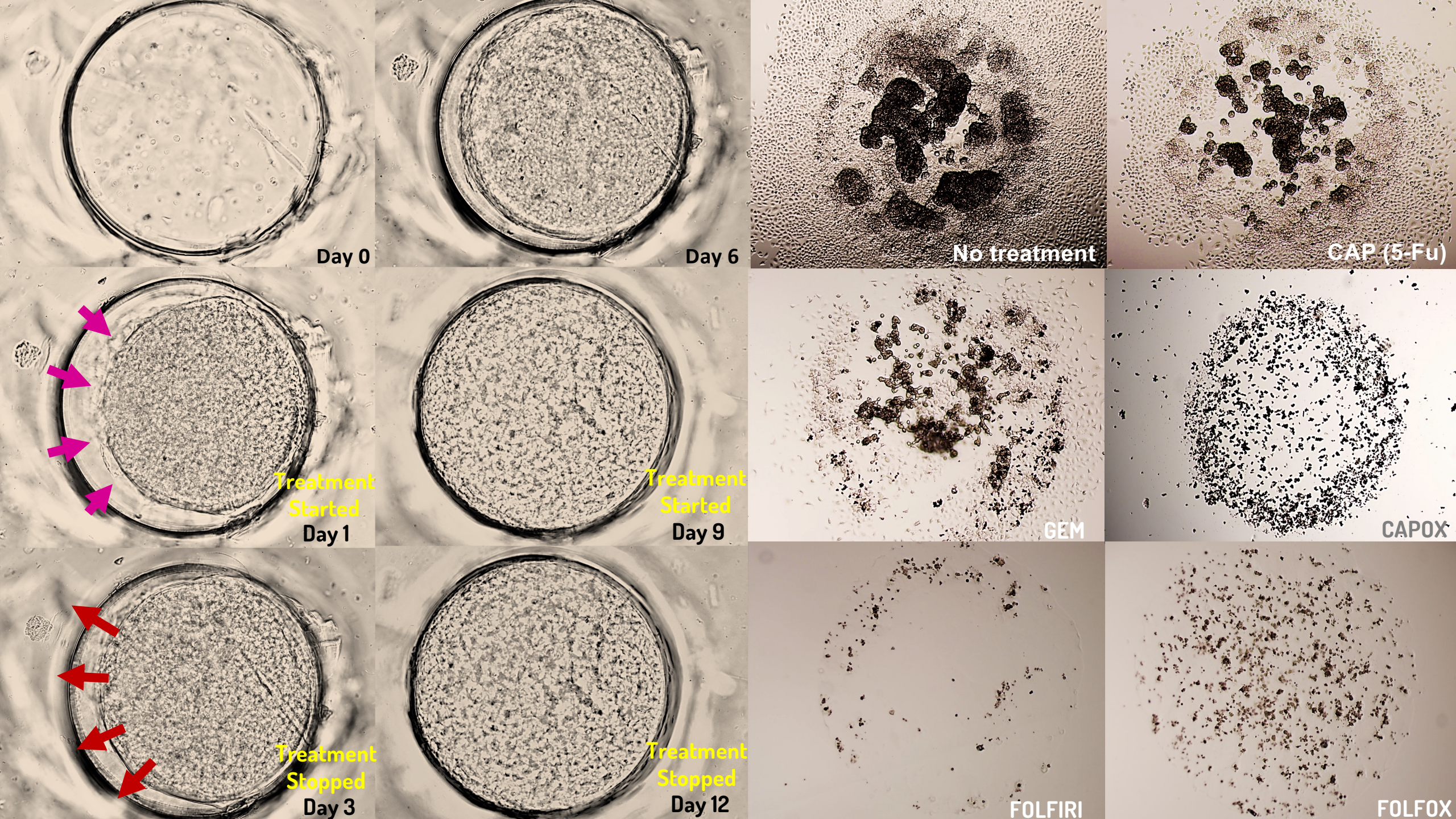


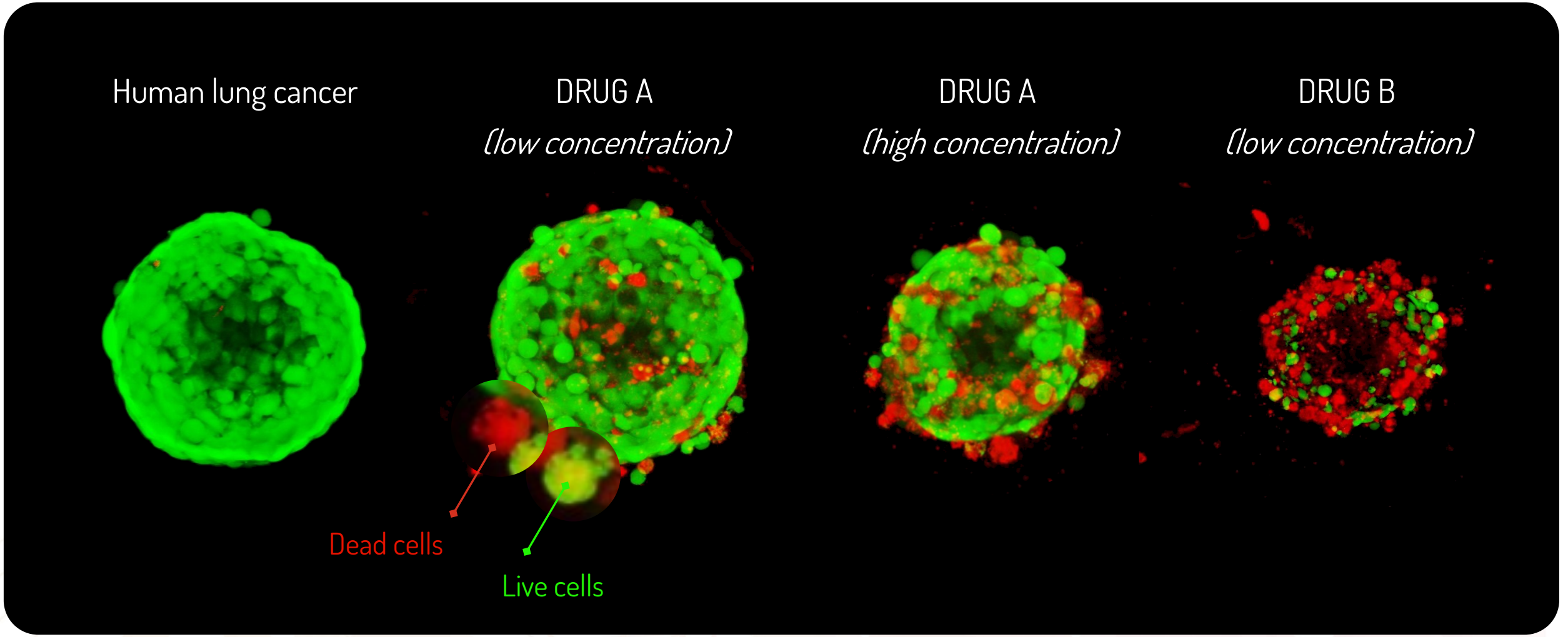
Shrinking Tumoroids



Aggressive tumoroids

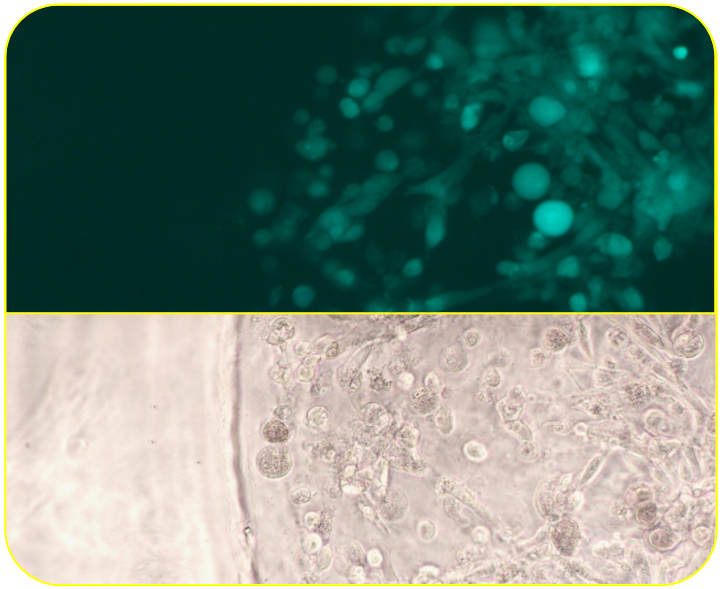
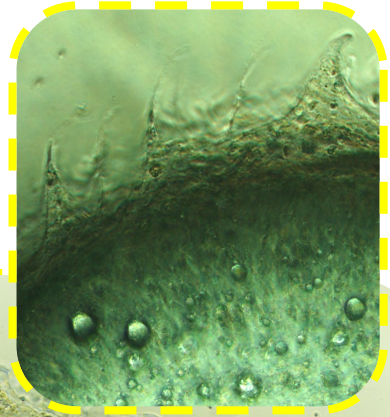
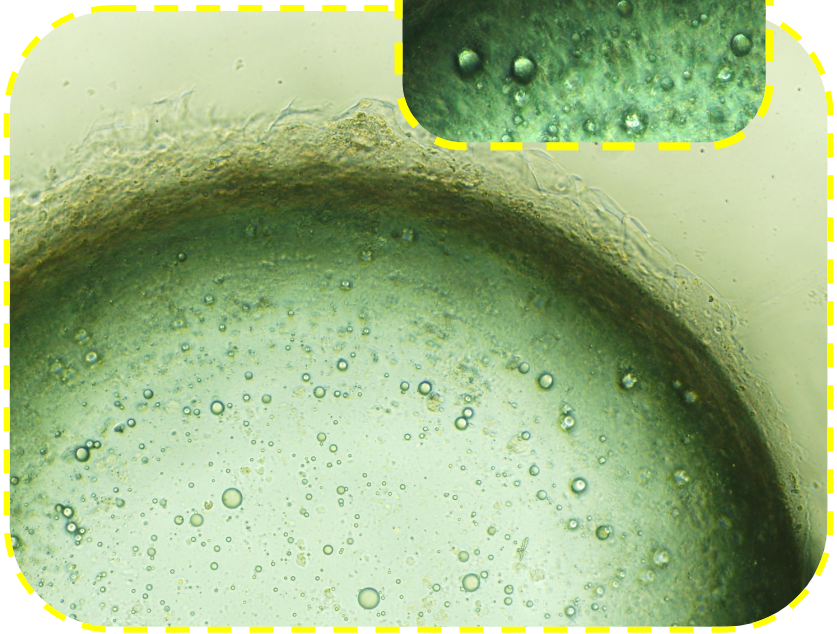
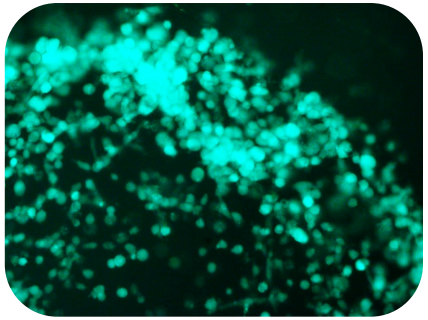
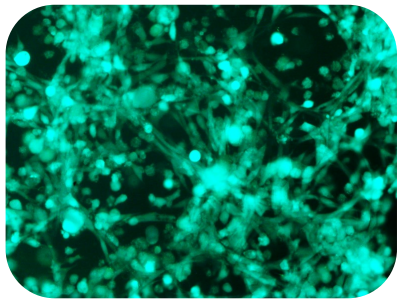
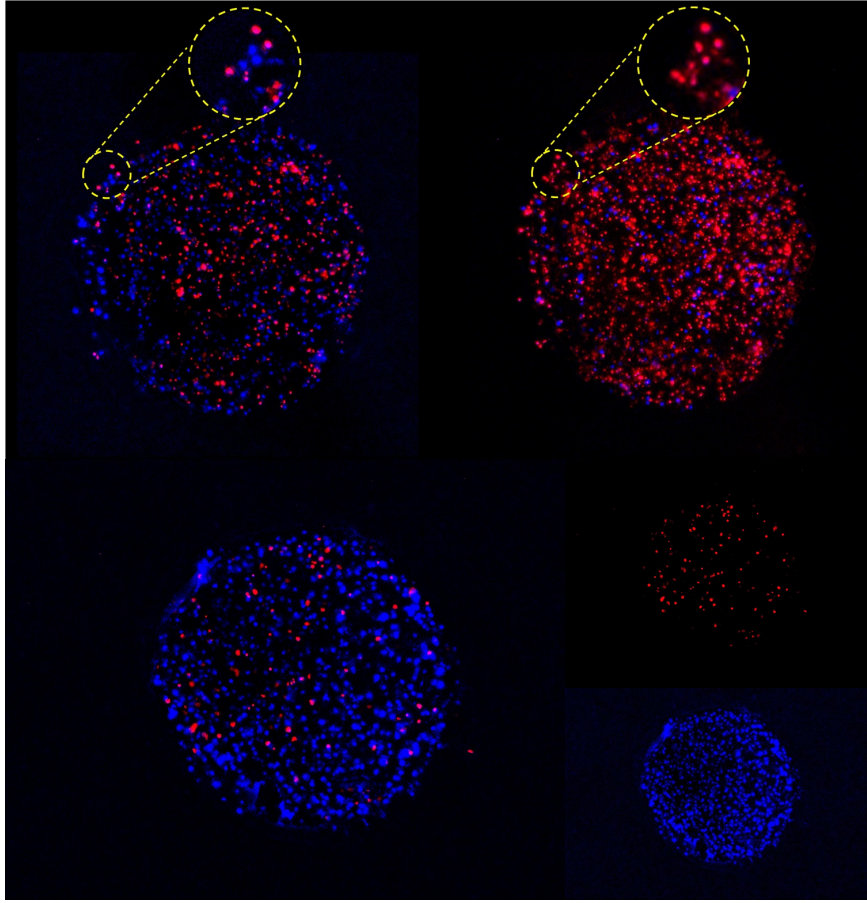



Day 0
Day 6
No treatment
CAP (5-Fu)
Treatment Started
Day 1
Treatment Started
Day 9
GEM
CAPOX
Treatment Stopped
Day 3
Treatment Stopped
Day 12
FOLFIRI
FOLFOX

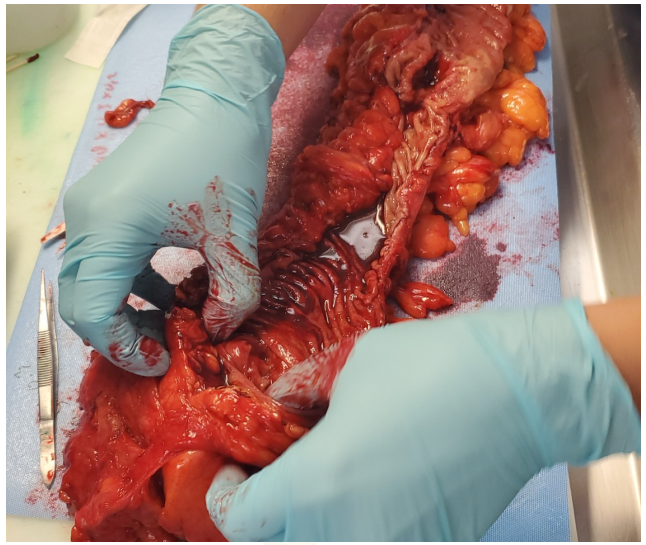

Human lung cancer
DRUG A
(low concentration)
DRUG A
(high concentration)
DRUG B
(low concentration)
Dead cells
Live cells

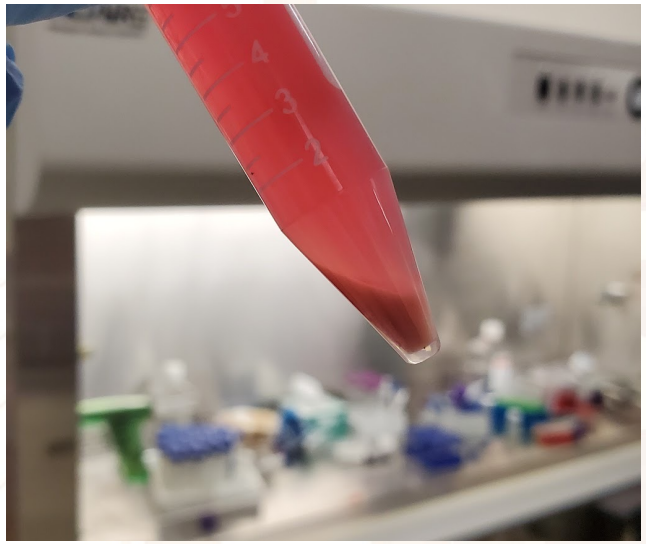
- nCapsule microtumors can be treated in 2 hours and start to proliferate within 24 hours.
- The size, the shape, and the density of these tumors are reproducible and easily modifiable.
- Tumor invasion can take place in 7 days post microtumor fabrication.

