Corporate Overview

April 2024

Theriva BIOLOGICS

FORWARD LOOKING STATEMENTS

This presentation includes forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. In some cases forward-looking statements can be identified by terminology such as "may," "should," "potential," "continue," "expects," "anticipates," "intends," "plans," "believes," "estimates," and similar expressions, and include statements regarding oncolytic viruses (OVs) being promising cancer therapeutics; the potential of VCN-01 and Theriva OVs and their ability to overcome key OV challenges; clinical advancement of VCN-01 (including completion of enrollment into the pancreatic ductal adenocarcinoma (PDAC) Phase 2 clinical trial in H1 2024); potential expansion of VCN-01 use in different lines of PDAC treatment; potential synergistic antitumor effects of VCN-01 with topoisomerase inhibitors; the potential of VCN-01 to enable immuno-oncology therapies in refractory tumors; the potential to obtain expedited status from the FDA; and the potential of the albumin shield to enhance OV systemic delivery. These forward-looking statements are based on management's expectations and assumptions as of the date of this press release and are subject to a number of risks and uncertainties, many of which are difficult to predict that could cause actual results to differ materially from current expectations and assumptions from those set forth or implied by any forward-looking statements. Important factors that could cause actual results to differ materially from current expectations include, among others, Theriva Biologics' product candidates demonstrating safety and effectiveness, as well as results that are consistent with prior results, the ability to initiate and complete clinical trials on time and achieve the desired results and benefits, continuing clinical trial enrollment as expected, the ability to obtain regulatory approval for commercialization of product candidates or to comply with ongoing regulatory requirements, regulatory limitations relating to Theriva Biologics' ability to promote or commercialize their product candidates for the specific indications, acceptance of product candidates in the marketplace and the successful development, marketing or sale of Theriva Biologics' products, developments by competitors that render such products obsolete or non-competitive, Theriva Biologics' ability to maintain license agreements, the continued maintenance and growth of Theriva Biologics' patent estate, the ability to continue to remain well financed, and other factors described in Theriva Biologics' Annual Report on Form 10-K for the year ended December 31, 2023 and its other filings with the SEC, including subsequent periodic reports on Forms 10-Q and 8-K. The information in this presentation is provided only as of the date of this release, and Theriva Biologics undertakes no obligation to update any forward-looking statements contained in this release on account of new information, future events, or otherwise, except as required by law.

OVERVIEW

- Theriva Biologics is developing unique oncolytic viruses optimized for systemic administration
- VCN-01 is undergoing a Phase 2b clinical trial in first-line metastatic pancreatic cancer in combination with SoC chemotherapy
- VCN-01 Phase 1 clinical trials support multiple additional indications (retinoblastoma, HNSCC, CRC) and combinations (immunotherapies)
- Albumin Shield™ platform and innovative oncolytic virus discovery engine enable development of a distinct product pipeline

Financial Snapshot	
Exchange	NYSE American
Ticker	TOVX
Cash (12/31/2023)	$23.2M
Projected cash runway	Q1 2025
Average Daily Volume (3M Ave)	100.7K
Locations	Rockville, MD Barcelona, Spain

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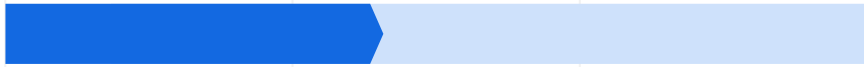
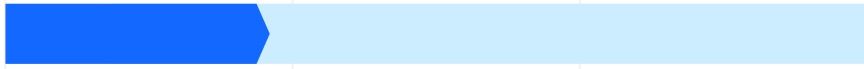
CRC colorectal cancer. HNSCC head and neck squamous cell carcinoma. SoC standard of care. Immunotherapies include immune checkpoint inhibitors and CAR-T cells.

THERIVA PIPELINE

Candidate	Target	Pre-IND / Phase 1 / Phase 2	Collaborators	Status*
VCN-01 Selective, Stroma Degrading OV	Pancreatic Cancer (IV) with gemcitabine/nab-paclitaxel			Phase 2 Study On-going (ODD EU, US)
	Retinoblastoma (IVit)		Sant Joan de Déu Hospital Materno-Infantil Universitat de Barcelona	Phase1 Study On-going (ODD US)
	HNSCC (IV) + durvalumab		ICO Institut Català d'Oncologia	Phase 1 Treatment Complete Survival Follow-up On-going
	Solid Tumors – Brain, Ovarian, PDAC (IV)		LEEDS; University of Pennsylvania	Phase 1 Studies On-going
VCN-11 Albumin Shield OV	Solid tumors (IV)		ICO Institut Català d'C; IDIBELL	Preclinical Studies On-going
SYN-004 [1,2] Oral β-lactamase	**Prevention of aGVHD in allo-HCT**		Washington University in St. Louis	Phase 1b/2a On-going
SYN-020 [3] Oral IAP	**Potential indications include NAFLD/NASH, celiac, radiation enteritis**		Massachusetts General Hospital	Phase 1 Studies Complete

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*Based on Management's current beliefs and expectations. aGVHD acute graft-vs-host disease; allo-HCT allogeneic hematopoietic cell transplant. IAP recombinant bovine intestinal alkaline phosphatase. HNSCC head and neck squamous cell carcinoma. IV intravenous. IVit intravitreal. MAD multiple ascending dose. ODD Orphan Drug Designation.

VCN-01 IS A UNIQUELY ENGINEERED HUMAN ADENOVIRUS 5

Systemic

Access primary and **metastatic** lesions
High dose, highly replicating

Selective

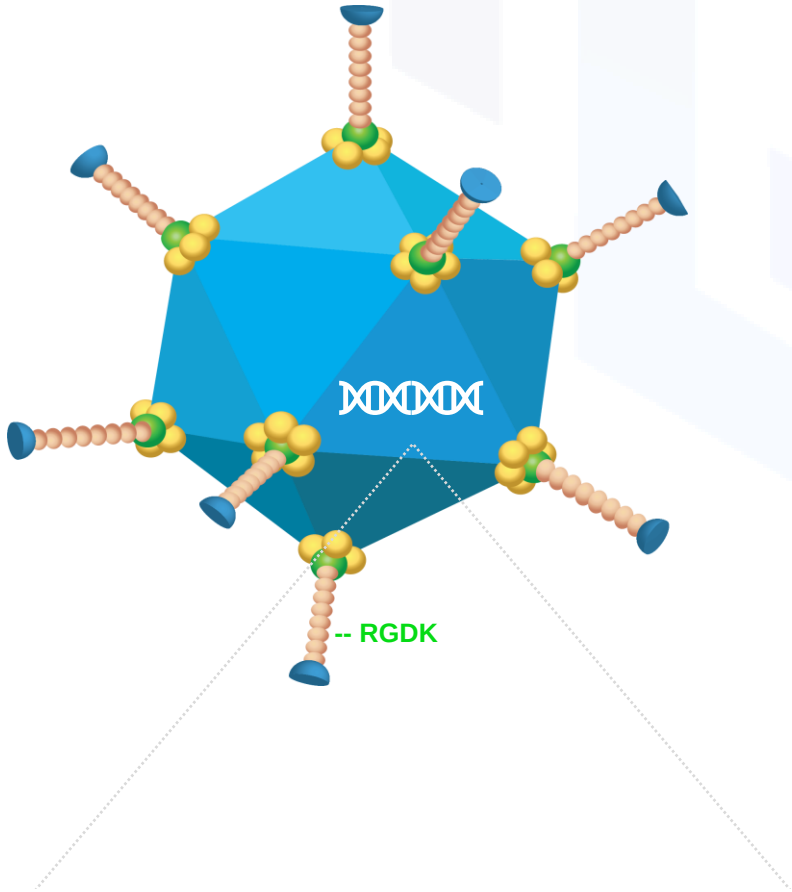
Replicates only in **tumor** cells
Liver detargeted

Stroma Degrading

Expresses **PH20** (hyaluronidase) after viral replication cycle

Self Reporting

PH20 in blood is a **biomarker** for virus replication in tumors



E2F binding +++ → E1a-Δ24 → MLP → PH20

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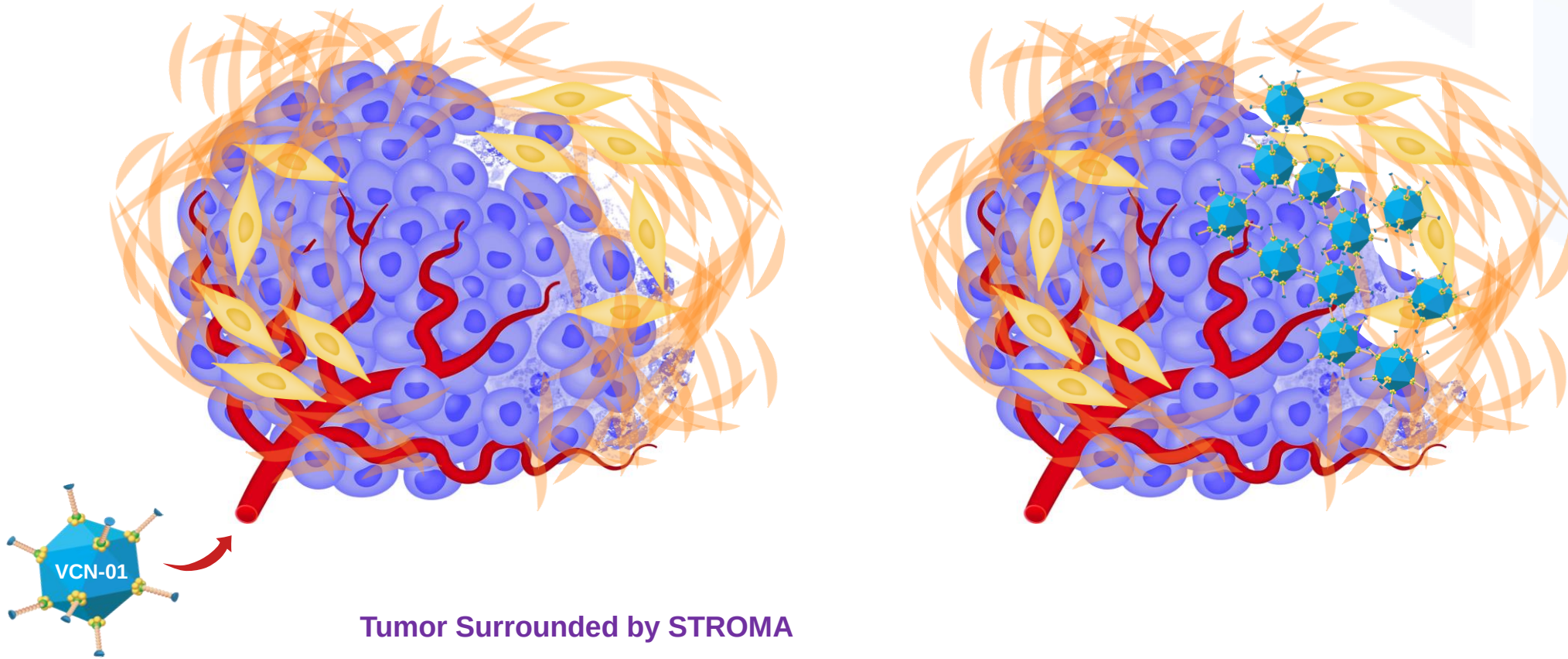
Replication enhanced by significantly increased E2F binding. E1a-δ24 gene deletion means replication only in cells with a defective Rb-E2F pathway. Fiber shaft RGDK modification. PH20 soluble human testicular hyaluronidase enzyme expression is under control of the virus major late promoter (MLP).

VCN-01 IS A UNIQUELY ENGINEERED HUMAN ADENOVIRUS 5

1 **SYSTEMIC** administration enables VCN-01 access to primary tumor and metastases and detargets the liver

2 **SELECTIVE** replication at very high levels lyses tumor cells directly without harming healthy tissues



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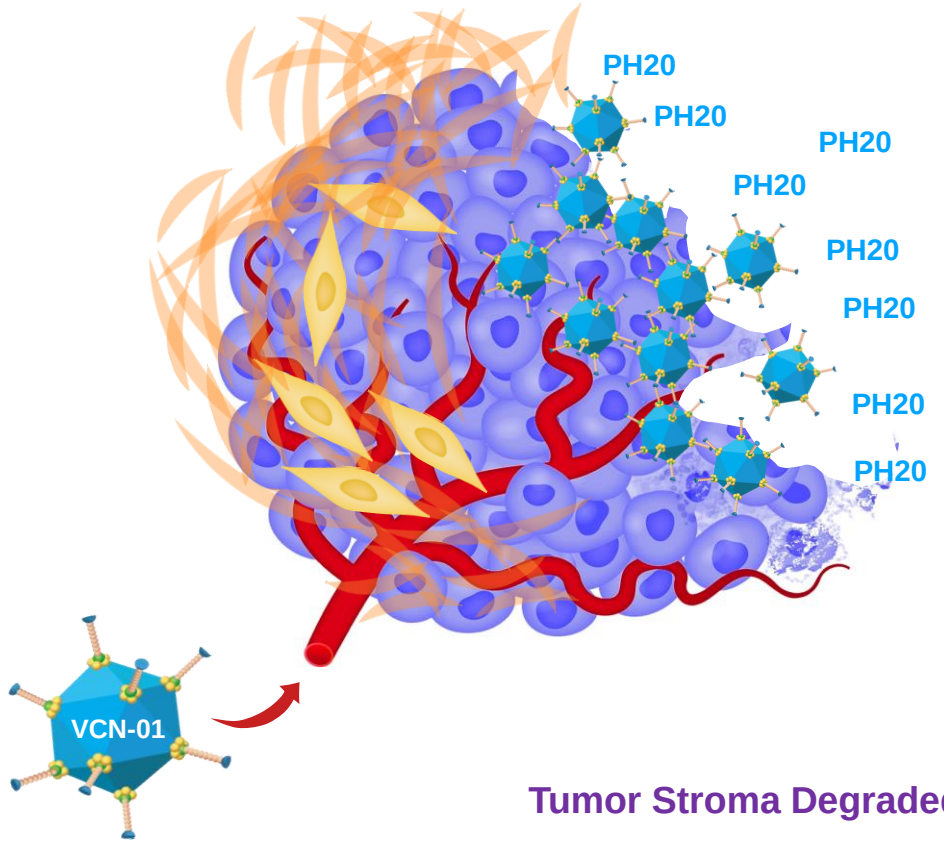
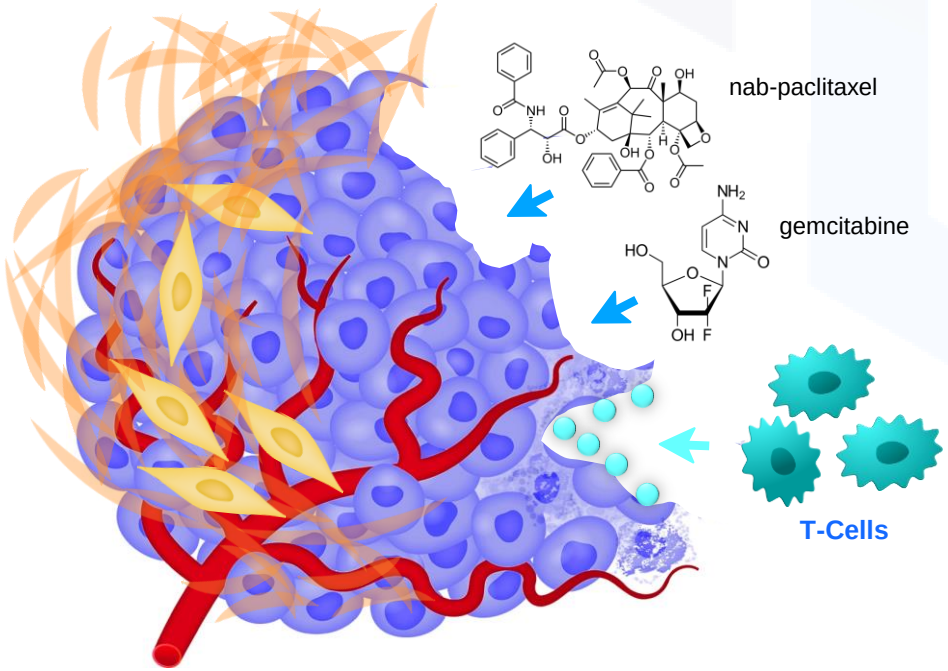
VCN-01 DESIGNED TO HAVE MULTIPLE ANTI-TUMOR ACTIONS

3 **STROMA** degradation by PH20 facilitates tumor access and destruction by coadministered cancer therapies



4 **IMMUNOGENIC** actions of VCN-01 turn “cold” tumors “hot” and elicit an anti-tumor immune response



5 **SELF REPORTING** PH20 detected in the circulation indicates VCN-01 is active and replicating in the tumor

Stroma

Cancer Associated Fibroblast

Neoantigen

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VCN-01 COMPARED TO OTHER ONCOLYTIC VIRUSES

COMPANY	THERIVA BIOLOGICS	CG ONCOLOGY	GENELUX	ONCOLYTICS BIOTECH	REPLIMMUNE
Ticker	NYSE MKT: TOVX	NASDAQ: CGON	NASDAQ: GNLX	NASDAQ:ONCY	NASDAQ: REPL
Product	**VCN-01**	**CG0070**	**Olvi-Vec**	**Pelareorep**	**RP1, RP2**
Virus	Adenovirus 5	Adenovirus 5	Vaccinia	Reovirus	Herpes Simplex
Type	DNA	DNA	DNA (enveloped)	RNA	DNA (enveloped)
Tumor selectivity mechanism	Selective replication (Rb-E2F dysfunction)	Selective replication (Rb-E2F dysfunction)	Low tumor IFN TK deletion	Low tumor IFN Ras activation	Low tumor IFN ICP34.5 deletion
Therapeutic Transgene	PH20	GM-CSF	..	..	GM-CSF, GALV-GP R(-), anti-CTLA-4
Lead Indication (Ph)	Pancreatic (2b)	Bladder (3)	Ovarian (3)	Pancreatic, GI (2b)	Melanoma (2/3)
Route	IV	IVESIC	IP	IV	IT
Dose	$1x10^{13}$ vp*	$1x10^{12}$ vp	$3x10^{9}$ pfu	$4.5x10^{10}$ $TCID_{50}$	$1x10^{7}$ pfu/mL
Stroma Degrading	Yes	No	No	No	No
Biomarker	PH20	..	Beta-GAL, beta-GLU, GFP	..	..

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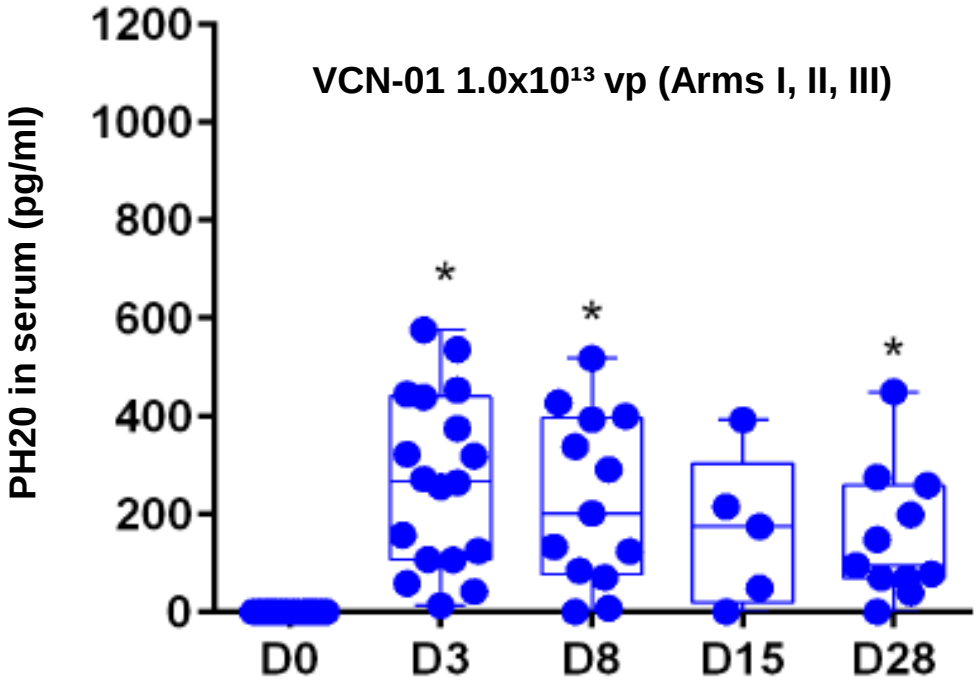
*Approximately $7x10^{11}$ $TCID_{50}$. References describing the different OV product candidates are provided in the appendix; information is also available on each company's website and clinicaltrials.gov