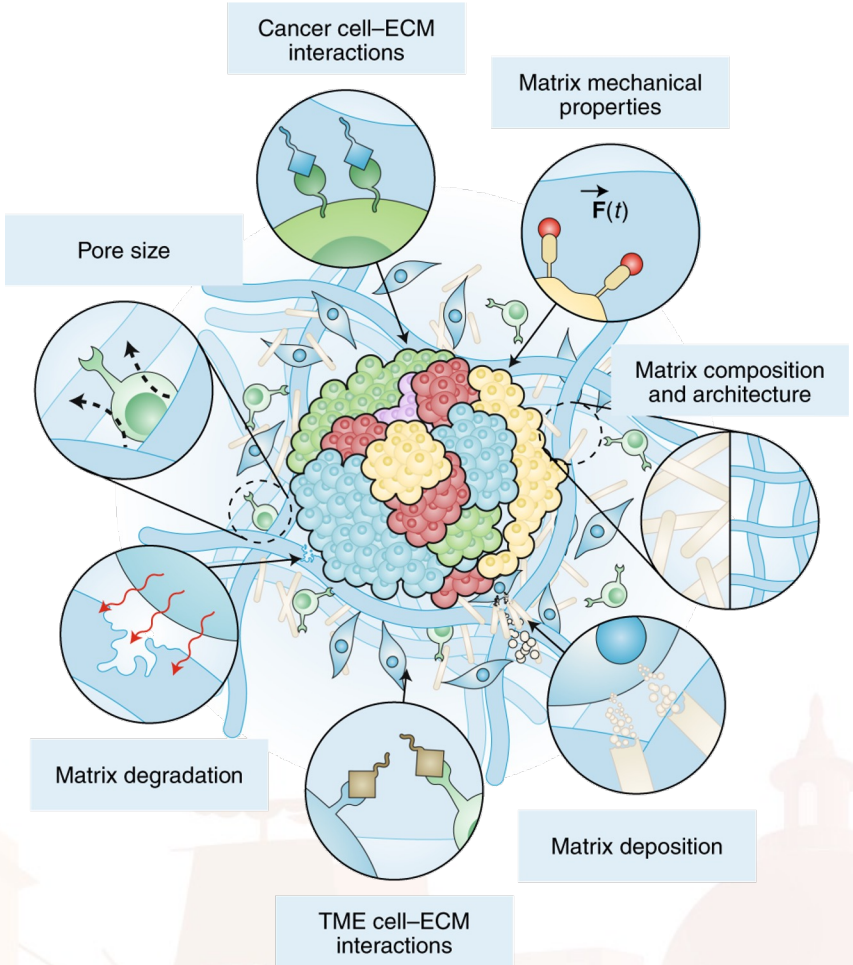


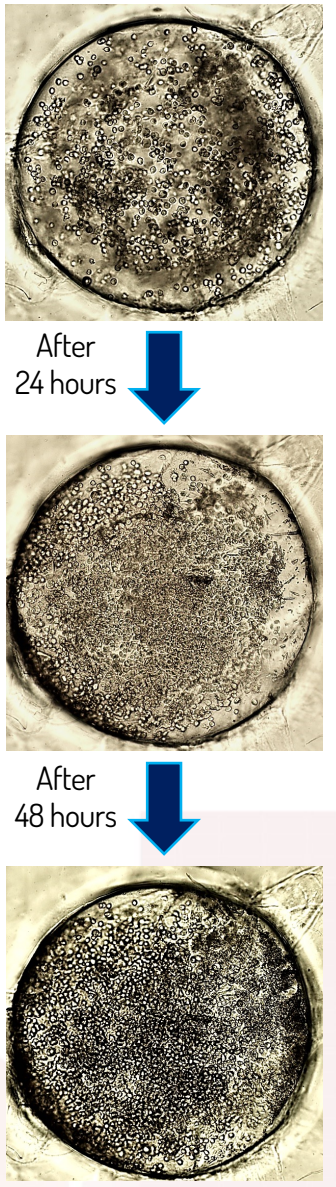







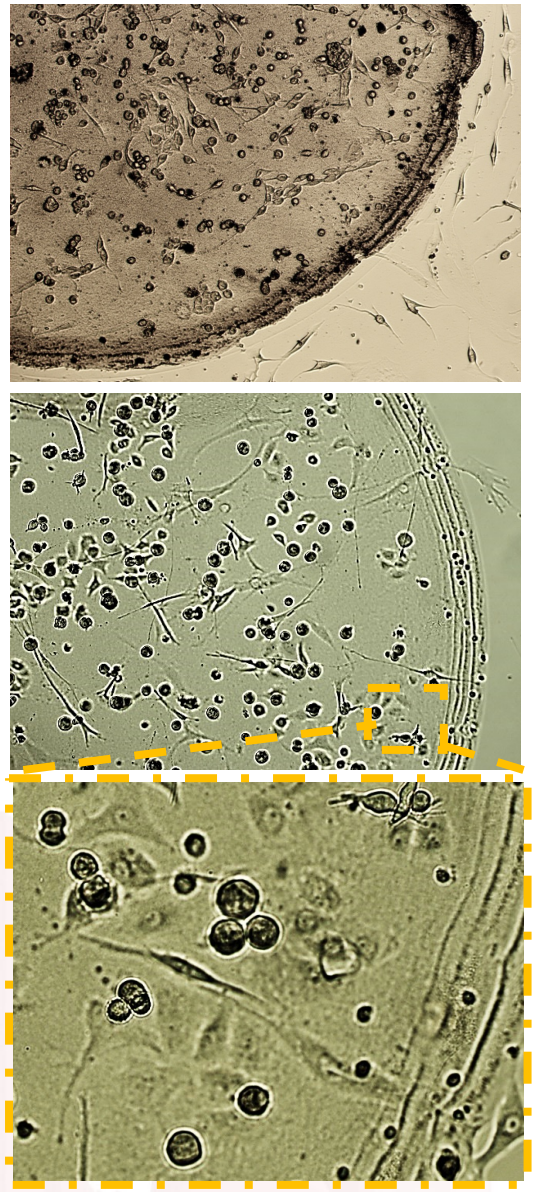
Tumoroids Heterogeneity and Growth











Bauer L. LeSavage et al, Nature Materials, 2022

First round response:
Complete: 8
Partial: 7
Non-responder: 15

Whole treatment success (5-year survival):
Failed: 19
Success: 11

II: 4
III: 8
IV: 18

30 Bio-banked patient samples
21 Cell lines

Total of 74 rounds

CR: 28
PR: 15
SD: 6
PD: 25

20 White
5 African-American
4 Latino
1 Asian

14 Women / 16 Men

Biopsies from:
Colon, Rectum, Sigmoid, Lung, & Ovary

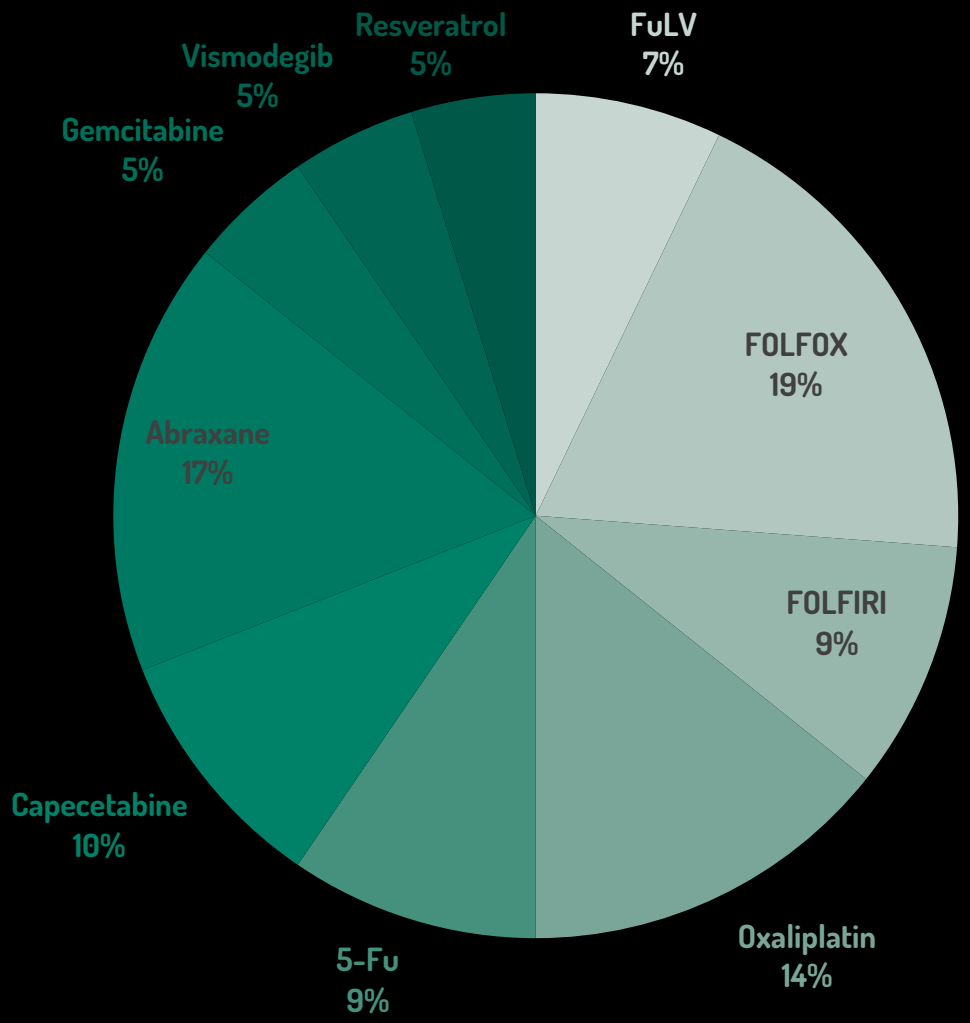
Total of
30 Prospective
30 Retrospective

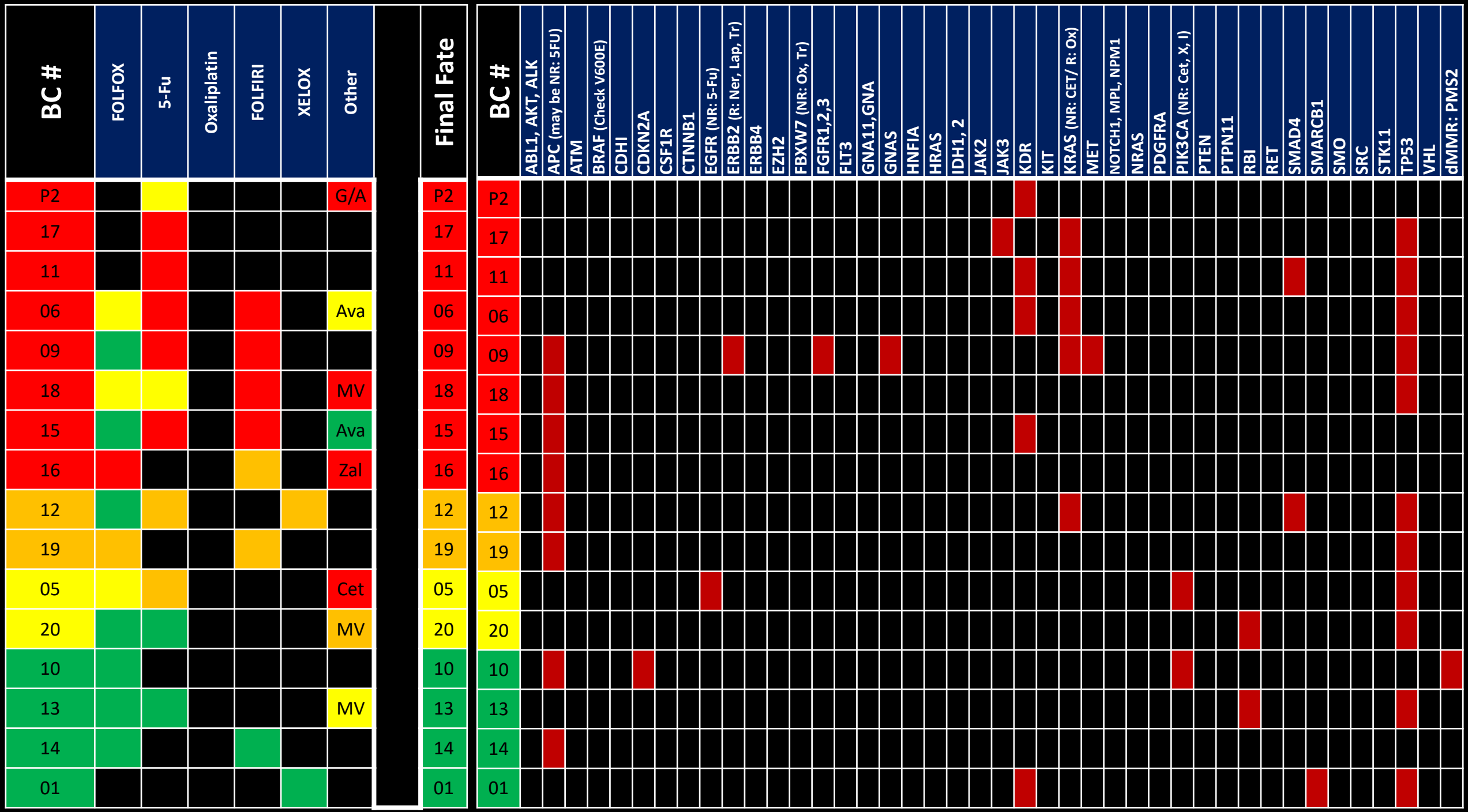
More than 7000 µTumors to date

Ages: 38-82

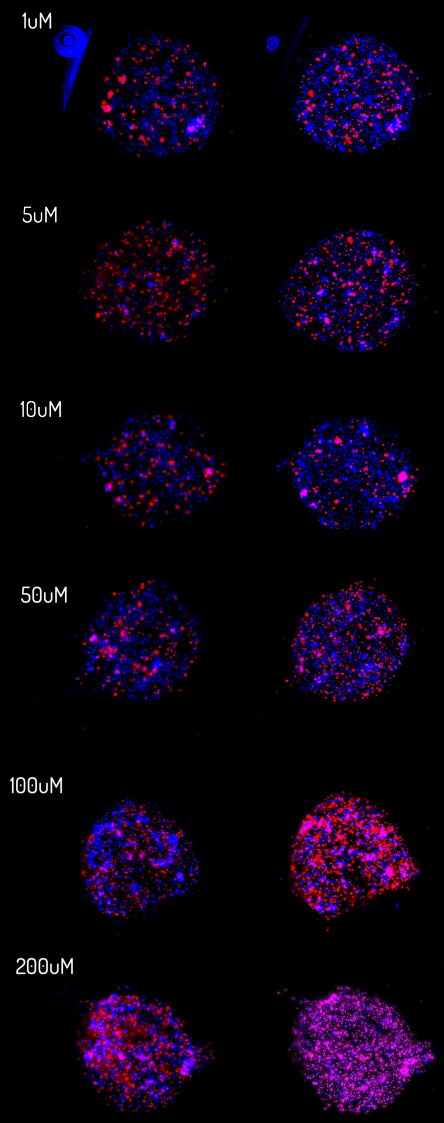
1 Current Smoker
8 Previous Smoker
21 Non-smoker

Number of responders in the first 30 patients

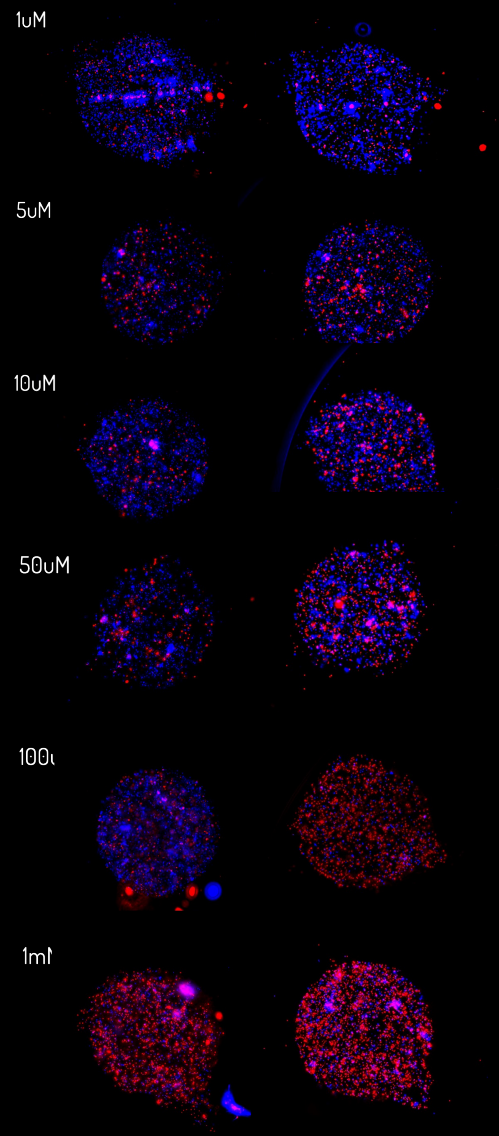



BC #
FOLFOX
5-Fu
Oxaliplatin
FOLFIRI
XELOX
Other
Final Fate
P2 G/A P2
17 17
11 11
06 Ava 06
09 09
18 MV 18
15 Ava 15
16 Zal 16
12 12
19 19
05 Cet 05
20 MV 20
10 10
13 MV 13
14 14
01 01
BC #
ABL1, AKT, ALK
APC (may be NR: 5FU)
ATM
BRAF (Check V600E)
CDHI
CDKN2A
CSF1R
CTNNB1
EGFR (NR: 5-Fu)
ERBB2 (R: Ner, Lap, Tr)
ERBB4
EZH2
FBXW7 (NR: Ox, Tr)
FGFR1,2,3
FLT3
GNA11,GNA
GNAS
HNFIA
HRAS
IDH1, 2
JAK2
JAK3
KDR
KIT
KRAS (NR: CET/ R: Ox)
MET
NOTCH1, MPL, NPM1
NRAS
PDGFRA
PIK3CA (NR: Cet, X, I)
PTEN
PTPN11
RBI
RET
SMAD4
SMARCB1
SMO
SRC
STK11
TP53
VHL
dMMR: PMS2

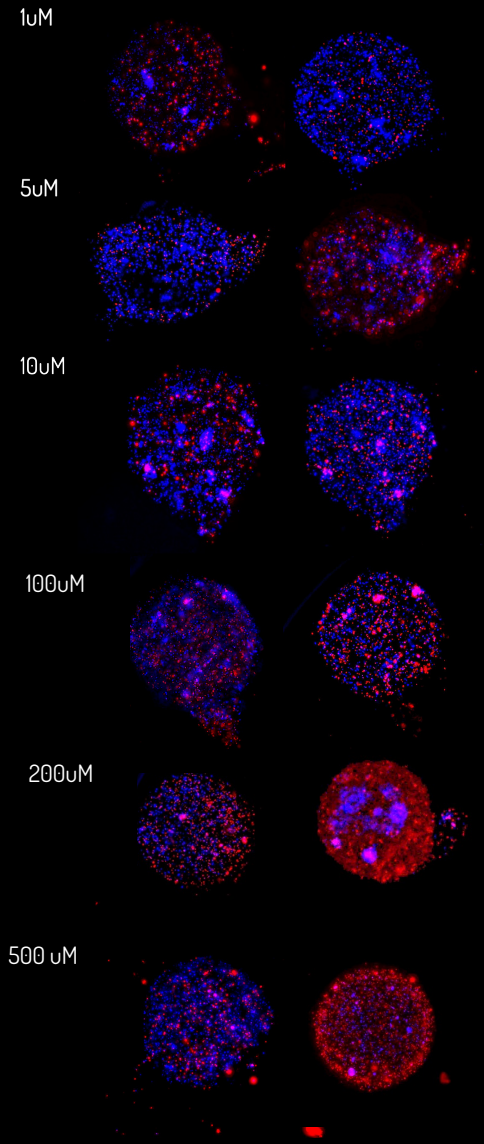
OX: Day 3 → day 7

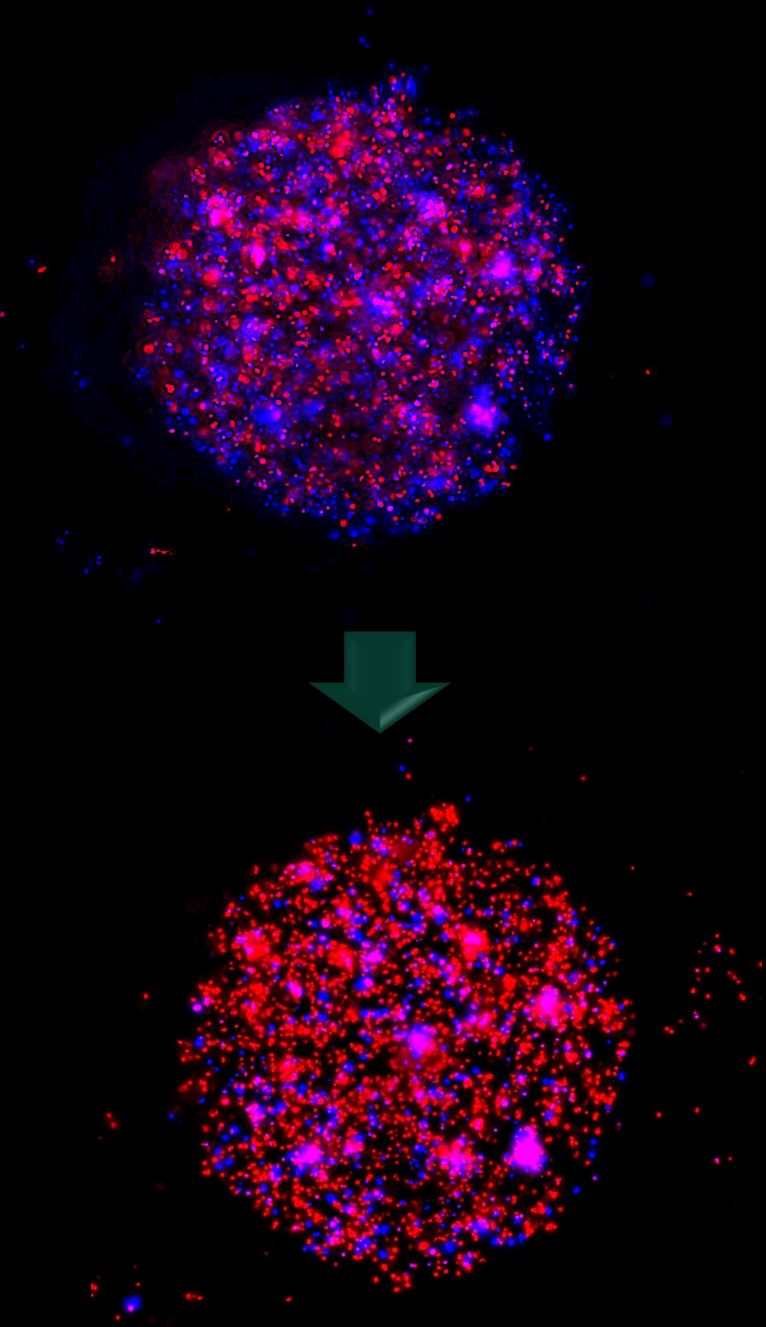


FOLFOX: Day 3 → day 7



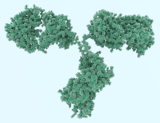
FOLFIRI: Day 3 → day 7



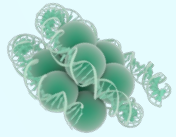


- ✓ Best combination with other drugs
- ✓ Minimal effective dose
- ✓ Resistance development
- ✓ Genetic mutations after treatment
- ✓ Microbiome alterations
- ✓ Tumor metastatic response
- ✓ Pre- & post- treatment mutations
- ✓ RNA/DNA seq
- ✓ Proteomics and metabolomics
- ✓ Drug diffusion model within ECM