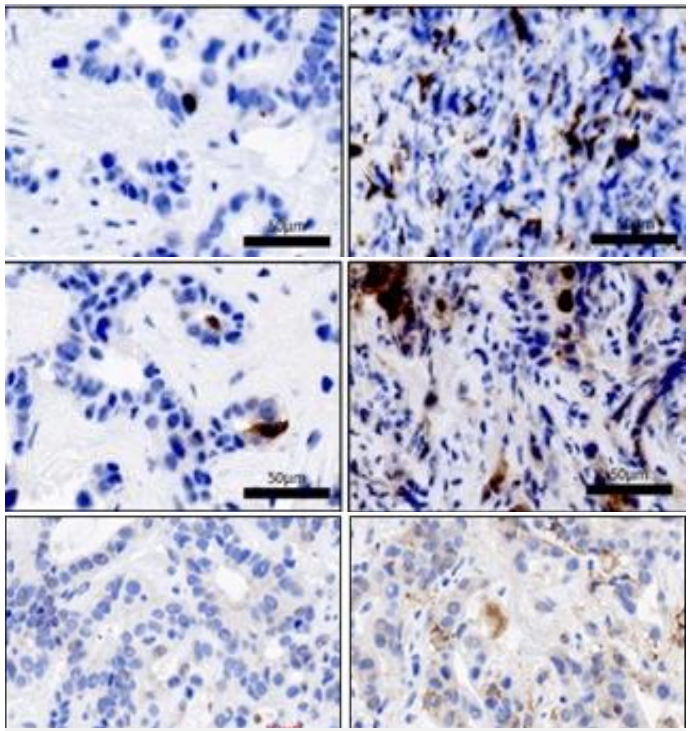
CLINICAL DATA SUPPORT VCN-01 MODE-OF-ACTION

Remodels the tumor matrix and turns “cold” tumors “hot”

Built-in biomarker: PH20 levels in patient sera indicate sustained VCN-01 activity in tumors



Immune markers upregulated in biopsies of **hepatic metastases**



CD8⁺ lymphocytes

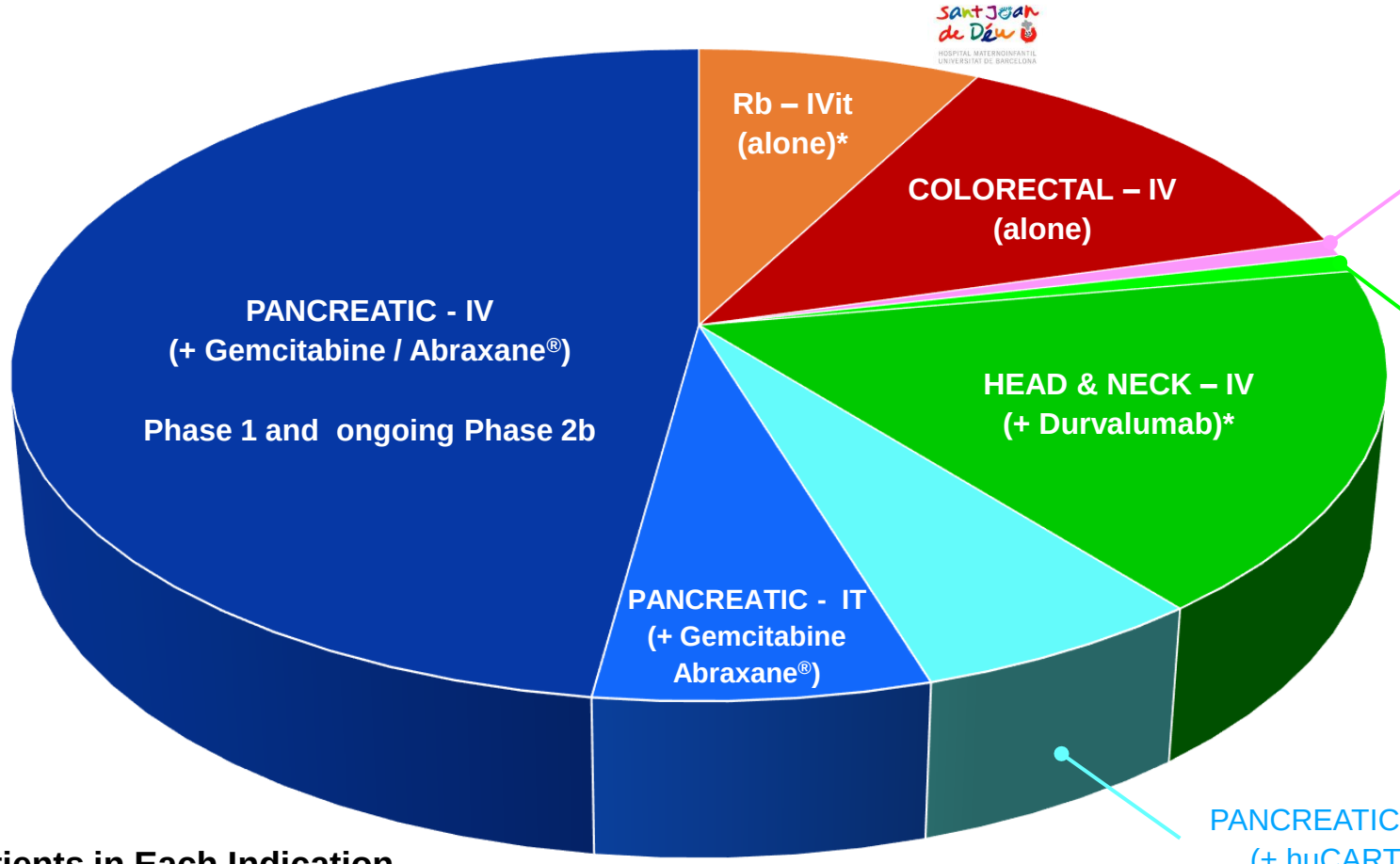
IDO upregulation

PD-L1 upregulation

IDO indoleamine 2,3-dioxygenase, PD-L1 programmed death-ligand 1 and CD8⁺ lymphocyte infiltration measured by immunohistochemistry. PH20 (hyaluronidase) levels measured using an ELISA assay. Garcia-Carbonero (2022) J Immunother Cancer 10:e003255 [NCT02045602].

VCN-01 EXTENSIVE CLINICAL PROGRAM

116 patients treated to date in multiple indications and combinations



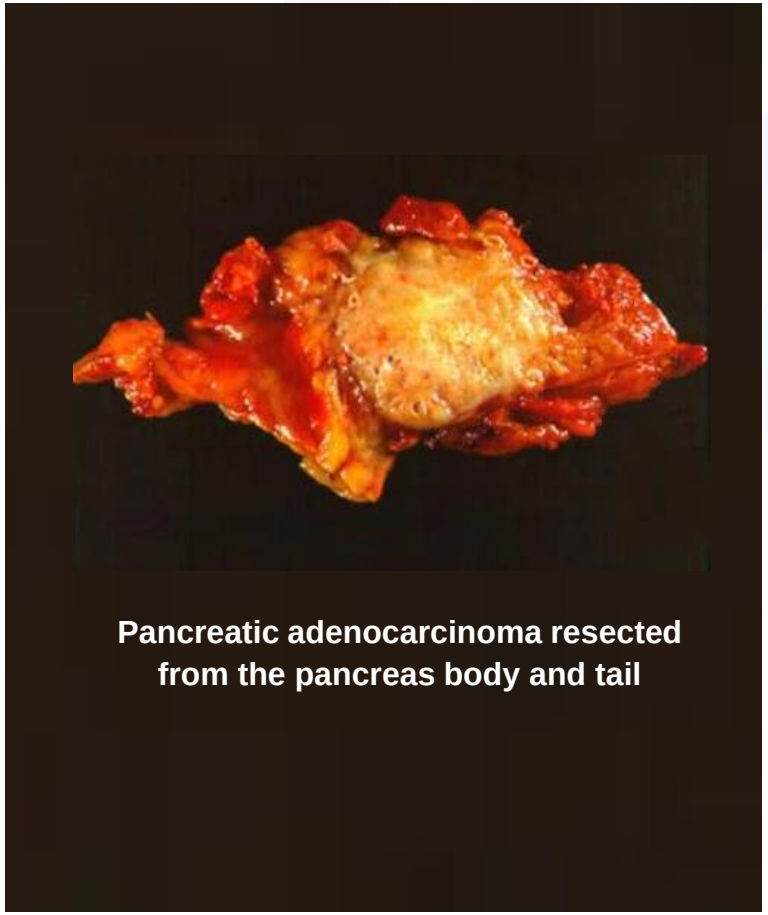
Number of Patients in Each Indication

*On-going study. Abraxane® - nab-paclitaxel. Durvalumab (IMFINZI®, AstraZeneca) is an anti-PD-L1 mAb immune checkpoint inhibitor. huCART-meso are autologous T cells engineered to express an extracellular single chain variable fragment (scFv) with mesothelin specificity. IT - intratumoral. IV - intravenous. IVit - intravitreal. Rb - retinoblastoma. See Appendix for study registry numbers and publications.

VCN-01 LEAD INDICATION PANCREATIC CANCER

Highly fatal cancer protected by dense tumor stroma

- Orphan disease with the highest mortality of all solid tumors
  - Median survival 8-11 months for metastatic disease[1]
  - USA est. 62,210 new cases and 49,830 deaths in 2022[2,3]
- Hyaluronic acid in stroma is associated with reduced treatment efficacy and poor prognosis[4]
  - VCN-01 designed to degrade hyaluronic acid
- Incidence is growing worldwide
  - Estimated treatment market ~$2.5B (2022) ~$7.0B (2030)[5]