Proteomics

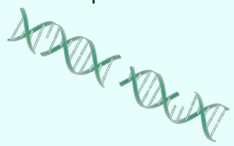


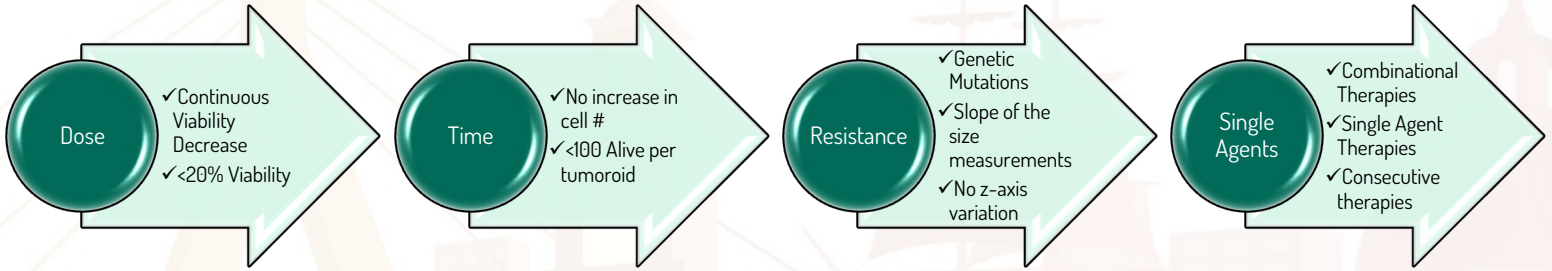
Metabolomics



Direct Toxicity

Follow-up mutations



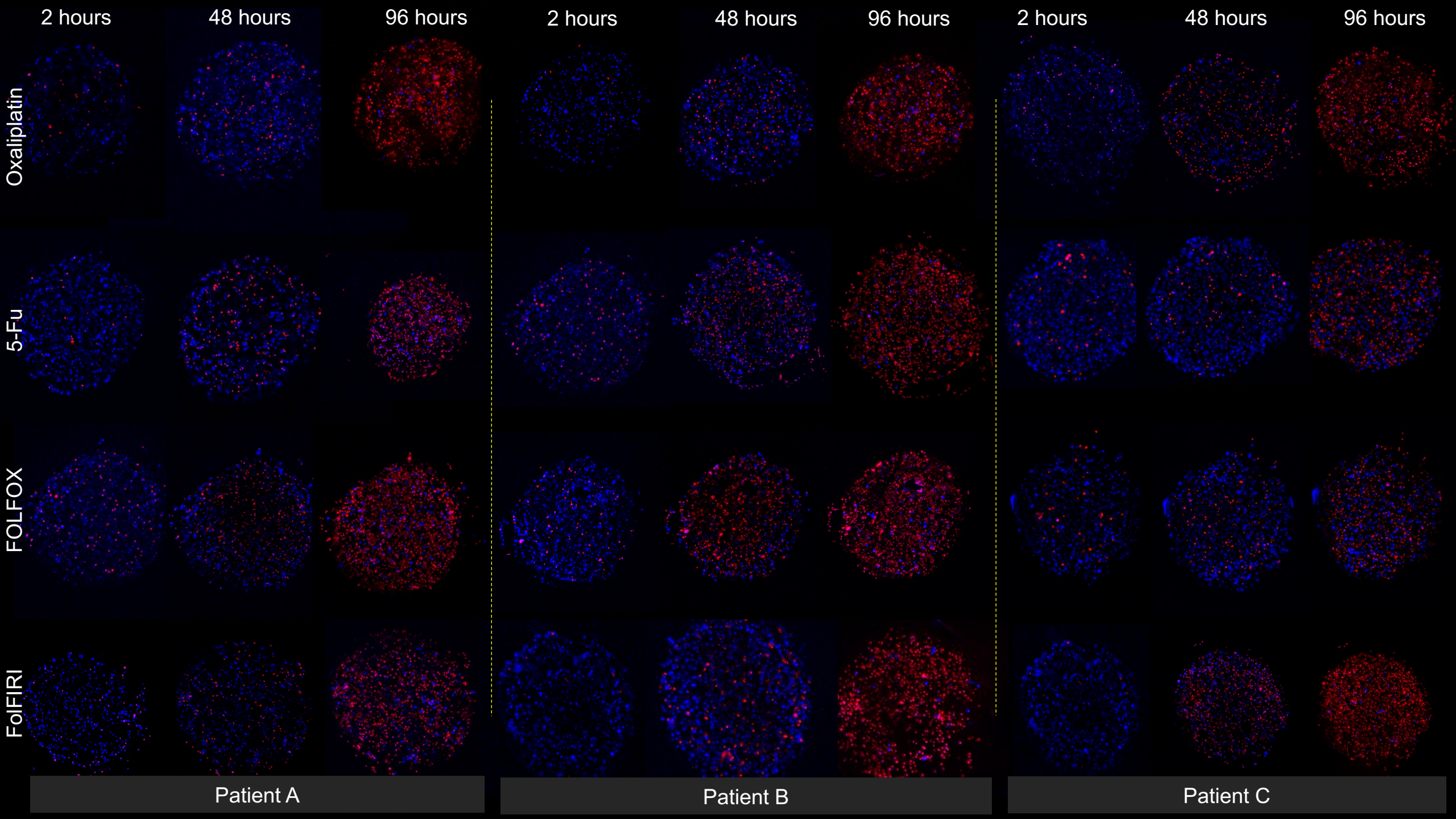


A translational tool to screen compounds

Cancer types	# of cell lines available	# of patient samples
6	25	45

Patients can be sorted by:

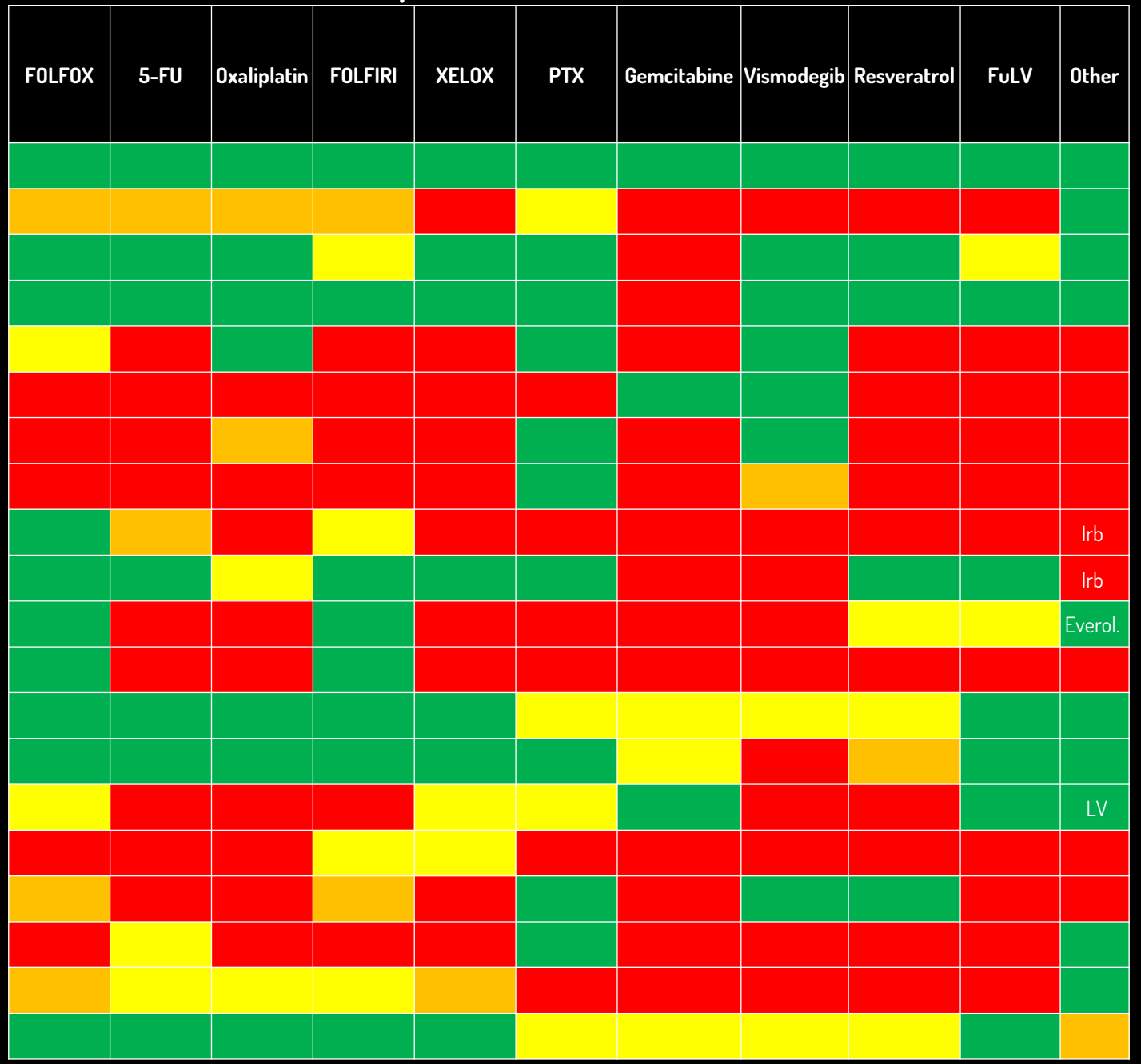
- Demography (gender, age, ethnicity, etc.)
- Cancer stage (II to IVB)
- Metastatic vs. Non-Metastatic
- Chemo-sensitive vs. Resistant
- Pre-op chemo vs. naïve
- Genetic mutations
  - We have a 50-gene mutation panel including APC, BRAF, CDKN2A, EGFR, ERBBs, FGFR, GNAS, JAKs, KDR, KRAS, PIK3CA, RBI, PTEN, SMAD4, TP53, dMMR, …


2 hours
48 hours
96 hours
2 hours
48 hours
96 hours
2 hours
48 hours
96 hours
Oxaliplatin
5-Fu
FOLFOX
FolFIRI
Patient A
Patient B
Patient C

Clinical Results

	# of rounds	FOLFOX	5-FU	Oxaliplatin	FOLFIRI	XELOX	Other	Final Fate
BC1	2							
BC2	3						Bev	
BC3	3							
BC4	3							
BC5	7						CET	
BC6	7						Avastatin	
BC7	3							
BC8	3							
BC9	3							
BC10	3							
BC11	3							
BC12	4		?					
BC13	3						MVASI	
BC14	3							
BC15	5						Avastatin	
BC16	3						Zaltrap	
BC17	4						Stivarga	
BC18	11						MVASI	
BC19	4							
BC20	3						MVASI	

Encapsulate Predictions



Clinical Results

	# of rounds	FOSLFOX	5-FU	Oxaliplatin	FOLFIRI	XELOX	Other	Final Fate
BC1	2							
BC2	3						Bev	
BC3	3							
BC4	3							
BC5	7						CET	
BC6	7						Avastatin	
BC7	3							
BC8	3							
BC9	3							
BC10	3							
BC11	3							
BC12	4		?					
BC13	3						MVASI	
BC14	3							
BC15	5						Avastatin	
BC16	3						Zaltrap	
BC17	4						Stivarga	
BC18	11						MVASI	
BC19	4							
BC20	3						MVASI	

Encapsulate Predictions

FOLFOX	5-FU	Oxaliplatin	FOLFIRI	XELOX	PTX	Gemcitabine	Vismodegib	Resveratrol	FuLV	Other
										Irb
										Irb
										Everol.
										LV

Pre/Post treatment Mutations

BC #	ABL1, AKT, ALK	APC (may be NR: 5FU)	ATM	BRAF (Check V600E)	CDH1	CDKN2A	CSF1R	CTNNB1	EGFR (NR: 5-Fu)	ERBB2 (R: Ner, Lap, Tr)	ERBB4	EZH2	FBXW7 (NR: Ox, Tr)	FGFR1,2,3	FLT3	GNA11,GNA	GNAS	HNF1A	HRAS	IDH1, 2	JAK2	JAK3	KDR	KIT	KRAS (NR: CET/ R: Ox)	MET	NOTCH1, MPL, NPM1	NRAS	PDGFRA	PIK3CA (NR: Cet, X, I)	PTEN	PTPN11	RB1	RET	SMAD4	SMARCB1	SMO	SRC	STK11	TP53	VHL	dMMR: PMS2
P2																																										
17																																											
11																																											
06																																											
09																																											
18																																											
15																																											
16																																											
12																																											
19																																											
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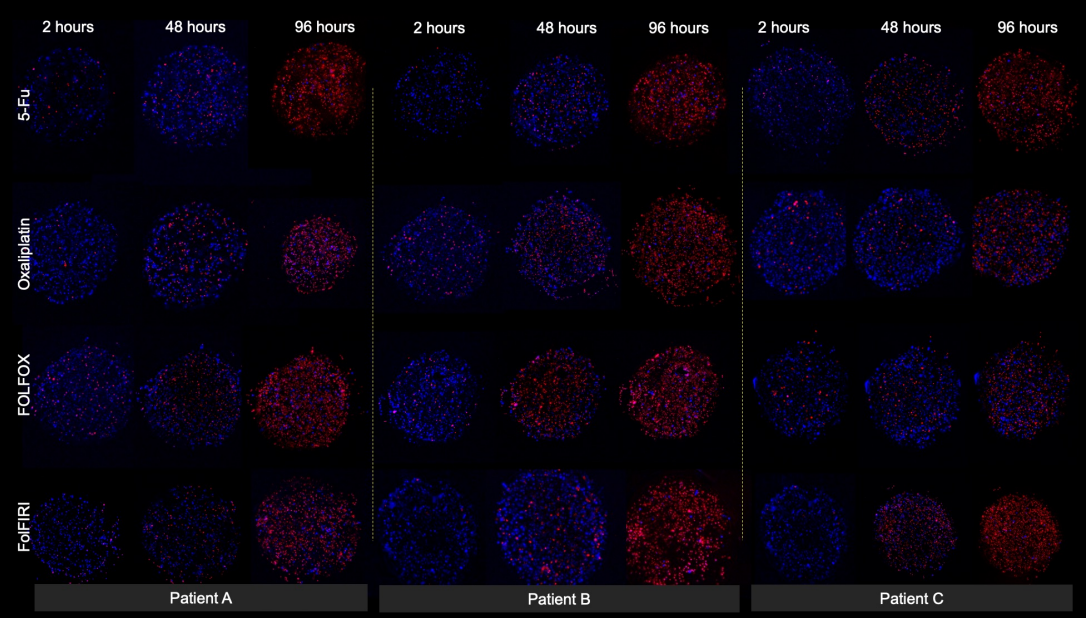
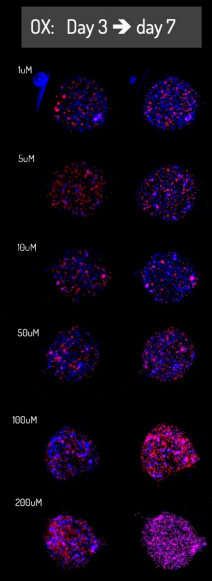
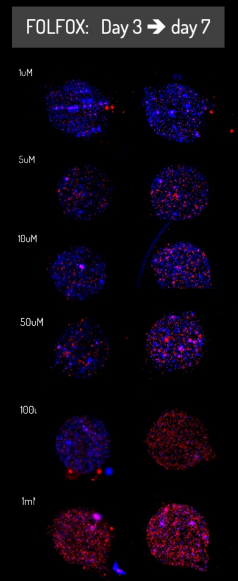
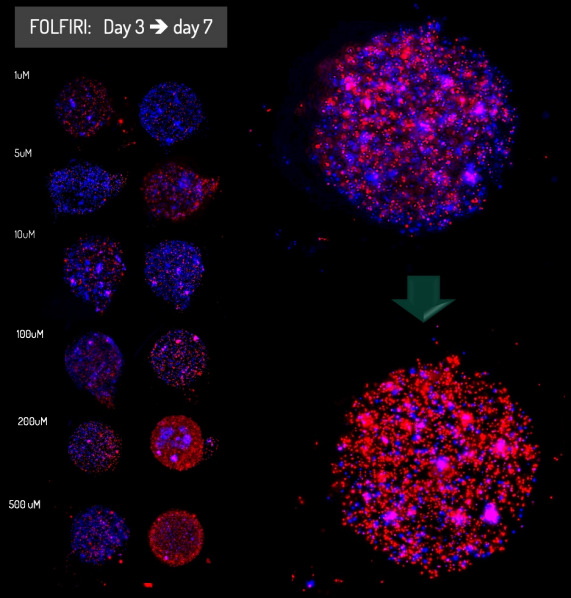
13																																											
14																																											
01																																											









Clinical Proofs

Completed two rounds of **clinical validation** (colon and pancreatic)

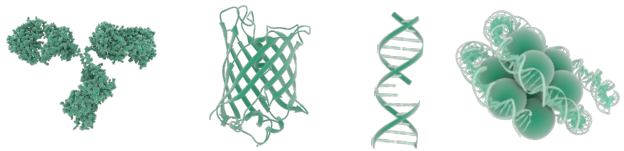
Clinical Outcomes

In **2022-2023** Encapsulate performed retrospective clinical studies on colorectal and pancreatic cases.

94 out of 98 RECIST outcome predictions precisely matched the clinical outcome. **100%** of survival predictions were accurate. The technology was effective in forming tumoroid for all the cancer patients tested.

Assays included

Proteomics Metabolomics Mutations Toxicity

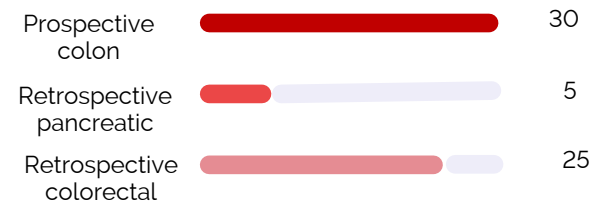


We **proved the accuracy** of our platform for predicting:

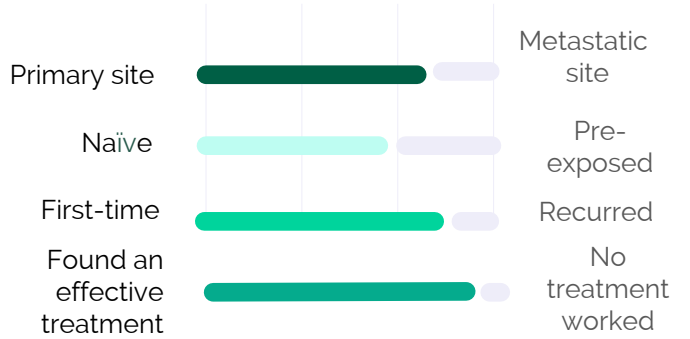
- Effective treatment(s)
- Drug elimination
- Minimal effective dose
- Resistance development

Successfully tested

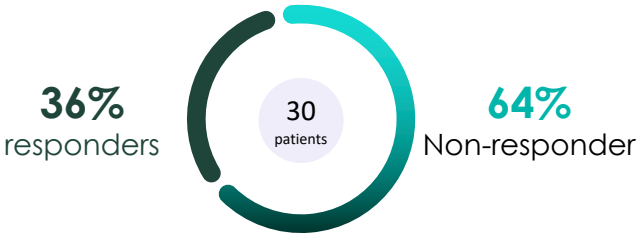
30+30 samples in different conditions, stages, and tumor locations have been tested.



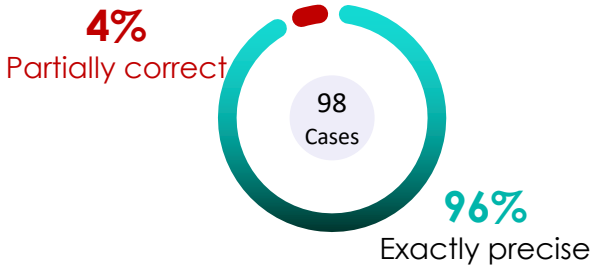
Patients with tumors at stage II, III, and IV, Naïve or pre-exposed to chemo/radiation, and resected from primary tumor location or secondary sites such as abdomen, lung, ovary, and liver, have been tested successfully and shown to be predicted precisely.



Response rate in clinical samples



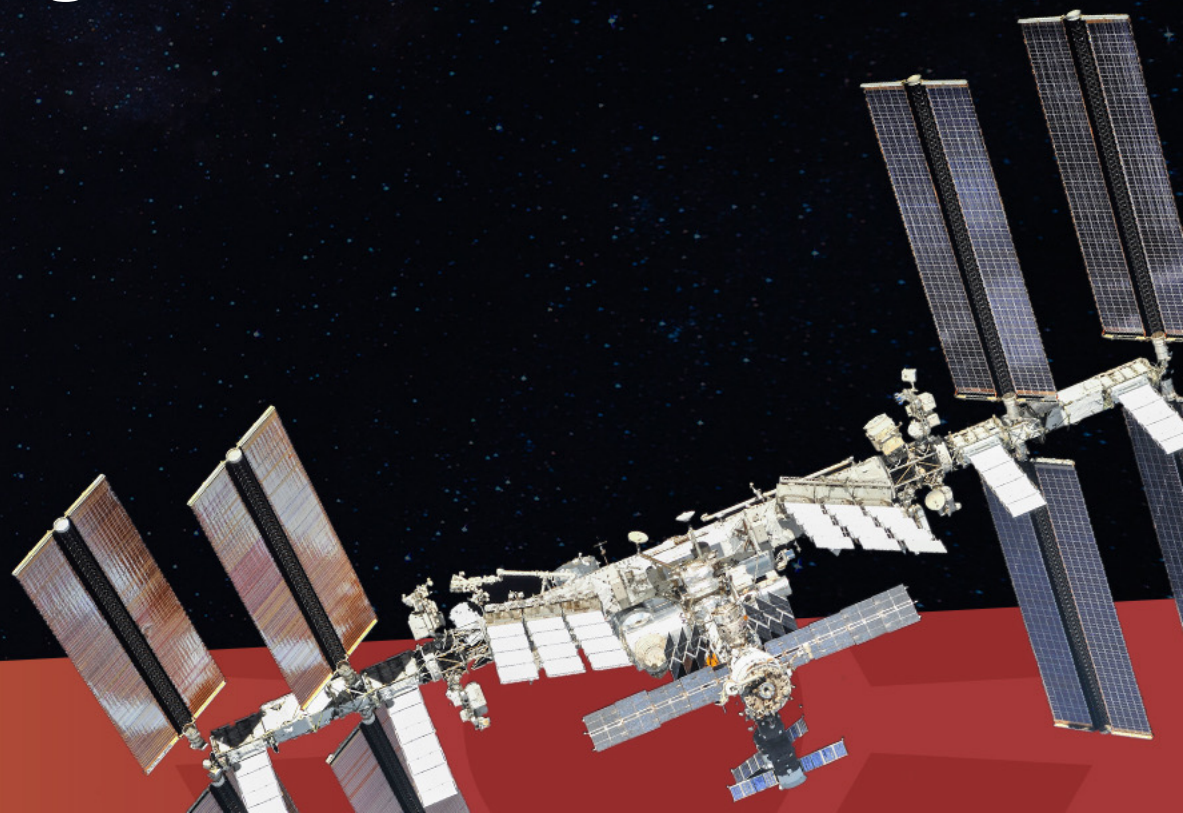
Accuracy of clinical predictions



Tumoroid formation success rate

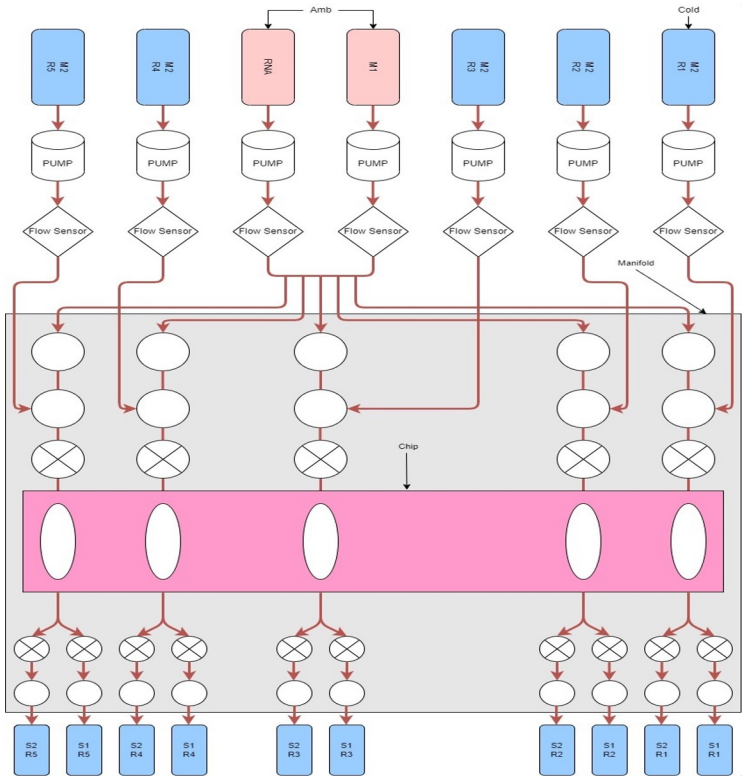
ISSRDC

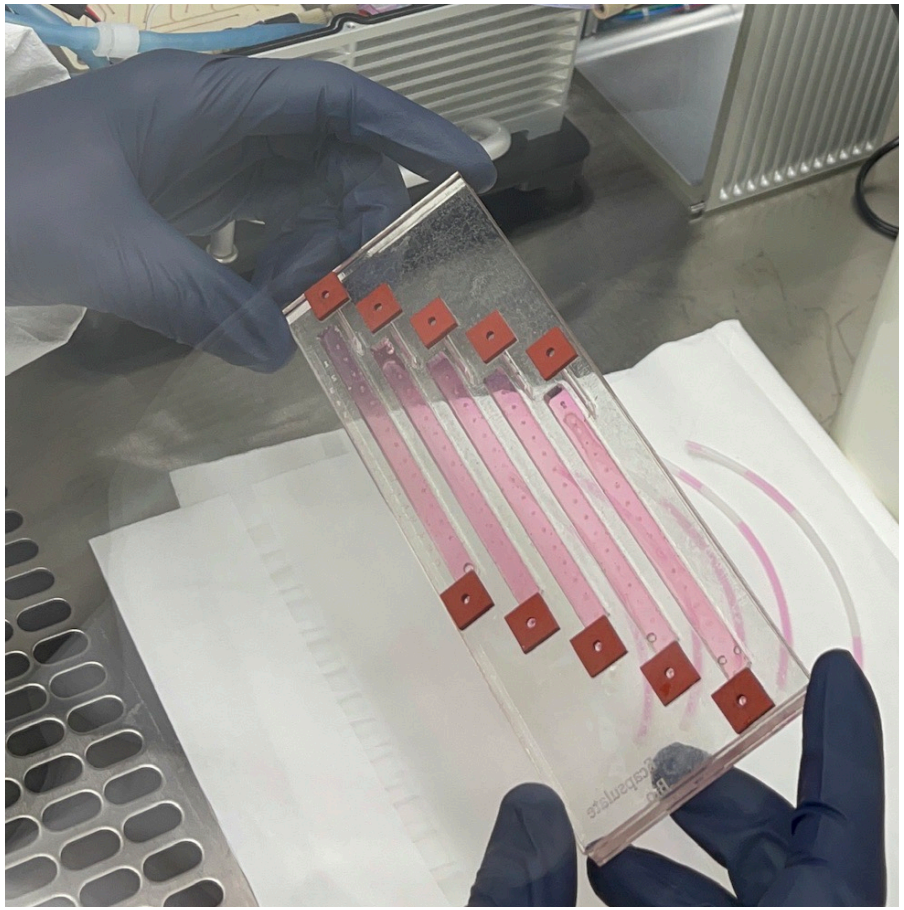
SpaceX CRS 30 Flight Results

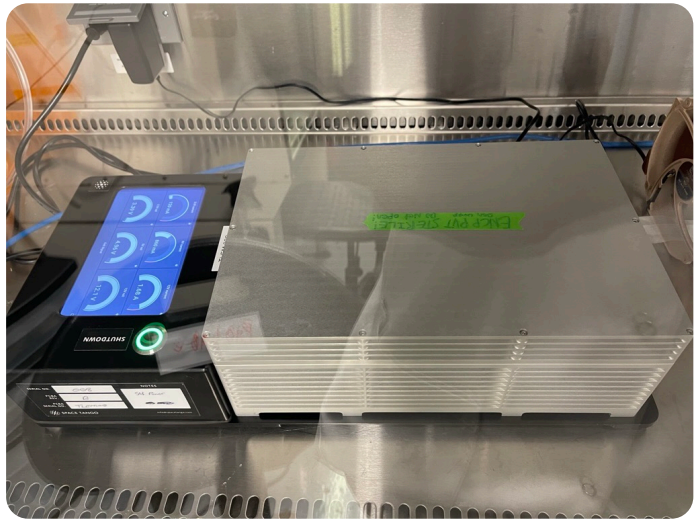


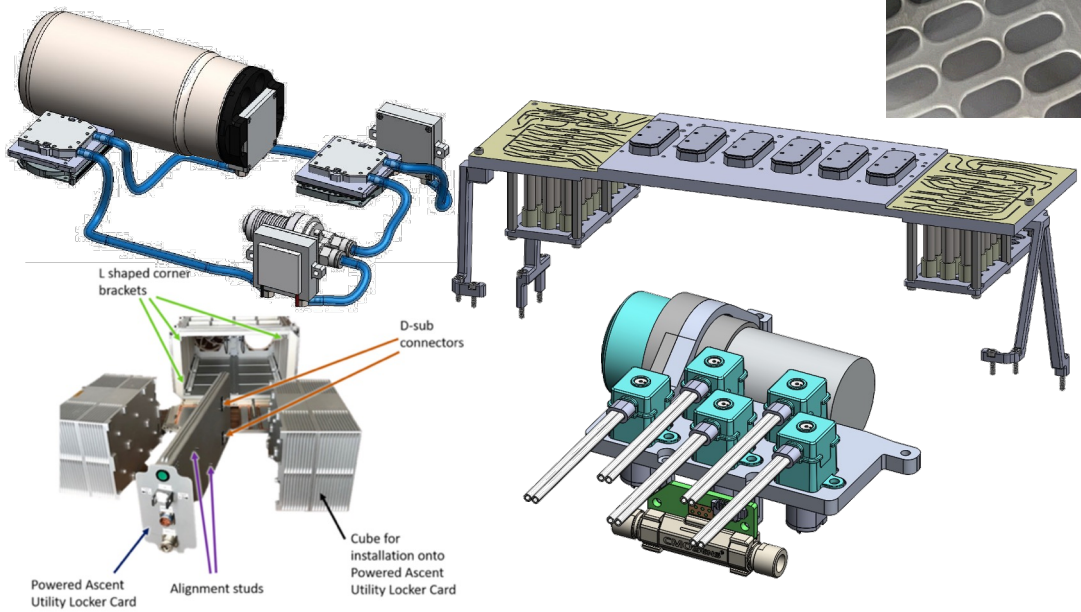
AIRBUS

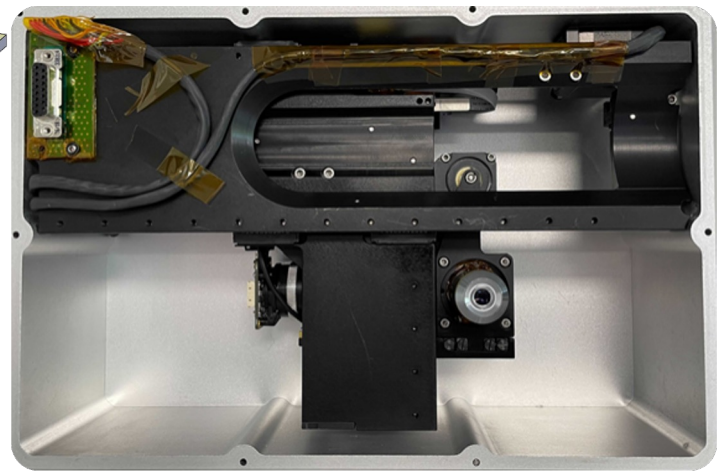
Technical Session Sponsor

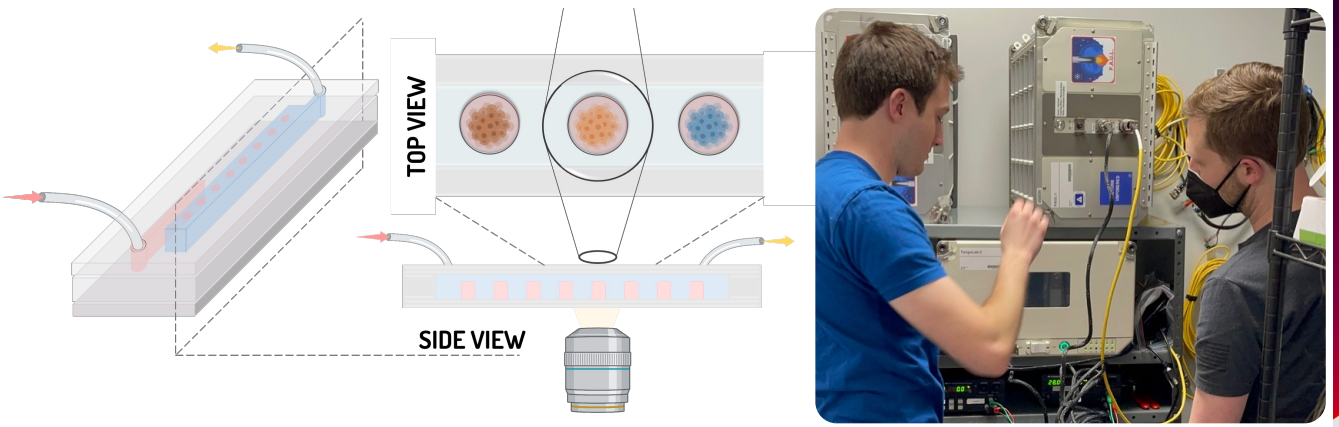

Amb
Cold
R5 M2
R4 M2
R/M M
M 1
R3 M2
R2 M2
R1 M2
PUMP
Flow Sensor
Manifold
Chip
S2 R5
S1 R5
S2 R4
S1 R4
S2 R3
S1 R3
S2 R2
S1 R2
S2 R1
S1 R1