Pancreatic adenocarcinoma resected from the pancreas body and tail

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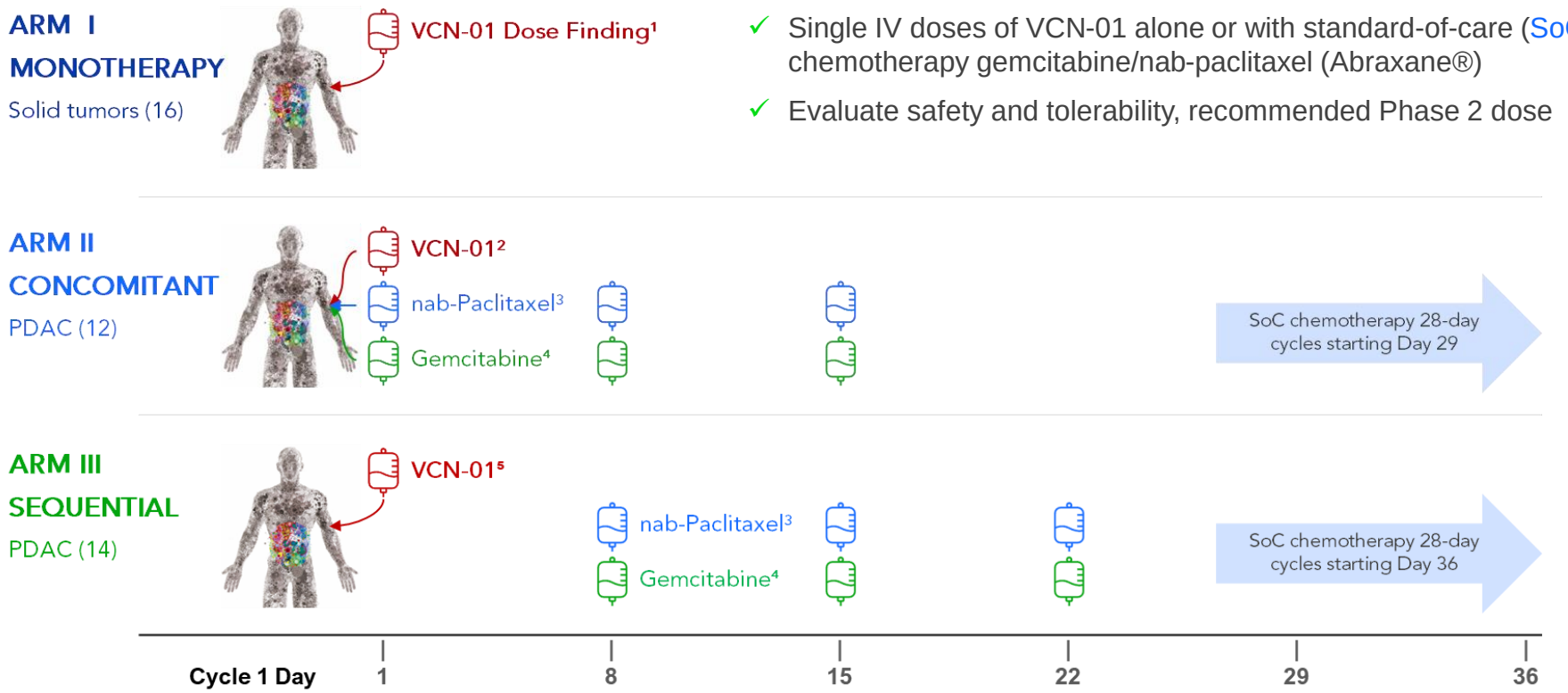
[1]Michael (2019) BMC Palliat Care 18:13, Bengtsson (2020) Sci Rep 10:16425, Carioli (2021) Ann Oncol 32:478, ASCO Pancreatic Cancer Statistics. [2]SEER Cancer Stat Facts: Pancreatic Cancer website. [3]WW estimated 495,773 new cases and 466,003 deaths in 2020; Sung (2021) CA Cancer J Clin 71:209. [4]Tahkola (2021) Sci Rep 11:12216, Placencio-Hickok (2022) Pancreatology 22:92. [5]Data Bridge Market Research website.

VCN-01 FAVORABLE OUTCOMES IN PHASE 1 TRIAL

Multicenter, open-label, dose escalation study (NCT02045602)



- ✓ Single IV doses of VCN-01 alone or with standard-of-care (SoC) chemotherapy gemcitabine/nab-paclitaxel (Abraxane®)
- ✓ Evaluate safety and tolerability, recommended Phase 2 dose

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[1]Single dose of VCN-01 (1x10[11] to 1x10[13] vp/dose) administered by 10 min IV infusion. [2]VCN-01 doses 3.3x10[12] vp (n=6) and 1x10[13] vp (6). [3]nab-Paclitaxel (Abraxane®; 30 min infusion) administered at least 4 hours after VCN-01. [4]Gemcitabine (30 min infusion) administered immediately after Abraxane® infusion. [5]VCN-01 doses 3.3x10[12] vp (8) 1x10[13] vp (6). Garcia-Carbonero (2022) J Immunother Cancer 10:e003255.

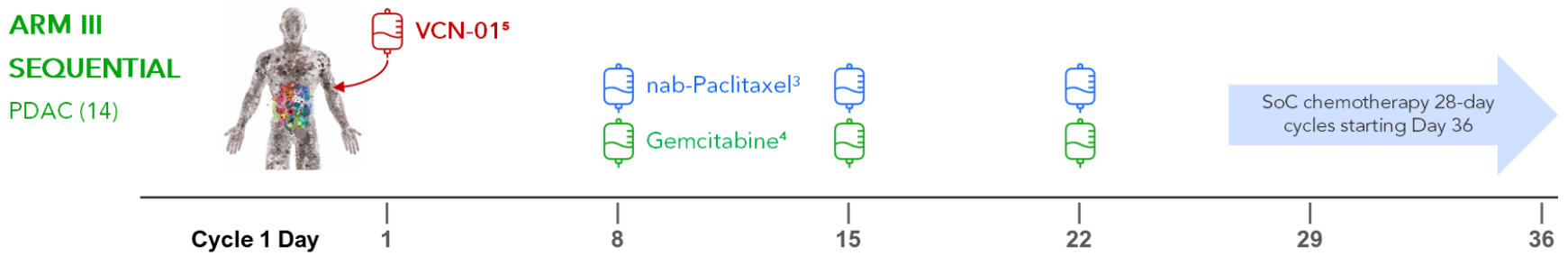
VCN-01 FAVORABLE OUTCOMES IN PHASE 1 TRIAL

Multicenter, open-label, dose escalation study (NCT02045602)

OUTCOME	VCN-01 DOSE, virus particles (n)[1]			SoC ALONE[2]
Sequential Regimen	$3.3x10^{12}$ (6)	$1.0x10^{13}$ (6)	Combined (12)	Phase 3 (431)
Responders, %	16.7%	**83.3%**	50.0%	22.9%
Median OS, months	13.1	**20.8**	13.5	8.5
Median PFS, months	9.9	6.7	7.2	5.5
Survival ≥12 months	.	.	67%	35%

KOLs advise that OS ≥15 months is a significant patient outcome

RELATED AEs IN ≥1 PATIENT[1]	CTCAE SEVERITY	
VCN-01 Combined, Sequential Regimen	Grade 1-2	Grade ≥3
Pyrexia/Influenza-like Illness	**12 (85.7%)**	-
Nausea	3 (21.4%)	-
Vomiting	3 (21.4%)	-
Asthenia/Fatigue	3 (21.4%)	-
Transaminase increases (ALT, AST)	2 (14.3%)	2 (14.3%)
Thrombocytopenia	2 (14.3%)	-

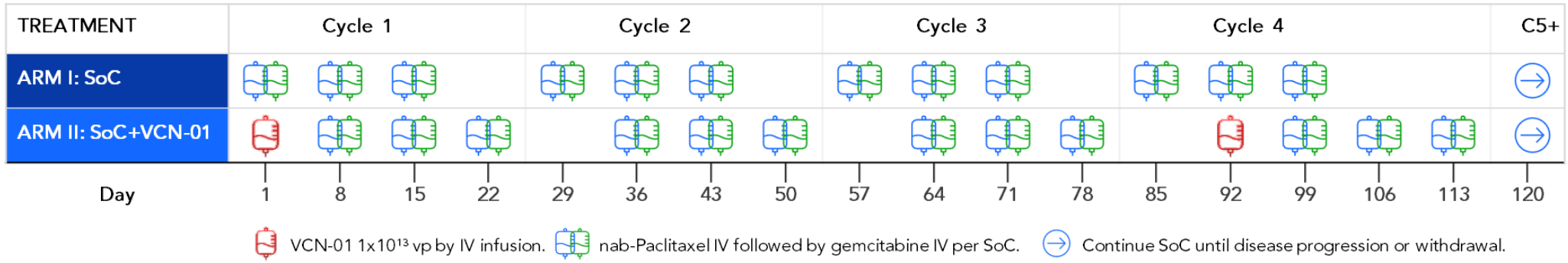


[1]Single dose of VCN-01 ($1x10^{11}$ to $1x10^{13}$ vp/dose) administered by 10 min IV infusion. [2]VCN-01 doses $3.3x10^{12}$ vp (n=6) and $1x10^{13}$ vp (6). [3]nab-Paclitaxel (Abraxane®; 30 min infusion) administered at least 4 hours after VCN-01. [4]Gemcitabine (30 min infusion) administered immediately after Abraxane® infusion. [5]VCN-01 doses $3.3x10^{12}$ vp (8) $1x10^{13}$ vp (6). Garcia-Carbonero (2022) J Immunother Cancer 10:e003255.

VIRAGE PHASE 2B CLINICAL TRIAL in PDAC

Multicenter, open-label, randomized, controlled trial (NCT05673811)

- Study on-going in patients with first-line metastatic pancreatic ductal adenocarcinoma (PDAC)
- Up to 92 patients to be enrolled at sites in Spain and the USA
- Randomized 1:1 to receive gemcitabine/nab-paclitaxel SoC or up to two doses of VCN-01 plus SoC
- Primary endpoints overall survival, VCN-01 safety and tolerability
- Secondary endpoints include response rates, progression free survival, landmark survival



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SoC standard of care

VIRAGE PHASE 2 CLINICAL TRIAL – DIFFERENTIATORS

- ✓ First-line treatment of metastatic PDAC patients
- ✓ Direct comparison with standard-of-care chemotherapy in the same trial
- ✓ Repeated dosing of VCN-01 may improve treatment outcomes
- ✓ Open label provides real-time opportunity to review emerging VCN-01 treatment effects
- ✓ Orphan Drug Designation to facilitate regulatory interactions and provide market exclusivity

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[1]Orphan Drug Designation has been obtained in the USA and Europe

VCN-01 DEVELOPMENT IN PANCREATIC CANCER

- Project complete enrollment into the VIRAGE Study H1 2024
  - First DMC safety review completed Q1 2024
  - No safety concerns were raised and no protocol amendments were requested
- Potential interim data analysis H2 2024
  - Opportunity to discuss pivotal study design and potential expedited status with FDA and EMA
- Evaluating potential expansion opportunities in pancreatic cancer[1]
  - Combination with FOLFIRINOX or NALIRIFOX[2]