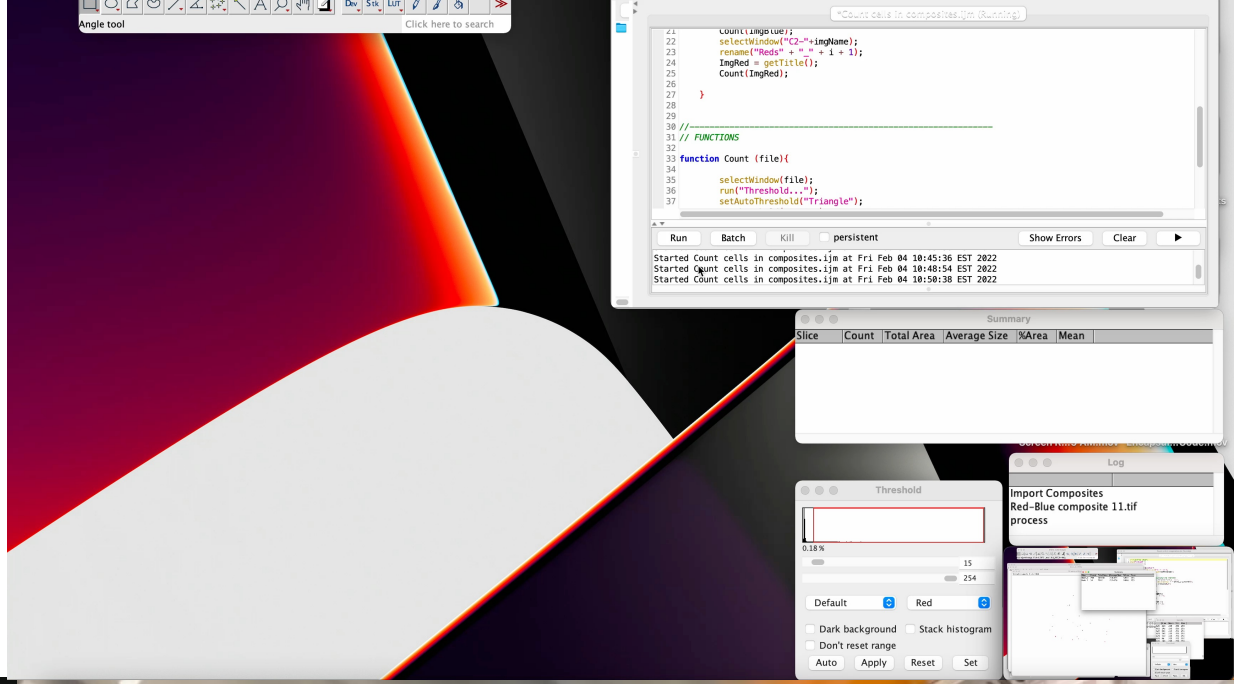


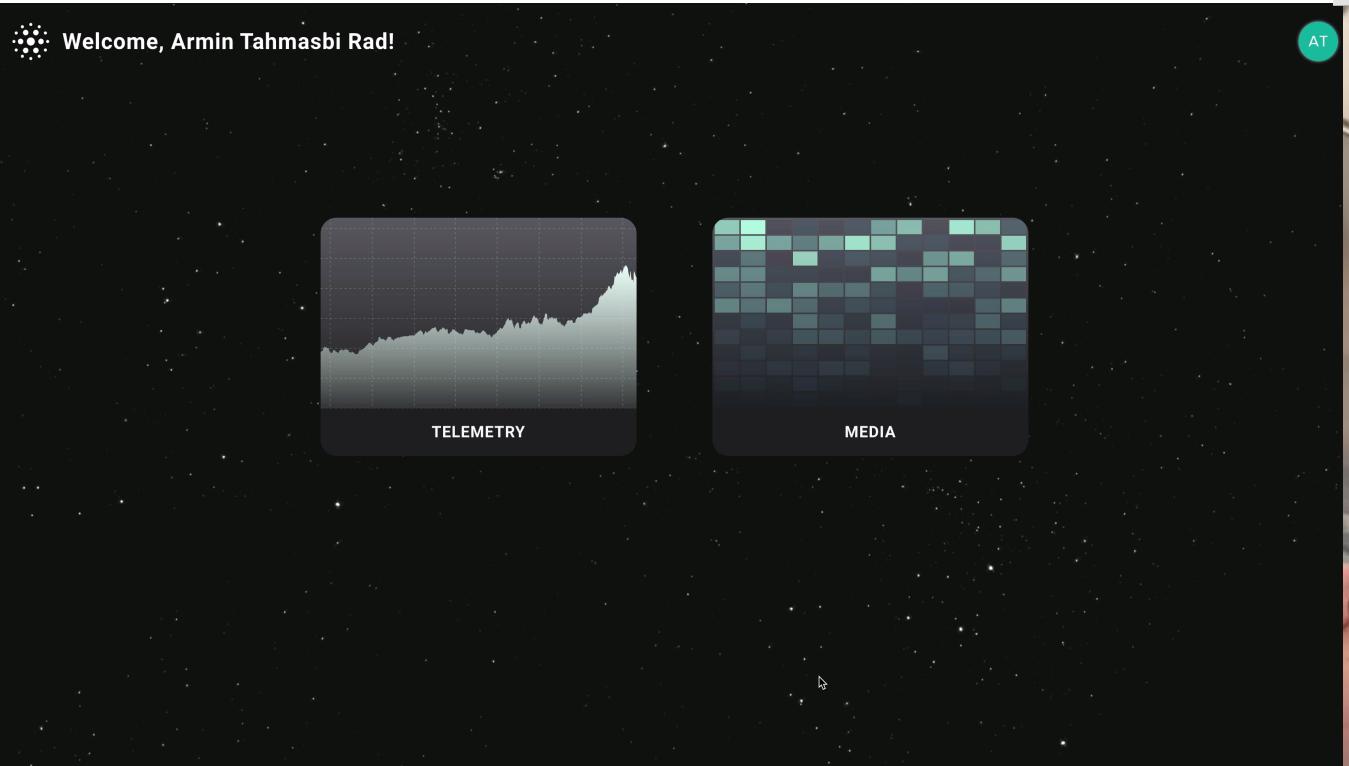


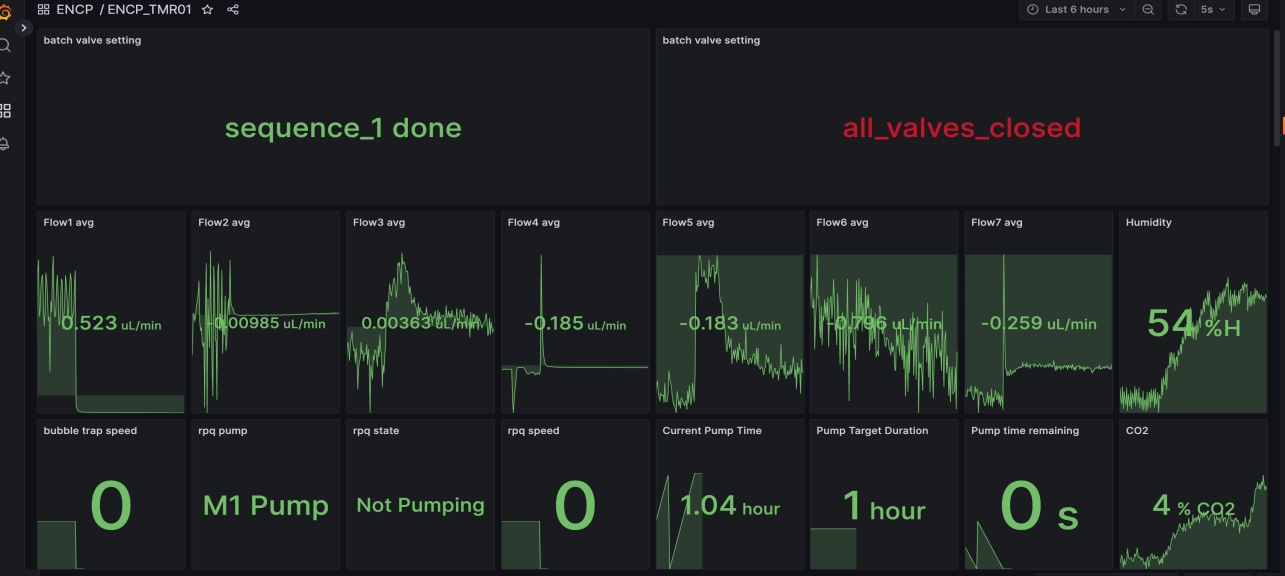

L shaped corner brackets
D-sub connectors
Powered Ascent Utility Locker Card
Alignment studs
Cube for installation onto Powered Ascent Utility Locker Card



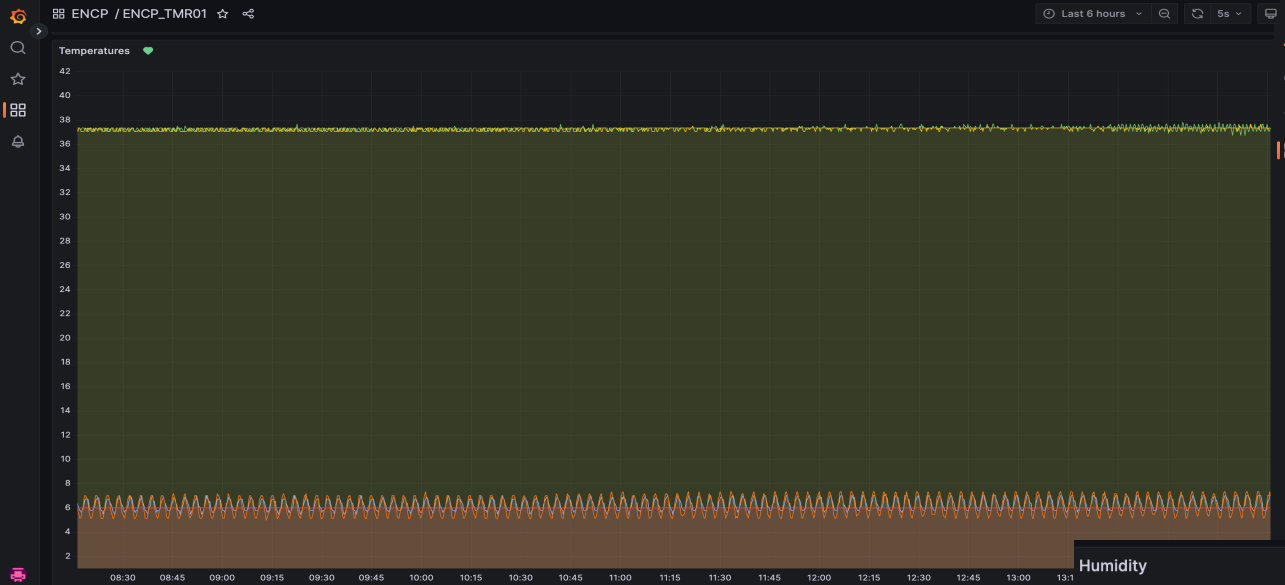

TOP VIEW
SIDE VIEW


Angle tool
Click here to search
Run
Batch
Kill
persistent
Show Errors
Clear
Started Count cells in composites.ijm at Fri Feb 04 10:45:36 EST 2022
Started Count cells in composites.ijm at Fri Feb 04 10:48:54 EST 2022
Started Count cells in composites.ijm at Fri Feb 04 10:50:38 EST 2022
Summary
Slice
Count
Total Area
Average Size
%Area
Mean
Threshold
Default
Red
Dark background
Stack histogram
Don't reset range
Auto
Apply
Reset
Set
Log
Import Composites
Red-Blue composite 11.tif
process

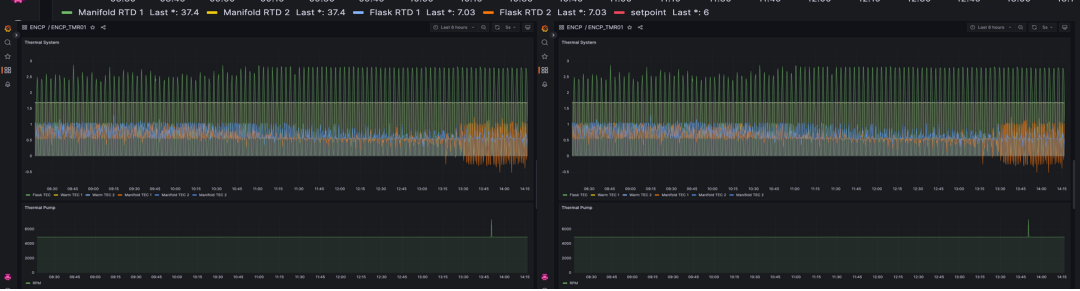

Welcome, Armin Tahmasbi Rad!
AT
TELEMETRY
MEDIA

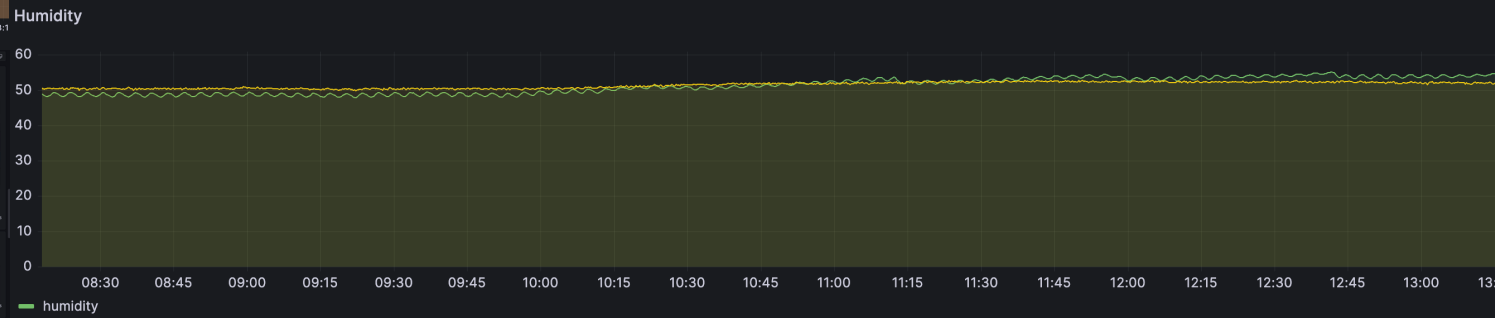

ENCP / ENCP_TMR01
Last 6 hours
5s
batch valve setting
sequence_1 done
batch valve setting
all_valves_closed
Flow1 avg
0.523 uL/min
Flow2 avg
0.00985 uL/min
Flow3 avg
0.00363 uL/min
Flow4 avg
-0.185 uL/min
Flow5 avg
-0.183 uL/min
Flow6 avg
-0.796 uL/min
Flow7 avg
-0.259 uL/min
Humidity
54 %H
bubble trap speed
0
rpq pump
M1 Pump
rpq state
Not Pumping
rpq speed
0
Current Pump Time
1.04 hour
Pump Target Duration
1 hour
Pump time remaining
0 s
CO2
4 % co2


ENCP / ENCP_TMR01
Flow Sensor Flow Rates
Flow 1 Flow (Pump 1, Media 1)
Flow 2 Flow (RNALater, Pump 2)
Flow 3 Flow (Media 2, Row 5)
Flow 4 Flow (Media 2, Row 4)
Flow 5 Flow (Media 2, Row 3)
Flow 6 Flow (Media 2, Row 2)
Flow 7 Flow (Media 2, Row 1)
RPQ Speed
Bbtrap rpm
Pump timing status
target duration
current pump duration

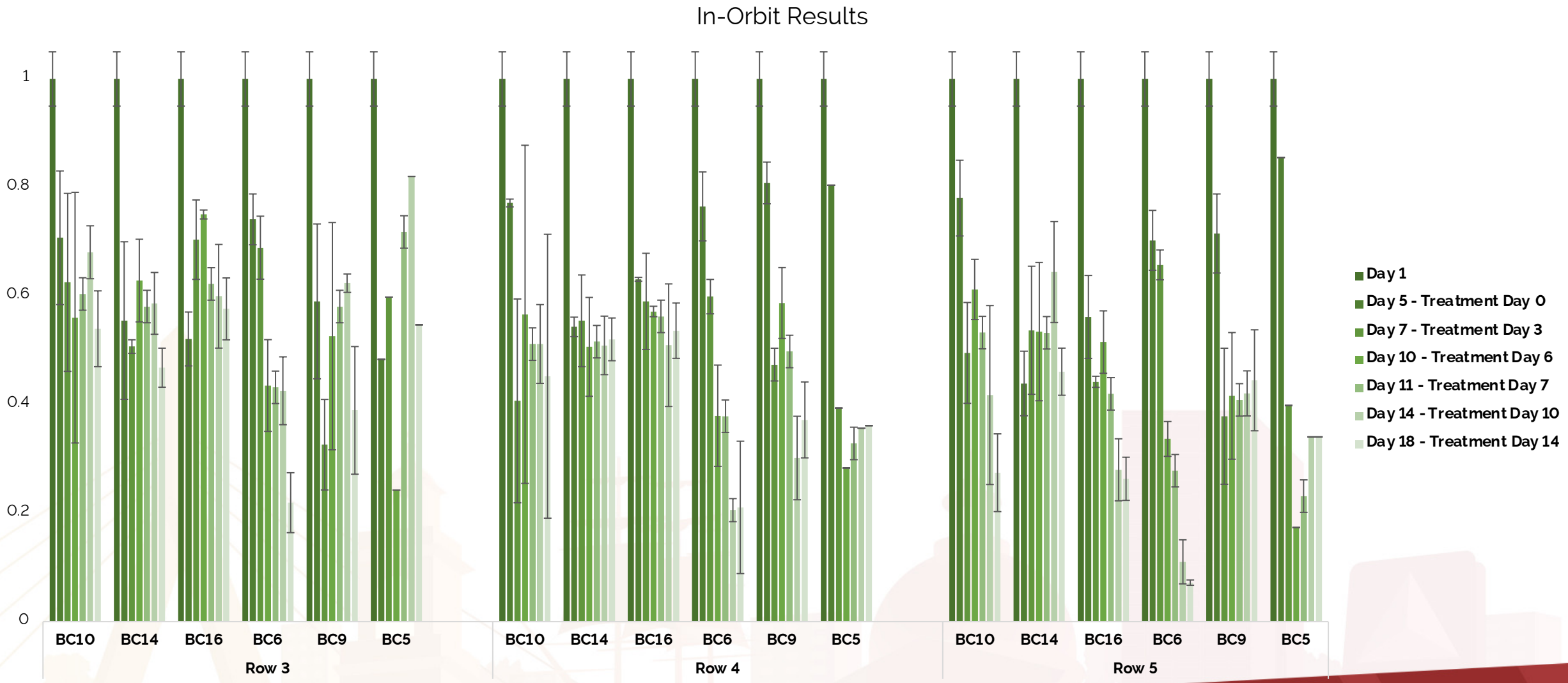

ENCP / ENCP_TMR01
Temperatures
Manifold RTD 1 Last *: 37.4
Manifold RTD 2 Last *: 37.4
Flask RTD 1 Last *: 7.03
Flask RTD 2 Last *: 7.03
setpoint Last *: 6

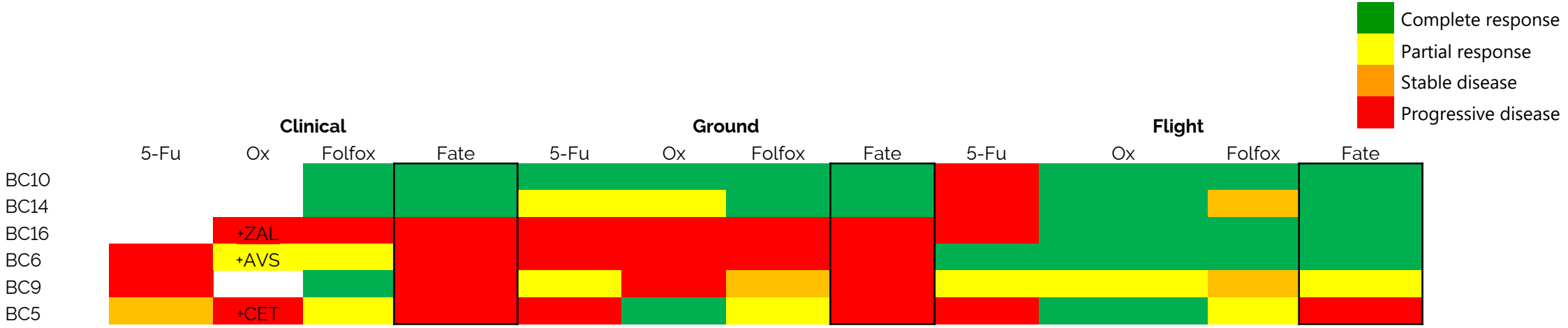

ENCP / ENCP_TMR01
Flow Sensor Temperatures
Flow 1 Temperature
Flow 2 Temperature
Flow 3 Temperature
Flow 4 Temperature
Flow 5 Temperature
Flow 6 Temperature
Flow 7 Temperature
Flow Sensor Voltages
Flow 1 Voltage
Flow 2 Voltage
Flow 3 Voltage
Flow 4 Voltage
Flow 5 Voltage
Flow 6 Voltage
Flow 7 Voltage




Humidity
humidity

In-Orbit Studies

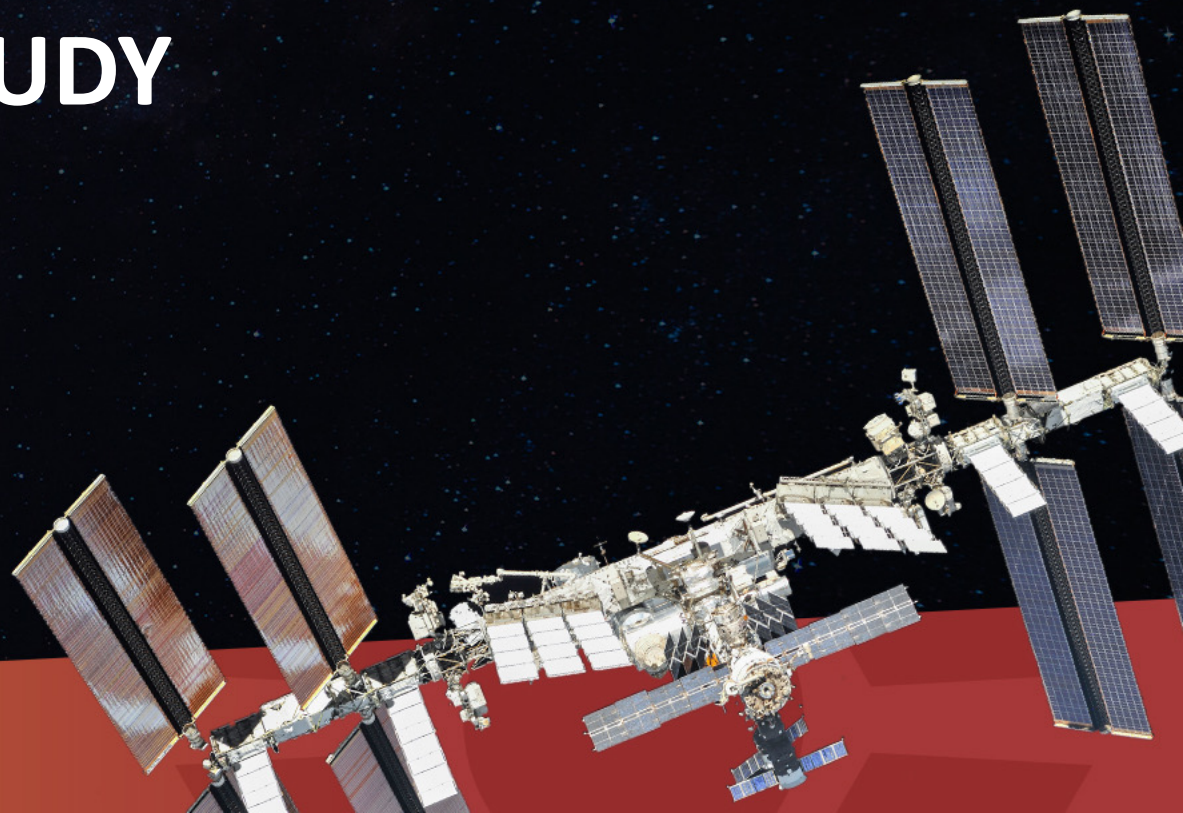




	Primary Mutations	Chemo-response based on genes			uG effect expected?		Stage	Gender	Race	Age	# of rounds
		5-Fu	Ox	Folfox							
BC10	APC, CDKN2A, PIK3CA, dMMR	APC, dMMR	dMMR	PIK3CA	APC	dMMR	III B	F	White	50	3
BC14	APC	APC			APC		III A	M	White	55	3
BC16	APC	APC			APC		II	F	White	69	3
BC6	KDR, KRAS, TP53		KRAS		KRAS	TP53	IV C	F	White	53	7
BC9	APC, ERBB2, FGFR, GNAS, KRAS, MET, TP53	APC	KRAS		APC	TP53	III A	F	White	38	3
BC5	EGFR, PIK3CA, TP53	EGFR		PIK3CA	PIK3CA	TP53	IV B	M	Latino	61	8

ISSRDC

CASE STUDY



AIRBUS

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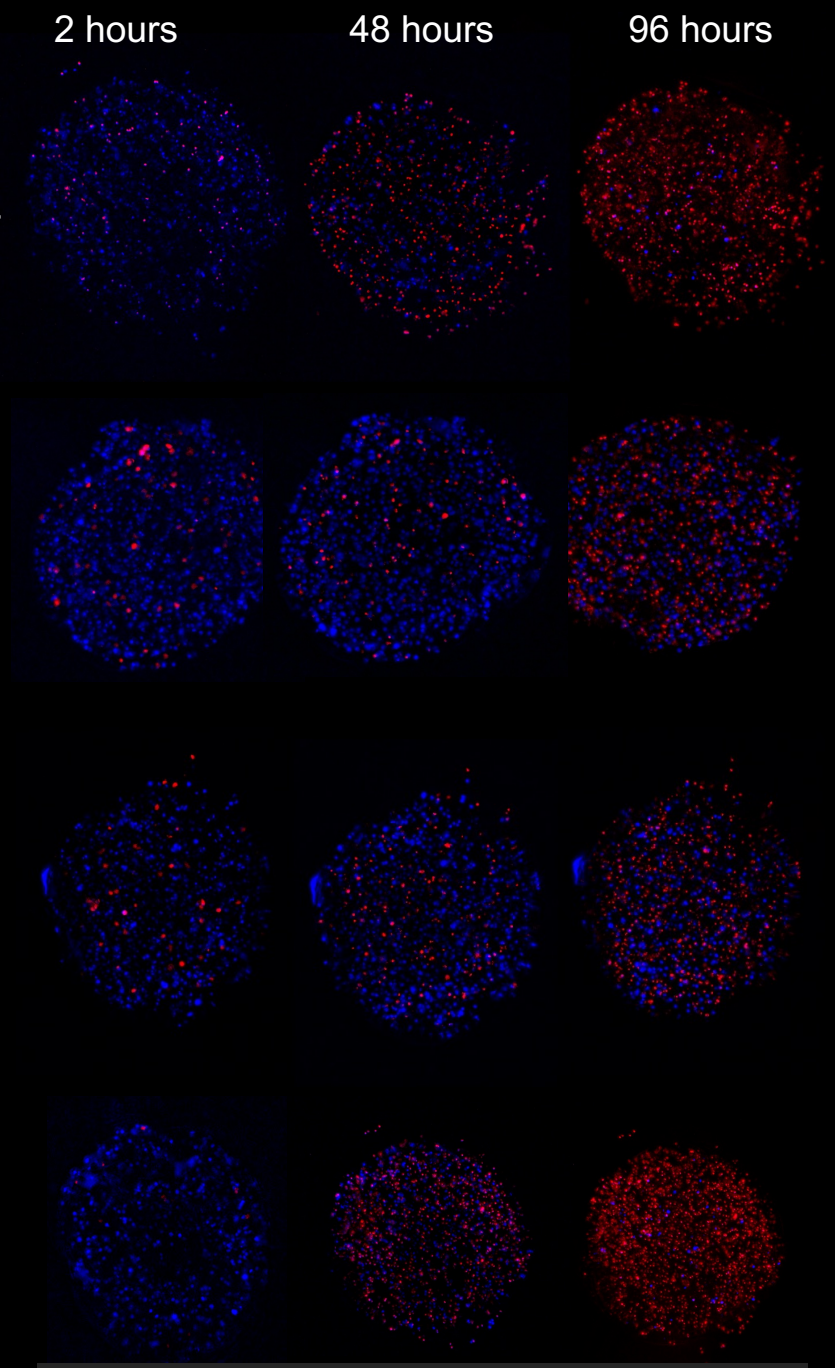


Clinical Results

Gender	Race	Diagnosis	T	N	M	Stage	Specimen Type	Spec Considered	Site	Specimen age in years	Patient Birth Year	Patient Age at Collection	Smoking History	Chemo Tissue Exposure	Rad Tissue Exposure
Male	Latino	Colon Cancer	T3	N2a	M1	IVB	LC Malignant	Primary	Colon	4	1958	61	Previous smoker	No	No

Mismatch Repair	KRAS Mutation	EGFR Mutation	BRAF mutations	HER2 Mutations	ROS1 rearrangement	ALK rearrangement
Intact	Negative	Negative	Negative	Negative	Negative	Negative

	# of rounds	FOLFOX	5-FU	Oxaliplatin	FOLFIRI	XELOX	Other	Final Fate
BC05	7	1	2-3		5-6		CET - 4	

Encapsulate Predictions

	FOLFOX	5-FU	Oxaliplatin	FOLFIRI	XELOX	PTX	Gemcitabine	Vismodegib	Resveratrol	FuLV	Other
BC05											CET

MUTATIONS	ABL1, AKT, ALK	APC (may be NR: 5FU)	ATM	BRAF (Check V600E)	CDH1	CDKN2A	CSF1R	CTNNB1	EGFR	ERBB2 (R: Ner, Lap, Tr)	ERBB4	EZH2	FBXW7 (NR: Ox, Tr)	FGFR1,2,3	FLT3	GNA11,GNA	GNAS	HNF1A	HRAS	IDH1,2	JAK2	JAK3	KDR	KIT	KRAS (NR: CET / R: Ox)	MET	NOTCH1, MPL, NPM1	NRAS	PDGFRA	PIK3CA (NR: Cet, X, I)	PTEN	PTPN11	RB1	RET	SMAD4	SMARCB1	SMO	SRC	STK11	TP53	VHL	dMMR: PMS2
BC 05																																										

KRAS mutation is a predictor of oxaliplatin sensitivity by the mechanism of ERCC1 downregulation

EGFR contributes 5-FU resistance in colon cancer cells through autophagy induction

KRAS and *BRAF* Mutations in Advanced Colorectal Cancer Are Associated With Poor Prognosis but Do Not Preclude Benefit From Oxaliplatin or Irinotecan

No correlation

Supposed not to respond to Oxaliplatin (KRAS negative), and respond to 5-Fu (EGFR negative)

DNA Mismatch Repair	KRAS Mutation	EGFR Mutation	BRAF mutations	HER2 Mutations	ROS1 rearrangement	ALK rearangmen	Code
Intact							BC1
Intact							BC2
Intact							BC3
Intact							BC4
Intact	Negative	Negative			Negative	Negative	BC5
Intact	Positive		Negative	Negative			BC6
Intact							BC7
Intact	Negative						BC8

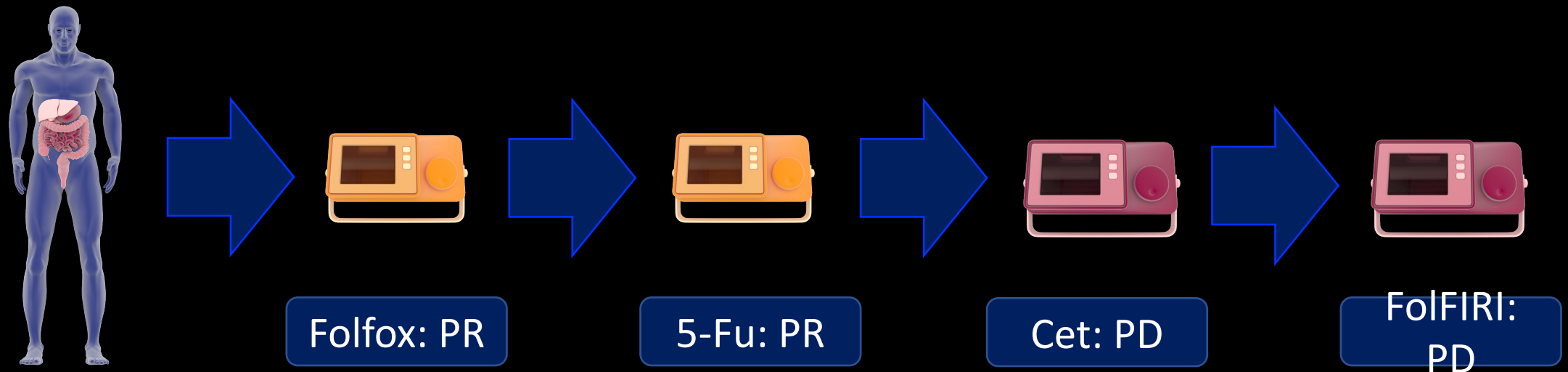
Expected to respond to Oxaliplatin (KRAS positive),

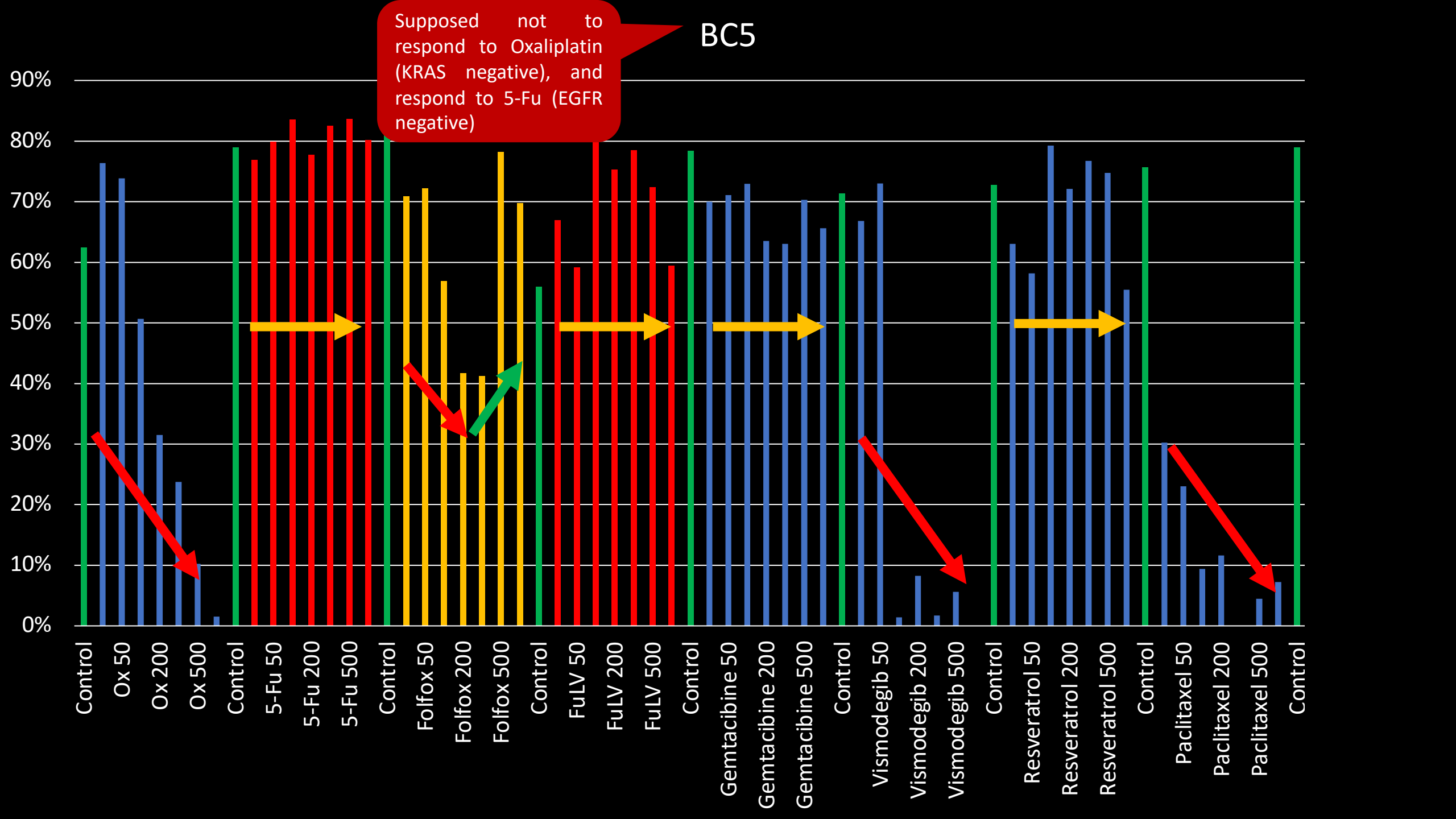
Expected not to respond to Oxaliplatin (KRAS negative),

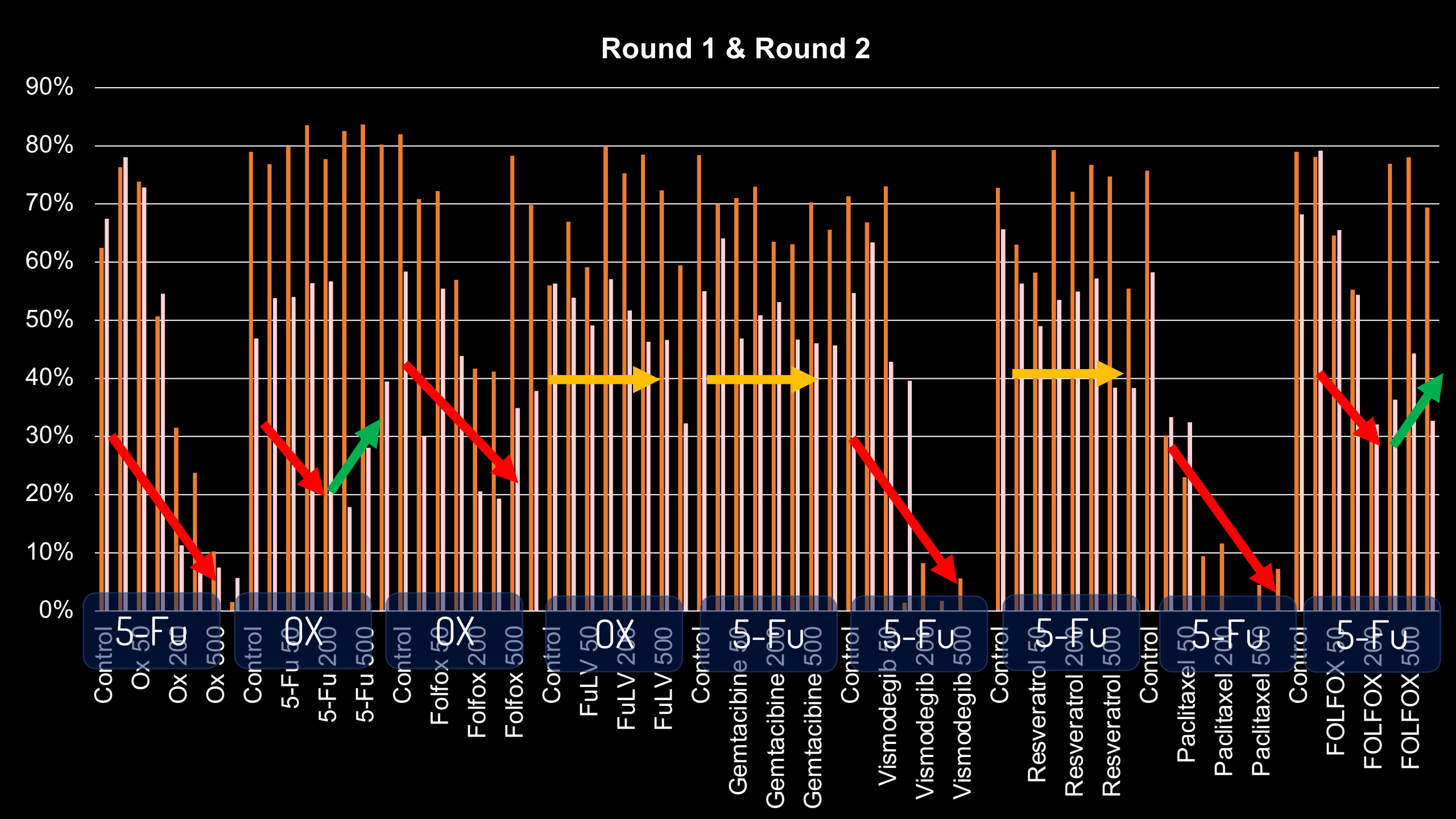
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6977699/
https://pubmed.ncbi.nlm.nih.gov/23209813/
https://jamanetwork.com/journals/jamaoncology/fullarticle/2481020