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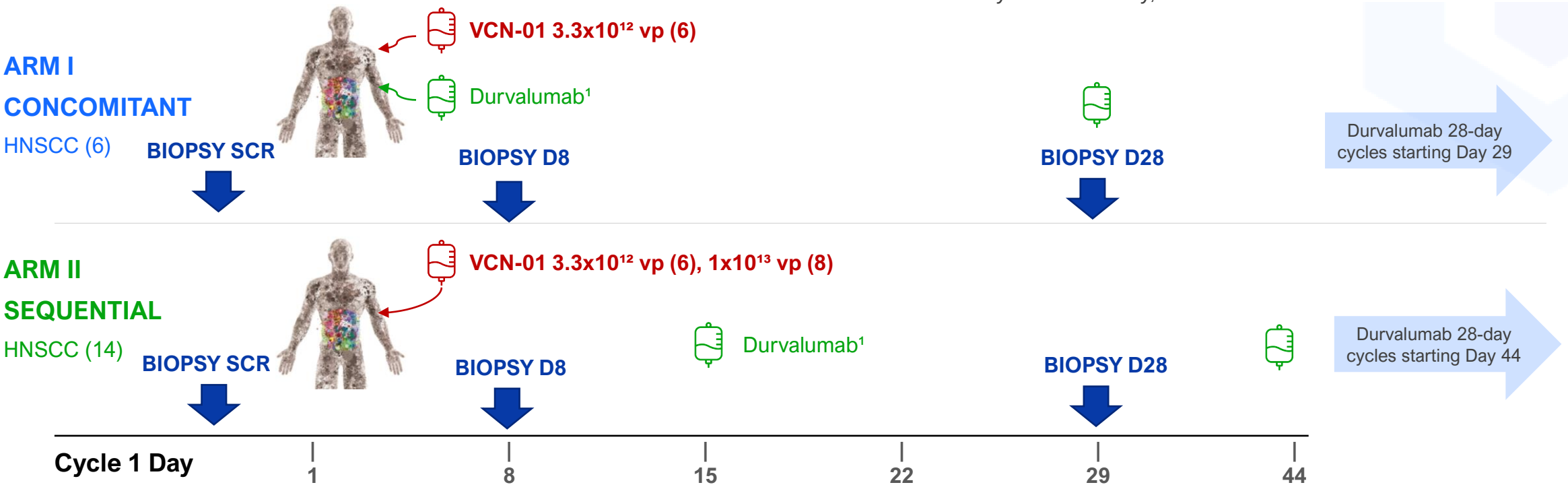
[1]Contingent on additional funding or investigator sponsored studies. [2]Preclinical data indicate synergistic anti-tumor effects when VCN-01 is administered with topoisomerase inhibitors including irinotecan and liposomal irinotecan.

VCN-01 IN HEAD & NECK CANCER

VCN-01 IV + ANTI-PD-L1 PHASE 1 TRIAL in HNSCC

Multicenter, open-label, dose escalation study (NCT03799744)

- ✓ Single IV doses of VCN-01 combined with anti-PD-L1
- ✓ Patients with metastatic squamous cell carcinoma of the head & neck previously **REFRACTORY** to anti-PD(L)1 treatment (R/M HNSCC)
- ✓ Evaluate safety and tolerability, recommended Phase 2 dose



¹Durvalumab 1500 mg (60 min infusion) administered at least 4 hours after VCN-01. HNSCC head and neck squamous cell carcinoma.
Jové M (2023) Ann Oncol 34:S589–S590.

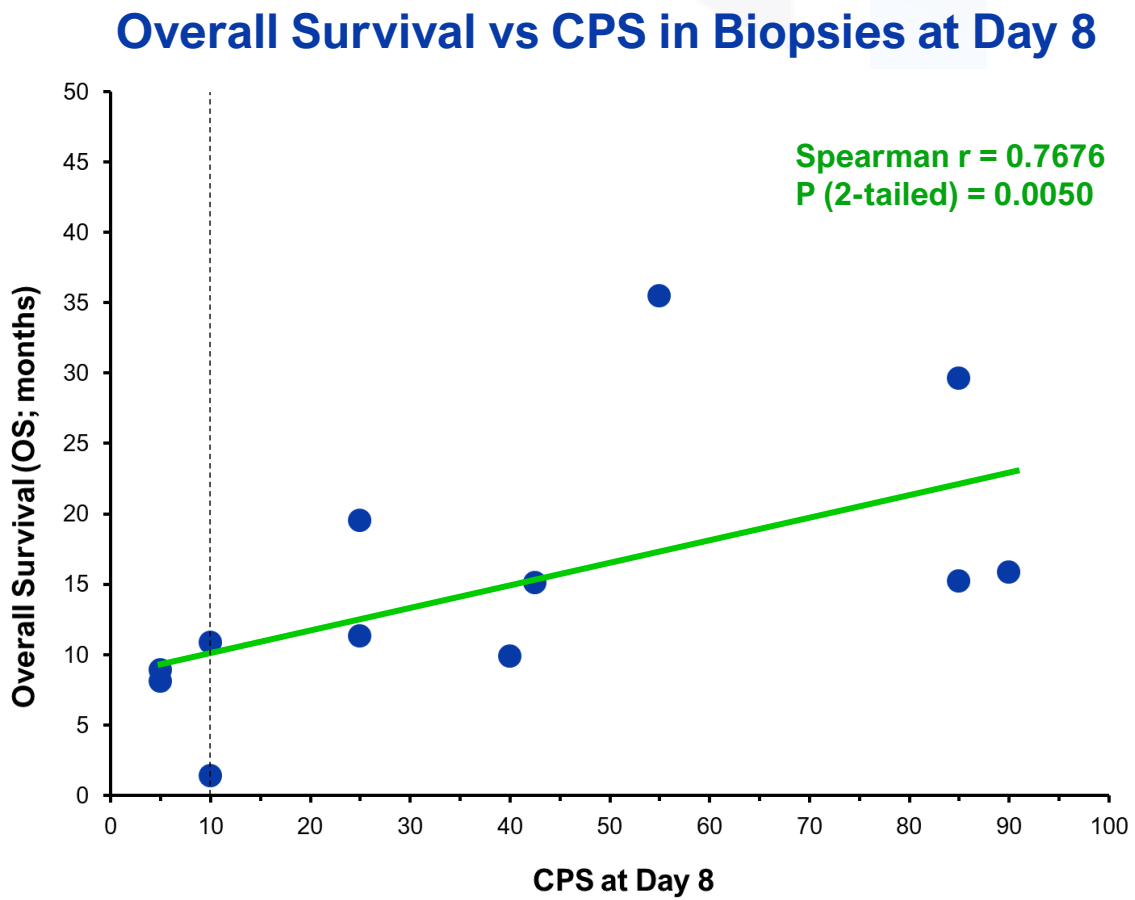
EXTENDED SURVIVAL with VCN-01+DURVALUMAB

Survival correlated with PD-L1 upregulation after VCN-01 treatment

- Higher than expected survival (OS) despite previous anti-PD(L)1 failure

Regimen	Median OS (95% CI), mos	
	$3.3x10^{12}$ vp	$1.0x10^{13}$ vp
Concomitant	10.4 (8.9-NE)	..
Sequential	15.5 (15.1-NE)	17.3 (11.3-NE)

- No correlation of survival with baseline tumor PD-L1 expression (CPS) BUT significant correlation of survival with CPS 8-days after VCN-01 treatment



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ESMO Congress 2023 Poster 937P: Survival Outcomes in Phase I Trial Combining VCN-01 and Durvalumab (MEDI4736) in Subjects with Recurrent/Metastatic Head and Neck Squamous Cell Carcinoma Refractory to Previous Immunotherapy Treatment. Jové M (2023) Ann Oncol 34:S589

VCN-01 MAY SENSITIZE PATIENTS TO SUBSEQUENT THERAPY

Patients responded to subsequent chemotherapy after progressing with VCN-01 + durvalumab

ARM	ICI Treatment Progression (Pre-trial)	Current Trial			1st Line after Current Trial	2nd Line after Current Trial
	Median OS post-1st ICI	ORR	Median PFS	Median OS	ORR	ORR
Concomitant Low (3.3E12vp)	21.6 (19.2-NE)	0/6	1.7 (1.6-NE)	10.4 (8.9-NE)	3/5	1/2
Sequential Low (3.3E12vp)	23.9 (16.6-NE)	1/6	3.7 (2.2-NE)	15.5 (15.1-NE)	3/6	1/6
Sequential High (1E13vp)	21.8 (12.9-NE)	0/6	2.1 (1.4-NE)	17.3 (11.3-NE)	2*/5	1/4

*Complete Responses

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VCN-01 FINDINGS in R/M HNSCC

Data support VCN-01 MOA and immune enhancing effects

- VCN-01 has an acceptable safety profile when administered prior to durvalumab (Imfinzi®)
- VCN-01 reaches tumors, has sustained replication and PH20 expression
- VCN-01 treatment led to downregulation of tumor matrix genes and increased levels of immune markers in tumor biopsies (CD8, PD-L1, IDO)
- VCN-01-treated patients showed increased response to subsequent chemotherapy treatment lines after progressing on this trial

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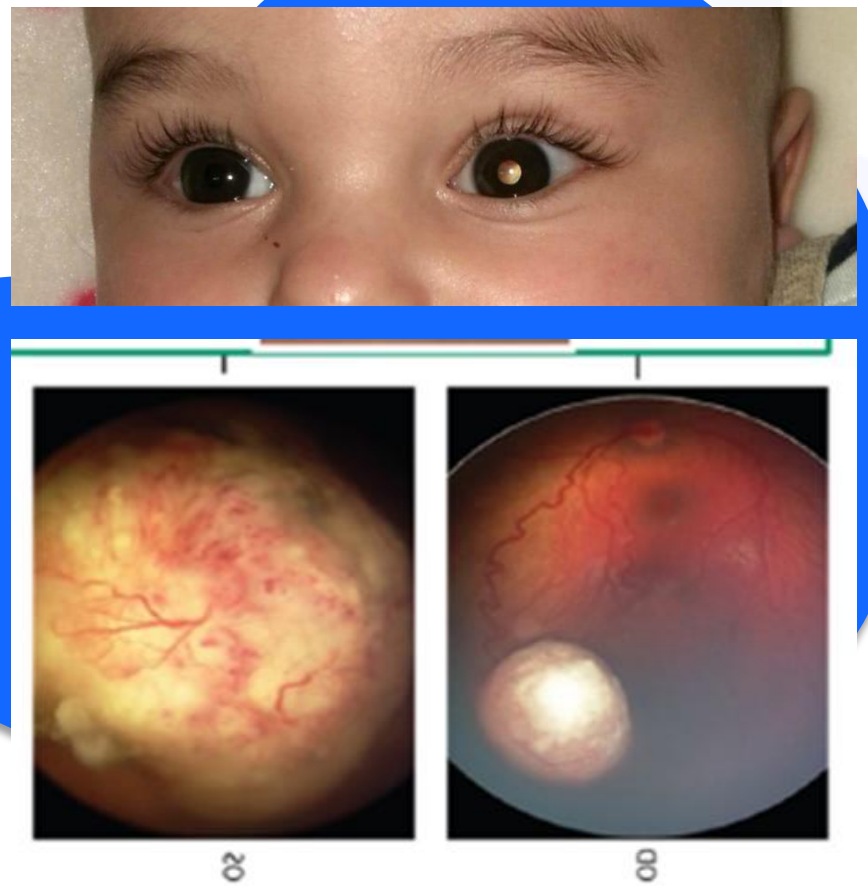
ESMO Congress 2022 Poster 1231P: Phase I Study to Evaluate the Safety, Tolerability, and Efficacy of VCN-01 in Combination With Durvalumab (MEDI4736) in Subjects With Recurrent/ Metastatic Squamous Cell Carcinoma of the Head and Neck (R/M HNSCC). Jove M (2022) Ann Oncol 33:S1112.
IDO Indoleamine-2,3-dioxygenase.