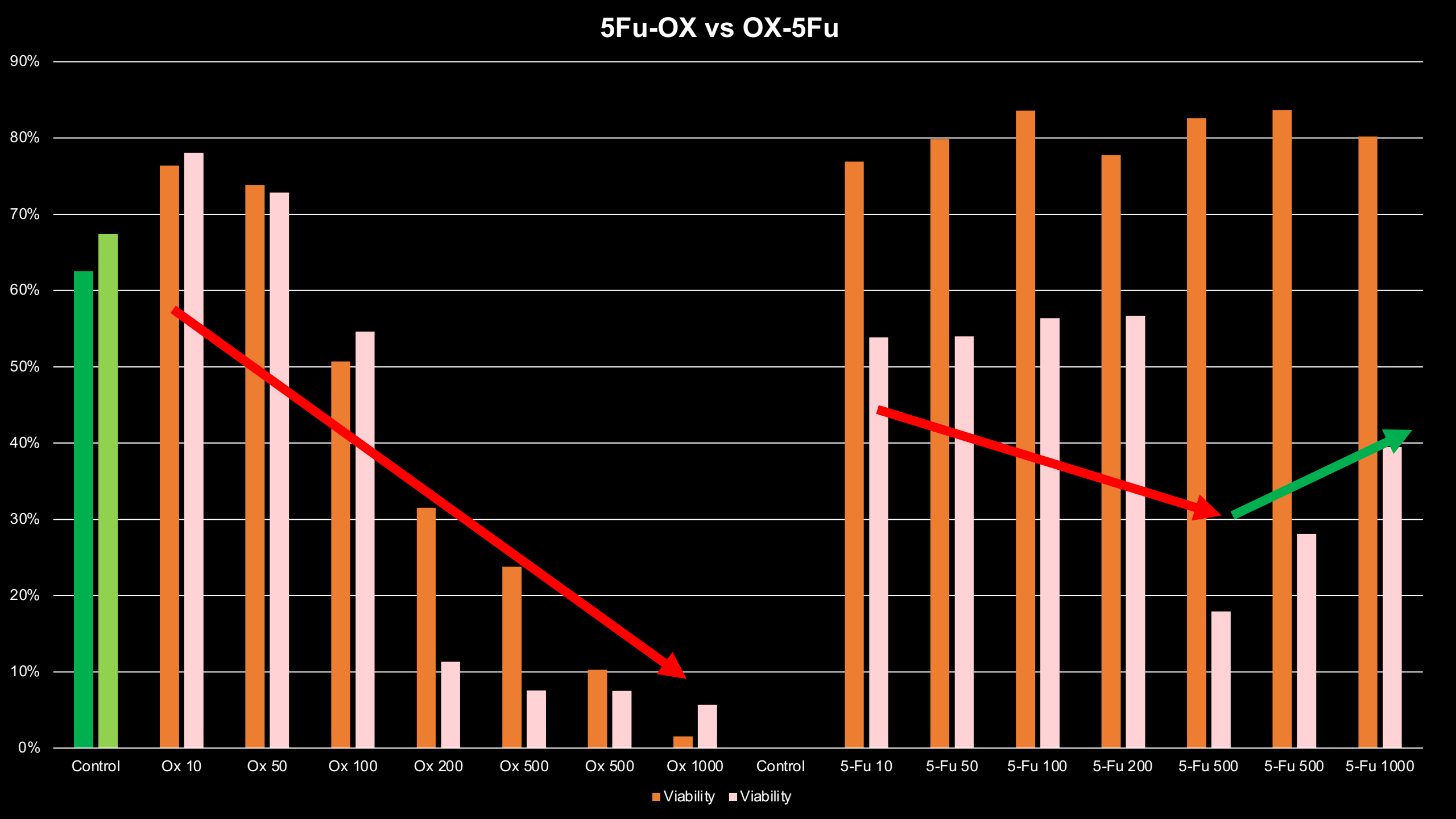
FWID	Unique Aliquot ID	Gender	Ethnicity	Race	Diagnosis	T	N	M	Stage	Specimen Type	Spec Considered	Site	Specimen age in years	Specimen Collection Year	Patient Birth Year	Patient Age at Collection	Smoking History	Chemo Tissue Exposure	Rad Tissue Exposure
106203	164152	Male	Spanish; Hispanic	Latino	Colon Cancer	T3	N2a	M1	IVB	LC Malignant	Primary	Colon	3	2018	1958	61	Previous smoker	No	No

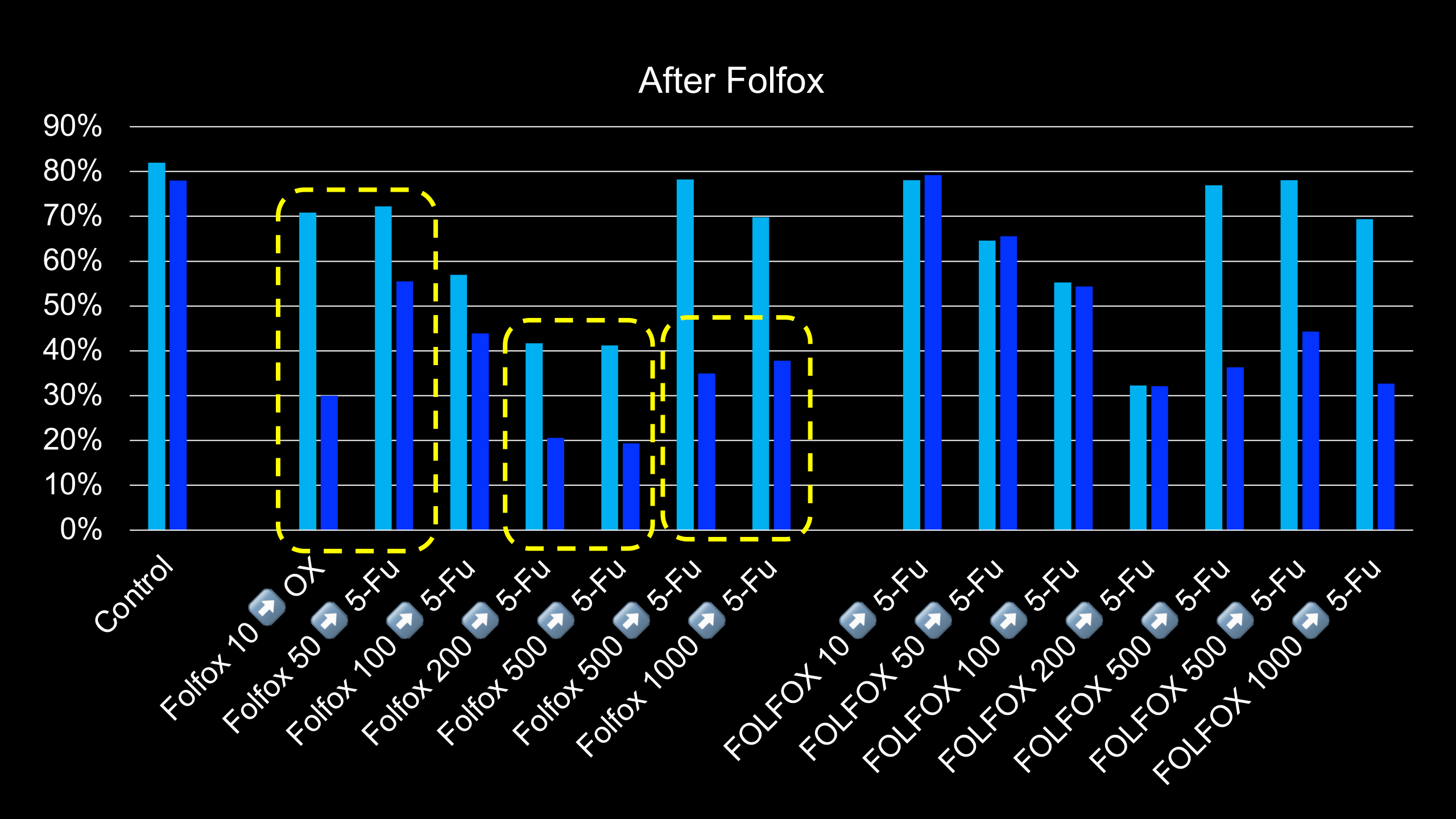
Course 1	Course 1 Start	Course 1 Chemo	Response to Chemo Course 1	Course 2	Course 2 Start	Course 2 Chemo	Response to Course 2	Course 3	Course 3 Start	Course 3 Chemo	Response to Course 3	Course 4	Course 4 Chemo Start	Course 4 Considered	Response to Course 4
Folfox Modified	11/2018	Palliative	PR - Partial Response	Adrucil/Fluorouracil	5/2019	Palliative	PR - Partial Response	Erbitux/Cetuximab	10/2019	Palliative	PD - Progressive Disease	Folfiri	10/2019	Palliative	PD - Progressive Disease

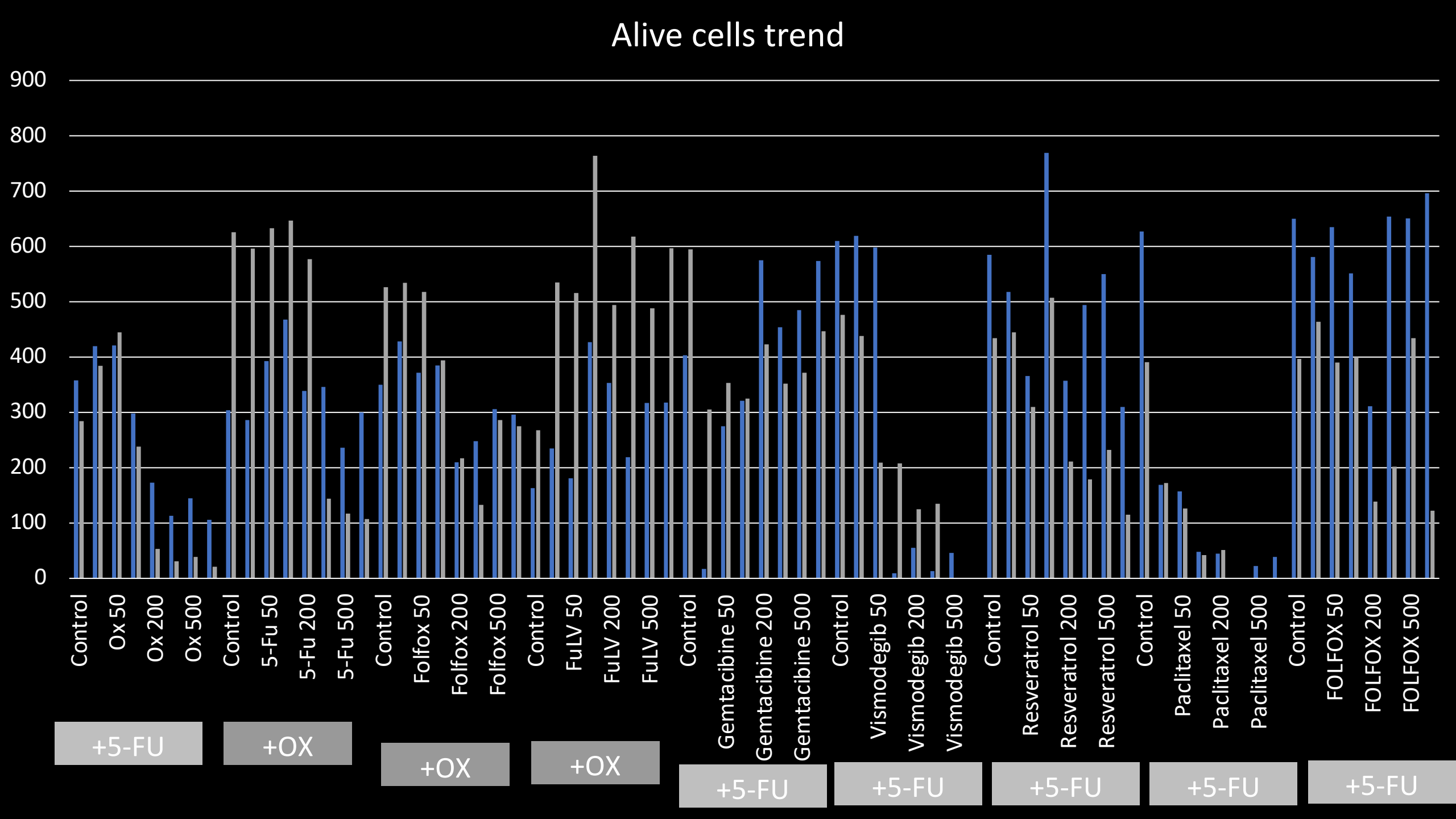



BC5
Supposed not to respond to Oxaliplatin (KRAS negative), and respond to 5-Fu (EGFR negative)
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Control
Ox 50
Ox 200
Ox 500
Control
5-Fu 50
5-Fu 200
5-Fu 500
Control
Folfox 50
Folfox 200
Folfox 500
Control
FuLV 50
FuLV 200
FuLV 500
Control
Gemtacibine 50
Gemtacibine 200
Gemtacibine 500
Control
Vismodegib 50
Vismodegib 200
Vismodegib 500
Control
Resveratrol 50
Resveratrol 200
Resveratrol 500
Control
Paclitaxel 50
Paclitaxel 200
Paclitaxel 500
Control


Round 1 & Round 2
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Control
Ox 50
Ox 200
Ox 500
Control
5-Fu 50
5-Fu 200
5-Fu 500
Control
Folfox 50
Folfox 200
Folfox 500
Control
FuLV 50
FuLV 200
FuLV 500
Control
Gemtacibine 50
Gemtacibine 200
Gemtacibine 500
Control
Vismodegib 50
Vismodegib 200
Vismodegib 500
Control
Resveratrol 50
Resveratrol 200
Resveratrol 500
Control
Paclitaxel 50
Paclitaxel 200
Paclitaxel 500
Control
FOLFOX 50
FOLFOX 200
FOLFOX 500

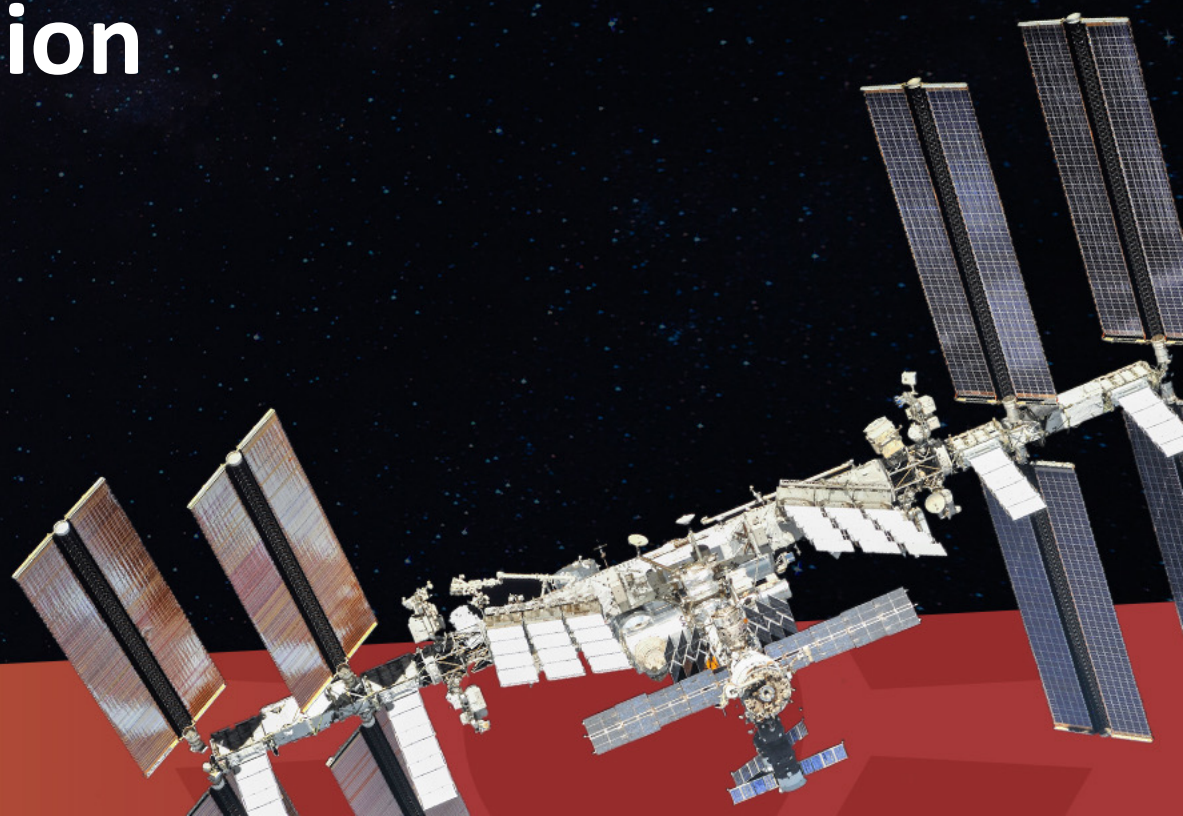

5Fu-OX vs OX-5Fu
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Control
Ox 10
Ox 50
Ox 100
Ox 200
Ox 500
Ox 500
Ox 1000
Control
5-Fu 10
5-Fu 50
5-Fu 100
5-Fu 200
5-Fu 500
5-Fu 500
5-Fu 1000
Viability
Viability