VCN-01 IN RETINOBLASTOMA

RETINOBLASTOMA, A RARE PEDIATRIC MALIGNANCY

- Retinoblastoma (Rb) is an orphan indication that accounts for ~2-3% of all childhood cancers[1]
- 200-300 cases each year in the USA, EU[2-4]
- VCN-01 selectivity enables development as an intravitreal treatment for Rb patients
- VCN-01 could be used in combination with chemotherapy to potentially improve outcomes
- VCN-01 could be used as a rescue therapy for patients who fail standard therapy



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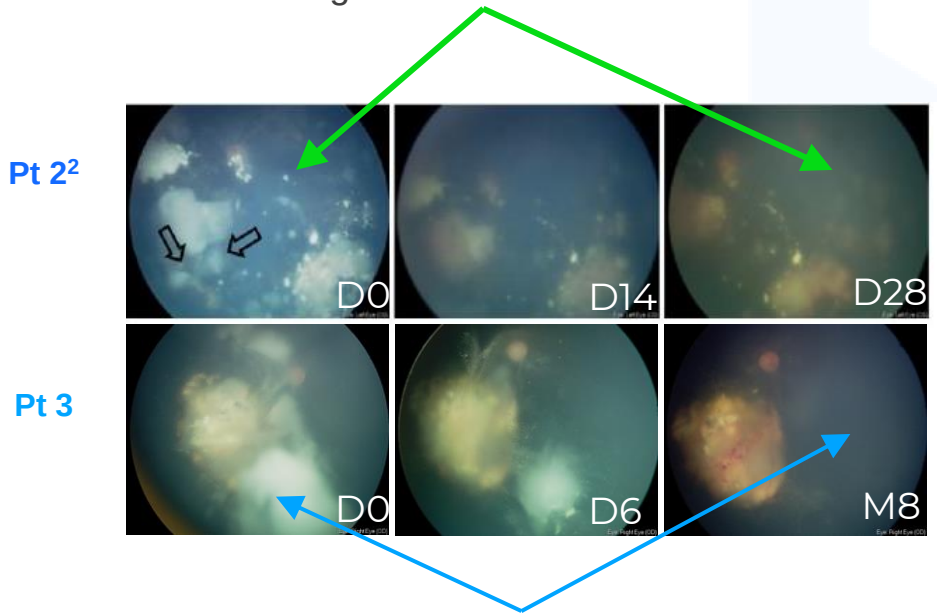
[1]https://www.cancer.org/cancer/retinoblastoma/about/key-statistics.html. [2]Stacey (2021) Ophthalmology 128:1369. [3]One Retinoblastoma World Map https://map.1rbw.org/. [4]For additional details and references see Appendix. IMAGE: Courtesy of Hospital Sant Joan de Déu, Barcelona

VCN-01 IN RETINOBLASTOMA

- On-going single center, open-label, dose escalation study of intravitreal (IVit) VCN-01[1-3]
  - Children aged 1-12 years (n=9)
  - Retinoblastoma that is recurrent or refractory to chemotherapy and for whom enucleation is the best treatment option
  - VCN-01 doses of $2.0x10^9$ vp per eye (n=1) or $2.0x10^{10}$ vp per eye (n=8) on days 1 and 15
- Promising antitumor activity and appropriate safety and tolerability at RP2D
  - Reduction of vitreous seeds in 4 patients of 9 evaluable patients
  - Enucleation avoided in 3 patients; low VCN-01 dose and/or damage from prior chemotherapy meant the eye could not be saved in 6 patients
- Earlier VCN-01 intervention anticipated to have better outcomes

Promising Results in Patients Treated with High Dose VCN-01

Reduced number and size of tumor vitreous seeds following VCN-01 administration[2]



Complete tumor regression[3]

[1]NCT03284268. [2]Pascual Pasto (2019) Sci Transl Med 11:eaat9321. [3]Data presented at International Oncolytic Virus Conference IOVC2021, 07 November 2021, Sedona, AZ. Link to IOVC2021 slide deck provided in Appendix. RP2D recommended phase 2 dose. vp virus particles.

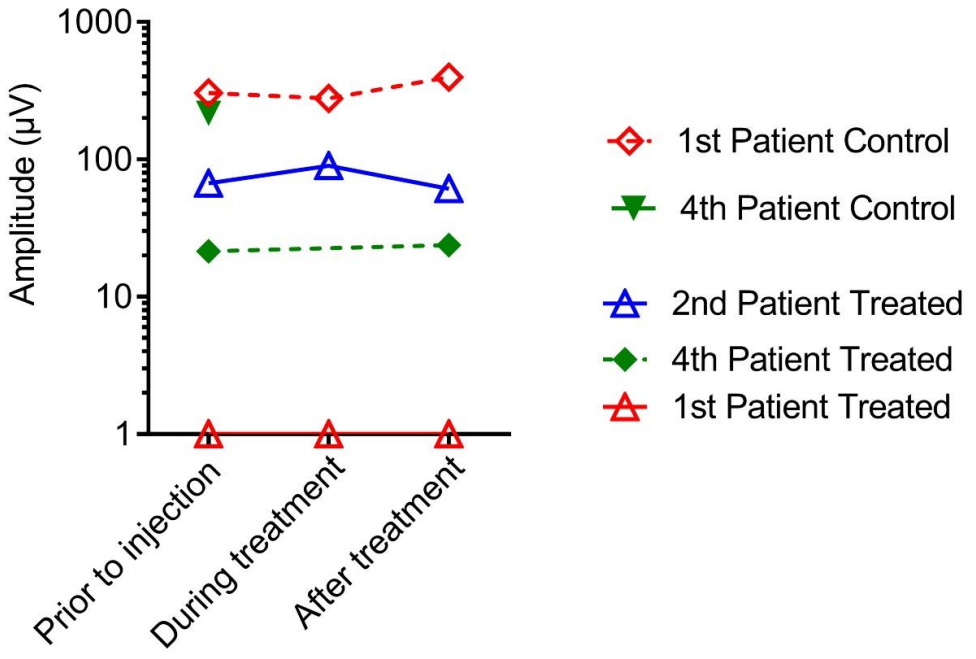
INTERIM SAFETY DATA FOR INTRAVITREAL VCN-01

Two Intravitreal VCN-01 Doses of $2.0x10^9$ or $2.0x10^{10}$ vp per eye[1]

Adverse Reaction	Pts	All Grades		Grade ≥3	
CTCAE grade	N	n	%	n	%
Uveitis	6	2	33%	2	33%
Eye oedema	6	1	17%	0	0%
Conjunctival hyperemia	6	1	17%	0	0%
Eye inflammation	6	1	17%	0	0%

- VCN-01 was reasonably well tolerated after intravitreal administration[2], although some turbidity and vitritis associated with intravitreal inflammation was observed
- Intravitreal inflammation was managed with local and systemic administration of anti-inflammatory drugs
- VCN-01 did not appear to change retinal function (electroretinographic signaling)
- VCN-01 does not replicate in healthy retinal tissue of patients with either somatic or germline Rb mutation[3]

Stable Electroretinographic Signals



[1]NCT03284268. [2]Intravitreal VCN-01 doses of $2.0x10^9$ virus particles (vp) per eye (Patient 1) or $2.0x10^{10}$ vp per eye (Patients 2-4) administered on days 1 and 15. [3]Pascual Pasto (2019) Sci Transl Med 11:eaat9321. Data presented at International Oncolytic Virus Conference IOVC2021, 07 November 2021, Sedona, AZ.

VCN-01 DEVELOPMENT IN RETINOBLASTOMA

- Phase 1 ISS to Complete in H1 2024
  - Enrollment completed and last patients in the follow-up period
  - Initial data demonstrate acceptable safety and one durable complete response
- Developing a clinical protocol for an open-label, multinational study
  - Retinoblastoma patients with vitreous seeds
  - IVit VCN-01 in combination with chemotherapy (no defined SoC)
  - PI Dr. Guillermo Chantada, MD PhD[1]
- Status
  - US Orphan Drug Designation (EU application in process)
  - Pre-IND meeting with FDA completed Q4 2023
  - Potential to apply for expedited status and Rare Pediatric Disease Designation

Theriva BIOLOGICS

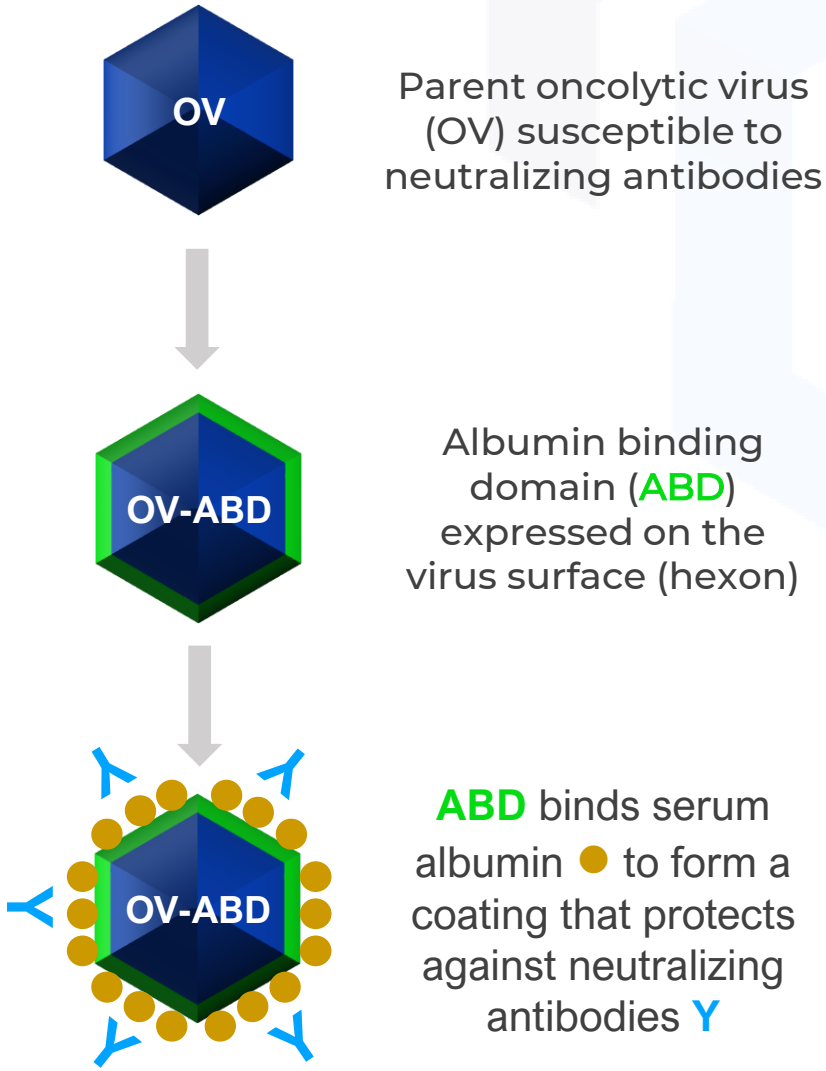
[1]Principal Researcher, Associate Physician, Hospital Sant Joan de Déu, Barcelona, Spain; Scientific Director, Pediatric Hemato-Oncology Service of the Hospital Universitario Austral, Argentina