After Folfox
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Control
Folfox 10 OX
Folfox 50 5-Fu
Folfox 100 5-Fu
Folfox 200 5-Fu
Folfox 500 5-Fu
Folfox 500 5-Fu
Folfox 1000 5-Fu
FOLFOX 10 5-Fu
FOLFOX 50 5-Fu
FOLFOX 100 5-Fu
FOLFOX 200 5-Fu
FOLFOX 500 5-Fu
FOLFOX 500 5-Fu
FOLFOX 1000 5-Fu


Alive cells trend
900
800
700
600
500
400
300
200
100
0
Control
Ox 50
Ox 200
Ox 500
Control
5-Fu 50
5-Fu 200
5-Fu 500
Control
Folfox 50
Folfox 200
Folfox 500
Control
FuLV 50
FuLV 200
FuLV 500
Control
Gemtacibine 50
Gemtacibine 200
Gemtacibine 500
Control
Vismodegib 50
Vismodegib 200
Vismodegib 500
Control
Resveratrol 50
Resveratrol 200
Resveratrol 500
Control
Paclitaxel 50
Paclitaxel 200
Paclitaxel 500
Control
FOLFOX 50
FOLFOX 200
FOLFOX 500
+5-FU
+OX
+OX
+OX
+5-FU
+5-FU
+5-FU
+5-FU
+5-FU

ISSRDC

Conclusion



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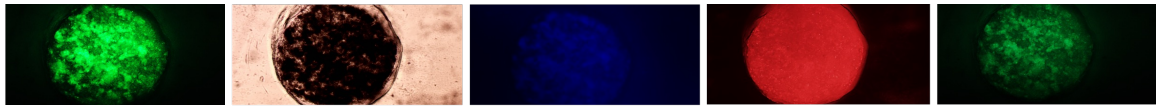
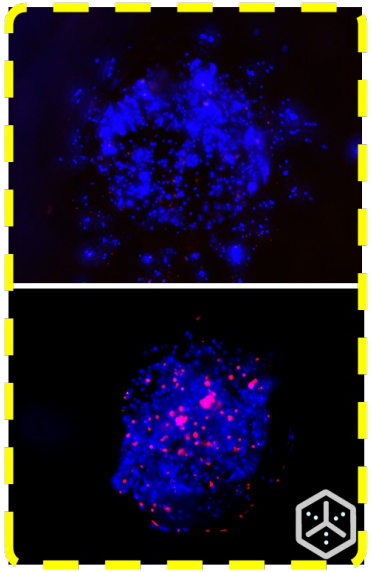
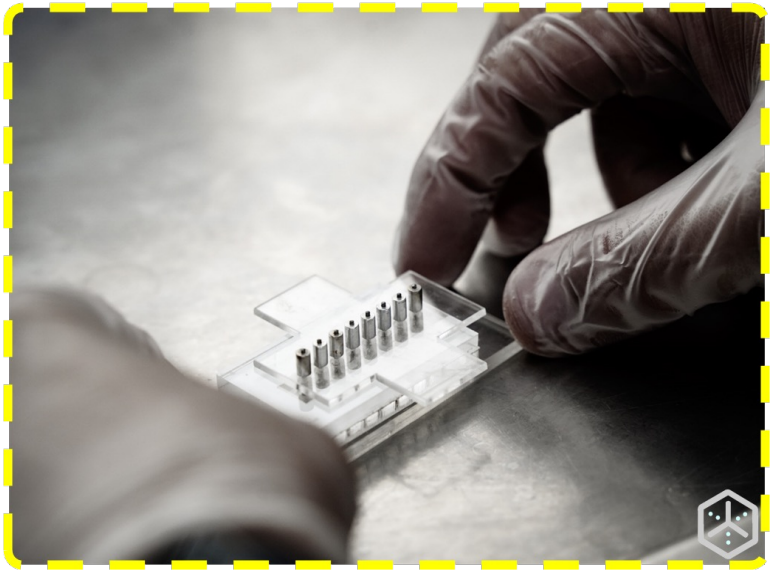
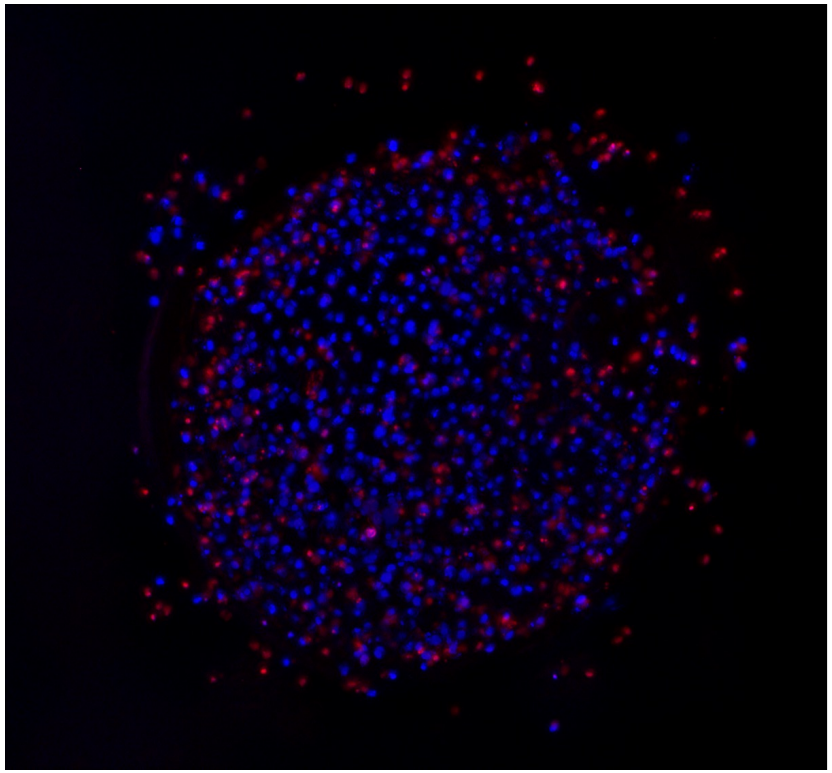


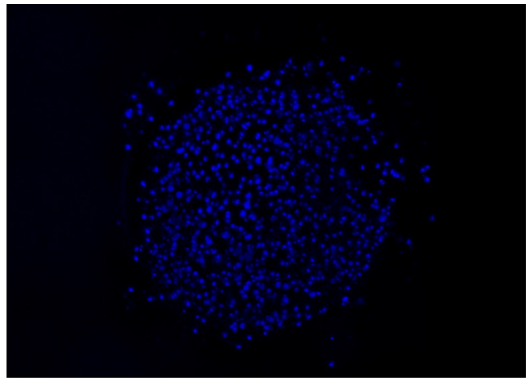
Our novel synthesized hydrogel has on-demand shape, high transparency & biocompatibility

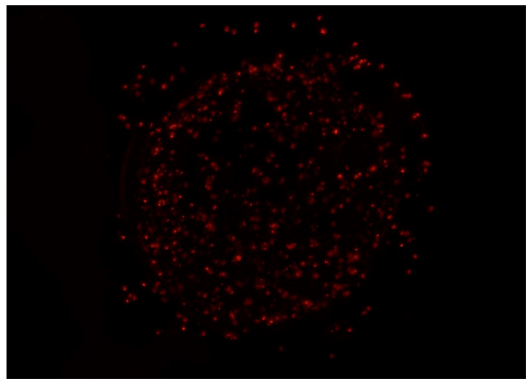
With only $6.20 to fabricate, easy to load, with 16 distinct tumoroids per each device, it takes only 1 hour to have a patient-derived microtumor ready to test.

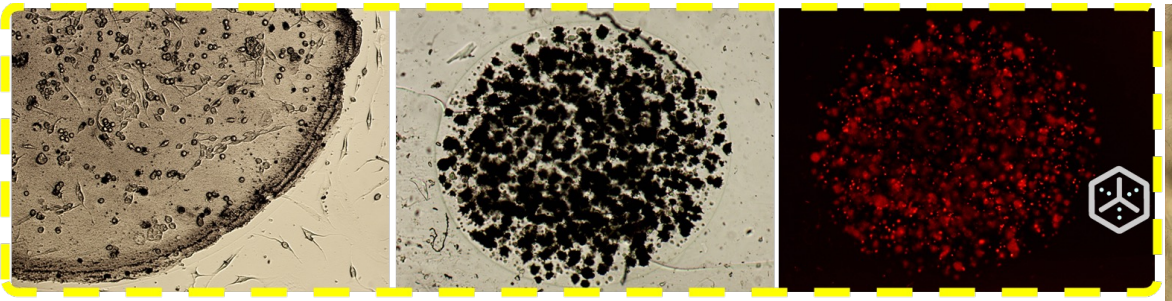




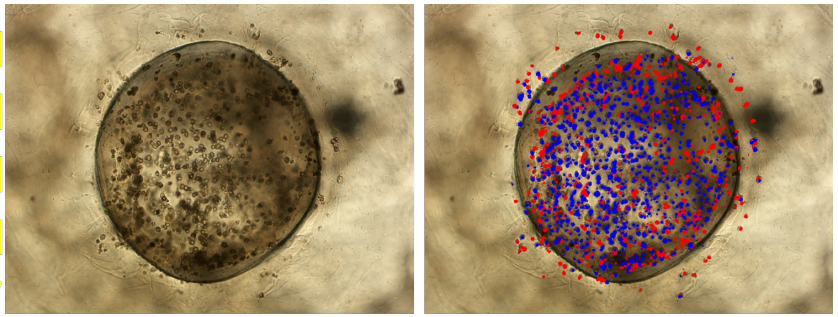


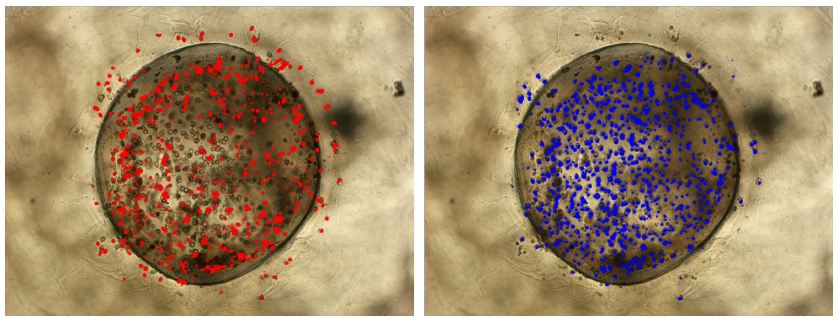


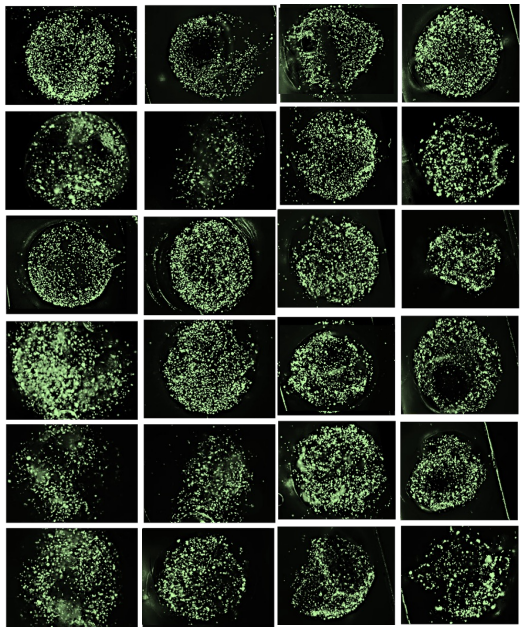


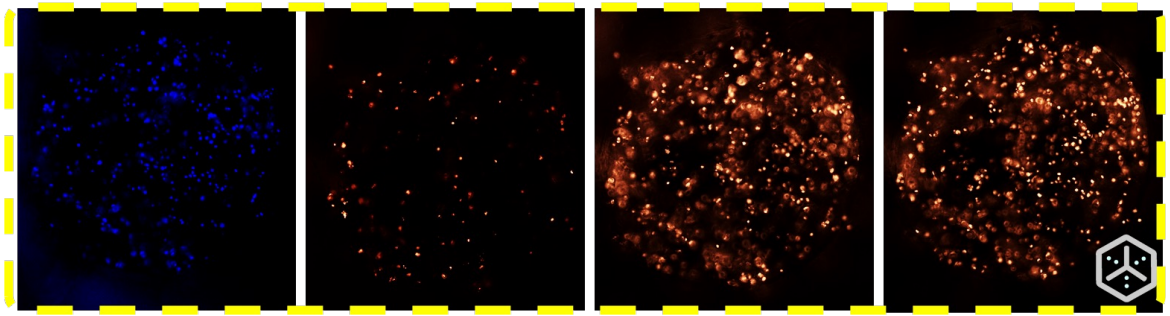


A timeline on the long-term multiple chemo rounds (Blue: alive cells, Red: dead cells)









A patient **tumor-specific treatment** has potential to save lives

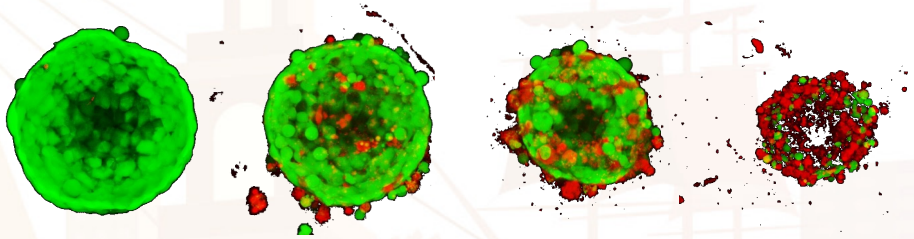
OUR SOLUTION

Rapidly create hundreds of identical, miniature **patient-derived microtumors** from biopsies

Perform **Functional** screening of **all drug candidates** at different combinations and doses

Assess outcomes and deliver insights and **recommendations**

in seven days

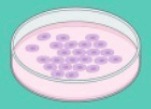
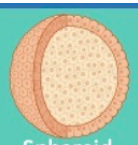
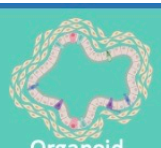
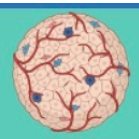


THE OUTCOME

Treatment time reduced by **10+ months** (avg time = 15 months)

Chemotherapy-related treatment costs reduced by **$100K+ per patient** in addition to chemotherapy-related comorbidities

Saving lives

Encapsulate Cancer Solutions	 Cell Line	 Primary Cell	 Spheroid	 Organoid	 OTSC	 OOAC	 Syngeneic Model	 GEMM	 Carcinogen Model	 PDX/CDX	 Humanized Mouse	 Encapsulate
Relative Cost	$	$	$	$$	$	$$	$$$	$$$	$$$	$$$	$$$	$
Preparation Time	🕐	🕐	🕐	🕐	🕐	🕐	🕐🕐	🕐🕐🕐	🕐🕐	🕐🕐	🕐🕐🕐	🕐
Ease of establishing	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Ease of long-term maintenance	✔	✔	✔	✔	✘	✘	✔	✔	✔	✔	✔	✔
Ease of use	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Ease of passage	✔	✔	✘	✔	✘	✘	✘	✔	✘	✔	✔	✔
Ease of genetic modification	✔	✔	✔	✔	✔	✔	✔	✔	✔	✘	✘	✔
Success rate of establishment	✘	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Physiologic representation	✘	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Similarity to original tumor	✘	✘	✘	✔	✔	✔	✘	✘	✘	✔	✔	✔
Vascularization	✘	✘	✘	✔	✔	✔	✔	✔	✔	✔	✔	✔
Cell diversity	✘	✔	✘	✔	✔	✔	✔	✔	✔	✔	✔	✔
Preservation of heterogeneity	✘	✘	✘	✔	✔	✔	✘	✘	✘	✔	✔	✔
Preservation of tumor morphology	✘	✘	✘	✔	✔	✘	✘	✘	✘	✔	✔	✔
Preservation of microenvironment	✘	✘	✘	✘	✔	✔	✔	✔	✔	✔	✔	✔
Scalability	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Clinical response prediction	✔	✔	✔	✔	✔	✔	✘	✘	✘	✔	✔	✔
High-throughput drug screening	✔	✔	✘	✔	✔	✔	✘	✘	✘	✔	✔	✔
Genome-wide screening	✔	✔	✔	✔	✘	✘	✔	✘	✘	✘	✘	✔
Biobanking	✔	✔	✘	✔	✘	✘	✘	✘	✘	✔	✘	✔

$ Cheap $$ Expensive $$$ Quite Expensive 🕐 Time Efficient 🕐🕐 Less Time Consuming 🕐🕐🕐 Time Consuming ✔ Well-suited ✔ Suited ✔ Partially-suited ✘ Unsuitable

We are grateful for the supports by:

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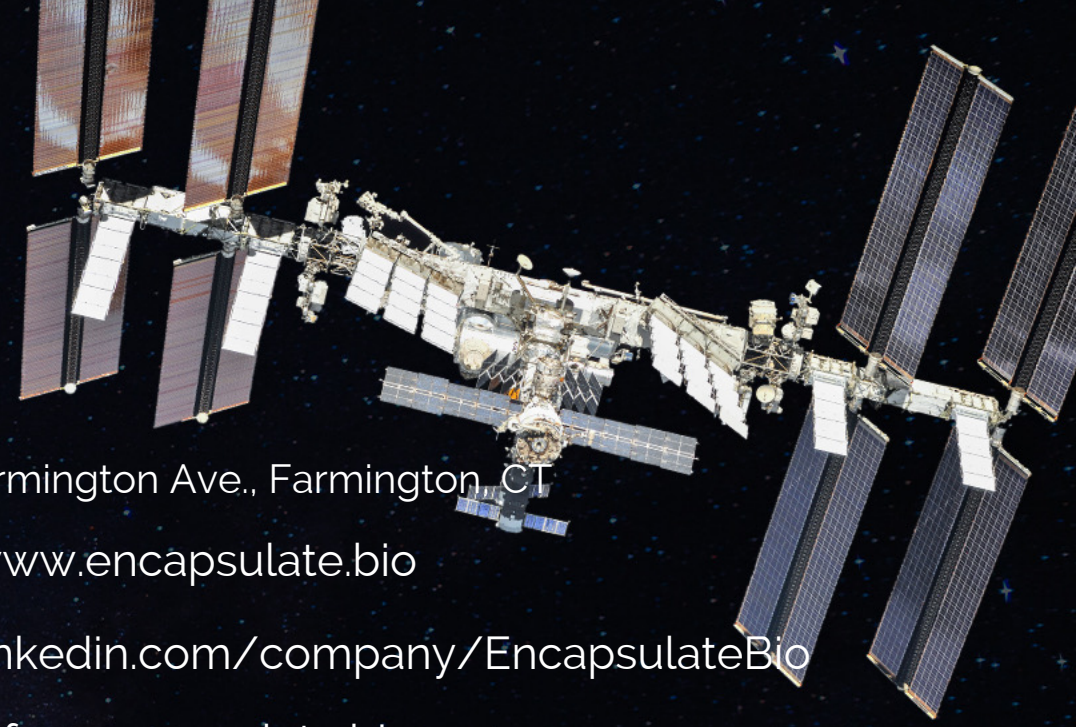
And all our team members at **Encapsulate**



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