Theriva BIOLOGICS

NEXT GENERATION OV DISCOVERY PLATFORM

ALBUMIN SHIELD™ to ENHANCE OV SYSTEMIC DELIVERY

- Albumin Shield technology protects OVs as they travel to tumors after systemic administration[1,2]
- Albumin Shield modified OVs bind albumin in the patient's blood to form a protective coating
- Albumin Shield genetic modification allows parent and progeny virus to be albumin coated
- Albumin Shield may enable multiple IV administrations for hard-to-treat patients
- Albumin Shield first candidate VCN-11 is being prepared for a potential Phase 1 clinical trial



Theriva BIOLOGICS

[1]Rojas (2016) J Control Rel 237:78; ABD binds mouse and human serum albumin, but not bovine; [2]Mato-Berciano (2021) J Control Rel 332:517.

THERIVA OV PIPELINE DISCOVERY AND DEVELOPMENT

Advancing founders' decade of world leading OV innovation

Common Features

Clinically-tested Adenovirus Expressing PH20 Hyaluronidase to Degrade Stroma

+

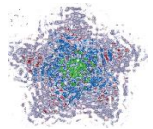
Albumin Shield™ To Prevent Neutralization by anti-viral Antibodies and Facilitate IV Multidosing

+

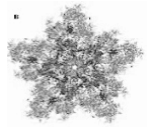
Unique Multifunctional Proteins to Turn Cold Tumors Hot and Enhance Anti-tumor Immune Response

Product Specific Features

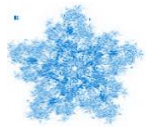
VCN-11 Hyaluronidase alone



VCN-12 Hyaluronidase + Toxins



VCN-13 Fusion Hyaluronidase + scPD-L1



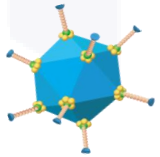
VCN-XX Hyaluronidase + other payloads

Theriva BIOLOGICS

SUMMARY

THERIVA OV PORTFOLIO HIGHLIGHTS

Unique MOA enables multiple indications and combinations



- Highly differentiated OV designed to have multiple antitumor effects
  - Systemic administration, selective tumor replication, stroma degradation
  - Designed to increases cell lysis, tumor immunogenicity, and tumor access by co-administered therapies
- Clinical data in different indications highlight multiple potential value opportunities for VCN-01
  - Encouraging clinical data in PDAC, HNSCC, and retinoblastoma support VCN-01 MOA and safety profile
  - Phase 1 clinical data suggest potential to improve/enable use of immune CPIs in refractory patients
  - Phase 1 clinical data support the feasibility of combining VCN-01 with CAR-T cells in solid tumor patients
- Regulatory status expected to facilitate VCN-01 development
  - Orphan Drug Designation in PDAC and retinoblastoma
  - Opportunity to apply for expedited status and/or Rare Pediatric Disease Designation (access to priority review voucher)
- Leading OV discovery engine advancing diverse new product candidates
  - Potent tumor killing with potential single agent efficacy

Theriva BIOLOGICS

CPI immune checkpoint inhibitor. PDAC pancreatic ductal adenocarcinoma. R/M HNSCC refractory/metastatic head and neck squamous cell carcinoma. SoC standard of care (gemcitabine + nab-paclitaxel in PDAC). Alternate indications include retinoblastoma and brain tumors; phase 1 data support additional evaluation in colorectal cancer. Topoisomerase inhibitors include topotecan and irinotecan.

ACHIEVEMENTS AND PROJECTED MILESTONES

Q1 2024

- VCN-01 PDAC
  Positive DMC safety review ✓
- VCN-01 RETINOBLASTOMA
  Patient dosing completed ✓

Q2 2024

- VCN-01 PDAC
  Phase 2 enrollment complete
  ASGCT poster (preclinical)[1]
  ASCO poster (trial design)
- VCN-01 RETINOBLASTOMA
  Patient follow-up complete
- SYN-004 aGVHD
  Phase 1b/2a data 2nd cohort

Q3 2024

- VCN-01 PDAC
  Potential interim data analysis (Q3/Q4)
- VCN OV DISCOVERY
  VCN-12 candidate selection[2]
- SYN-004 aGVHD
  Phase 1b/2a potential initiation of 3rd cohort (data est. H1 2025)

Q4 2024

- VCN-01 PDAC
  Potential FDA and EMA discussions of pivotal design
- VCN-01 RETINOBLASTOMA
  SIOP presentation (Phase 1)[3]
  Finalize Phase 2 study design
- VCN-01 + CAR-T
  Anticipate additional data presentations by U. Penn

Theriva BIOLOGICS

[1]VCN-01 synergistic antitumor effect with irinotecan; potential combination with FOLFIRINOX/NALIRIFOX. [2]VCN-12 is an armed version of VCN-11 designed to express an additional functional payload (VCN-11 is the first clinical candidate using the Albumin Binding Domain™ technology) [3]If accepted by the International Society of Pediatric Oncology. [4]Contingent on Theriva obtaining required funding for a clinical trial.

FINANCIAL AND INVESTMENT GOALS

- Immediate Goals
  - Augment share register with additional sophisticated institutional investors
  - Establish a realistic share price/valuation to facilitate financial options
  - External validation through a funded discovery or development partnership

- Mid- to Longer-Term Goals
  - Institutional investment to enable registration studies in lead indication(s)
  - Financing or partnering to advance OV pipeline and explore additional indications

SEASONED LEADERSHIP TEAM

Steven Shallcross

Chief Executive Officer, Chief Financial Officer

Served as the Company's CEO since 2018 and CFO since joining the Company in 2015

Deep operational, financial and international biotech industry experience and proven track record of leading the financial development and strategy in the public sector

Senseonics · VANDA PHARMACEUTICALS INC. · Innocoll · NUO THERAPEUTICS

Manel Cascalló PhD

General Director, EU Subsidiary

Expertise in oncolytic adenovirus clinical development, received several patents for the use of adenovirus as antitumoral agents and authored many peer-reviewed scientific publications

Deep regulatory experience and serves as an independent expert for the European Medicines Agencies (EMA)

VCN BIOSCIENCES

Vince Wacher PhD

Head Corporate Development

Nearly 30 years leading corporate strategy, partnering, research, clinical development, and intellectual property programs for start-ups, small companies, and new business units within large companies

Development experience across oncology, infection, GI, metabolic diseases, transplantation, and drug delivery

EASTMAN · Verva Pharmaceuticals

Theriva BIOLOGICS

APPENDIX

INTELLECTUAL PROPERTY

Hyaluronidase OV

VCN-01, VCN-11

Composition of Matter (exp 2030)

Methods of Use and Novel Formulations (examination)

Use in Rb (exp 2036)

ODD EU (PDAC)

ODD US (PDAC & Rb)

Albumin Shield™

VCN-11, Discovery

Composition of Matter (exp 2034)

Methods of Use and Novel Formulations (examination)

Oral β-Lactamase

SYN-004, -006, -007

Composition of Matter (exp 2031-5)

Methods of Use and Novel Formulations (exp 2035-6)

Oral IAP

SYN-020

Manufacturing Know-how (Trade Secret)

Methods of Use and Novel Formulations (applications filed)

Option to additional IP from MGH

Theriva BIOLOGICS

ODD Orphan Drug Designation provides 7 years market exclusivity in US and 10 years in the EU. OV oncolytic virus. PDAC pancreatic ductal adenocarcinoma. Rb retinoblastoma.

EXTENSIVE VCN-01 PHASE 1 CLINICAL EXPERIENCE

87 Patients Treated in Diverse Cancer Indications

Location	Phase	Indication	Co-therapy	Route	Status	Registry
Multicenter (ESP)	1	Part I: Solid tumor Part II, III: PDAC	Part I: None Parts II,III: Gemcitabine + nab-Paclitaxel	IV	Complete[1]	NCT02045602
Multicenter (ESP)	1	PDAC	Gemcitabine + nab-Paclitaxel	IT	Complete[2]	NCT02045589
Hospital Sant Joan de Déu, Barcelona	1	Retinoblastoma	None	IVit	Ongoing; partial data available	NCT03284268
Institut Català d'Oncologia (ICO)	1	HNSCC	Durvalumab	IV	Treatment complete; Initial data H2'22	NCT03799744
U. Leeds	1	Adult brain tumors	None	IV	Ongoing	ISRCTN 517624869
U. Pennsylvania	1	PDAC, Ovarian	huCART-meso[3]	IV	Ongoing	NCT05057715

Theriva BIOLOGICS

[1]Garcia-Carbonero (2022) J Immunother Cancer 10:e003255. [2]Bazan-Peregrino (2021) J Immunother Cancer 9:e003254. [3]huCART-meso are autologous T cells engineered to express an extracellular single chain variable fragment (scFv) with mesothelin specificity. HNSCC head and neck squamous cell carcinoma. IV intravenous. IT intratumoral. IVit intravitreal.

MOST COMMON IV VCN-01 RELATED AEs [NCT02045602]

ADVERSE EVENTS[1]	Part I (Alone, n=16)		Part II (Concomitant, 12)[2]		Part III (Sequential, 14)[3]	
	Grade 1-2	Grade ≥3	Grade 1-2	Grade ≥3*	Grade 1-2	Grade ≥3
Febrile neutropenia	-	-	-	2 (16.7%)	-	-
Neutropenia/Neutrophil count decreased	2 (12.5%)	-	1 (8.3%)	1 (8.3%)	-	-
Thrombocytopenia/Platelet count decreased	1 (6.3%)	1 (6.3%)	3 (25.0%)	4 (33.3%)	2 (14.3%)	-
Diarrhea	3 (18.8%)	-	1 (8.3%)	-	-	1 (7.1%)
Nausea	2 (12.5%)	-	3 (25.0%)	-	3 (21.4%)	-
Vomiting	3 (18.8%)	-	2 (16.7%)	-	3 (21.4%)	-
Asthenia/Fatigue	2 (12.5%)	-	5 (41.7%)	1 (8.3%)	3 (21.4%)	-
Pyrexia/Influenza-like Illness	**12 (75.0%)**	**1 (6.3%)**	**8 (66.7%)**	**-**	**12 (85.7%)**	**-**
Transaminase increases (ALT, AST)	2 (12.5%)	3 (18.8%)	1 (8.3%)	1 (8.3%)	2 (14.3%)	2 (14.3%)
Pancreatic enzyme increase (lipase, amylase)	1 (6.3%)	3 (18.8%)	-	-	-	-
Decreased appetite	3 (18.8%)	-	3 (25.0%)	-	-	-
Arthralgia	2 (12.5%)	-	-	-	-	-
Musculoskeletal pain	3 (18.8%)	-	4 (33.3%)	-	-	-
Dizziness	1 (6.3%)	-	1 (8.3%)	-	-	-
Headache	1 (6.3%)	-	1 (8.3%)	-	1 (7.1%)	-
Dyspnea	2 (12.5%)	-	-	-	-	-
Hypotension	2 (12.5%)	-	1 (8.3%)	-	-	-

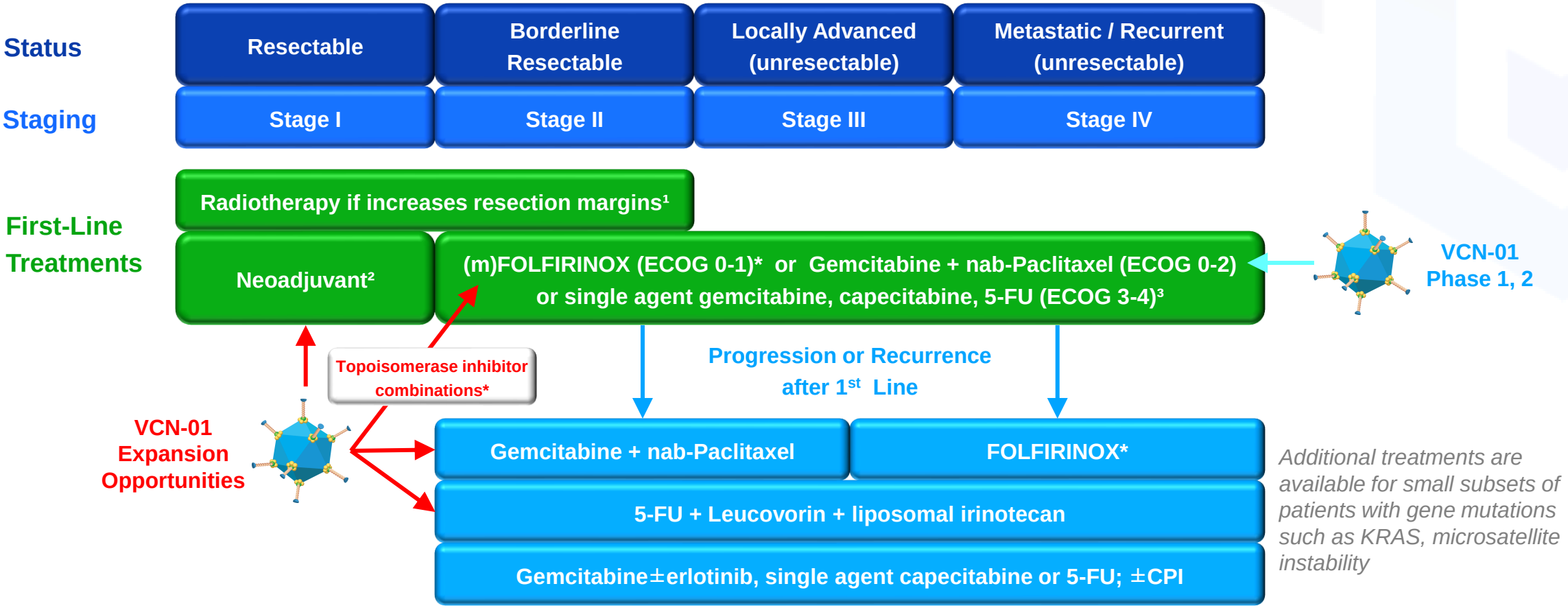
*Part II: one patient at the highest dose (1x10^{13} vp) died from a combination of thrombocytopenia (Grade 4) and enterocolitis (Grade 5)

Theriva BIOLOGICS

[1]Garcia-Carbonero (2022) J Immunother Cancer 10:e003255. [2]Concomitant IV VCN-01 3.3x10^{12} or 1.0x10^{13} vp/patient administered same day as first dose of SoC IV gemcitabine/nab-paclitaxel. [3]Sequential IV VCN-01 3.3x10^{12} or 1.0x10^{13} vp/patient administered 7-days prior to first dose of SoC.

EXPANSION OPPORTUNITIES for VCN-01 in PDAC

Alternate treatment lines and new chemotherapy combinations



[1]Used in <20% of PDAC cases. [2]Identical to first-line chemotherapy. [3]Eastern Cooperative Oncology Group Performance Status.
Abbreviations: CPI checkpoint inhibitor. (m)FOLFIRINOX (modified) leucovorin+5-FU+irinotecan+oxaliplatin. nab-Paclitaxel nanoparticle albumin-bound paclitaxel. *NALIRIFOX leucovorin+ 5-FU+liposomal irinotecan+oxaliplatin regimen sNDA accepted by FDA June 2023 for first line metastatic PDAC.
Adapted from Tempero (2021) *J Natl Compr Canc Netw* **19:**439.

AE PROFILE FOR THE COMBINATION OF VCN-01 AND DURVALUMAB

Most common AEs related to IV VCN-01 [NCT03799744]

Adverse Reactions	Arm I - Concomitant (Dose 3,3E12 , n=6)[2]		Arm II - Sequential (Dose 3,3E12 , n=6)[3]		Arm II - Sequential (Dose 1E13 , n=8)[3]	
CTCAE Grade	Grade 1-2	Grade ≥3	Grade 1-2	Grade ≥3	Grade 1-2	Grade ≥3
Pyrexia	2 (33,0%)	-	5 (62,5%)	-	3 (50%)	-
Influenza like illness	3 (50,0%)	-	3 (37,5%)	2(25%)	2 (33,3%)	-
Asthenia/Fatigue	2 (33.0%)	-	2 (25%)	1 (12,5%)	4 (66,6%)	-
AST increased	4 (66,7%)	1 (16,6%)	2 (25%)	-	-	2 (33,3%)
ALT increased	3 (50,0%)	1 (16,6%)	1 (12,5%)	-	-	2 (33,3%)
Decreased Apetite	1 (16,6%)	-	3(37,5%)	-	2 (33,3%)	-
Lymphocyte count decreased	1 (16,6%)	-	-	3 (37,5%)	-	-
Myalgia	-	-	3(37,5%)	-	1 (16,6%)	-
Hypotension	-	-	2 (25%)	-	1 (16,6%)	-
Chills	1 (16,6%)	-	1(12,5%)	-	1 (16,6%)	-
Vomiting	1 (16,6%)	-	1(12,5%)	-	1 (16,6%)	-
Anemia	2 (33,0%)	-	1(12,5%)	-	1 (16,6%)	-
Nausea	-	-	1(12,5%)	-	1 (16,6%)	-
Headache	-	-	1(12,5%)	-	1 (16,6%)	-
Erythema	1 (16,6%)	-	1(12,5%)	-	-	-
Guillain-Barre Syndrome	-	1 (16,6%)	-	1 (12,5%)	-	-
Hepatic enzymes increased	-	-	-	1 (12,5%)	-	-
GGT Increased	-	-	-	-	-	1 (12,5%)

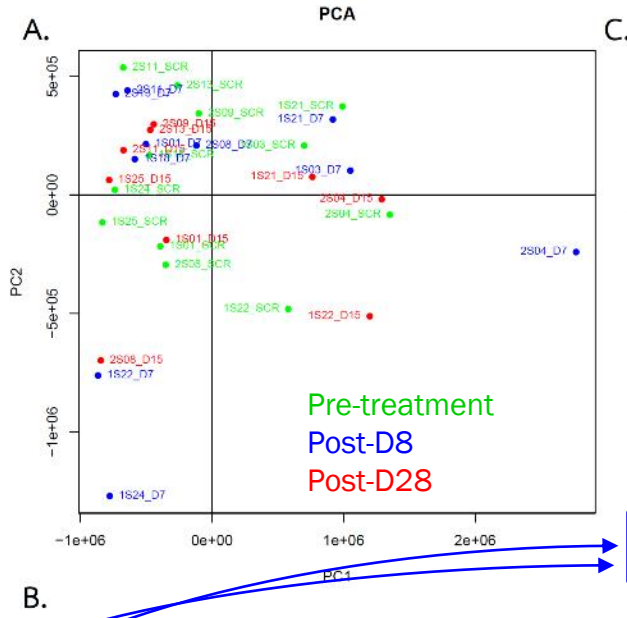
Theriva BIOLOGICS

VCN-01 INDUCES TRANSCRIPTOMIC CHANGES in TUMOR MICROENVIRONMENT

RNAseq Analysis in Clinical Samples from HNSCC Patients [NCT03799744]

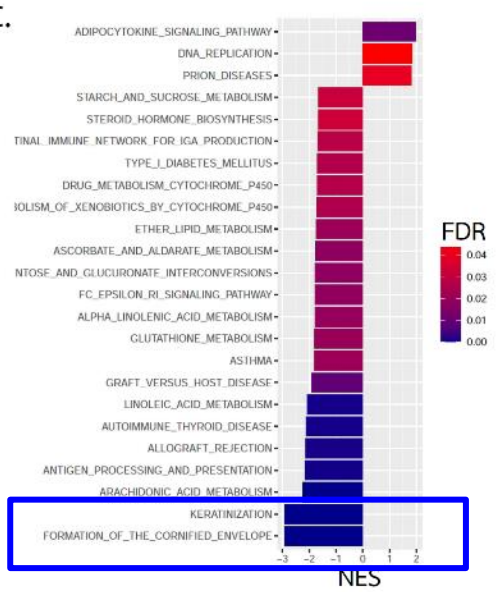
Principal Component Analysis[1]

including all the Pre- and Post-treatment samples

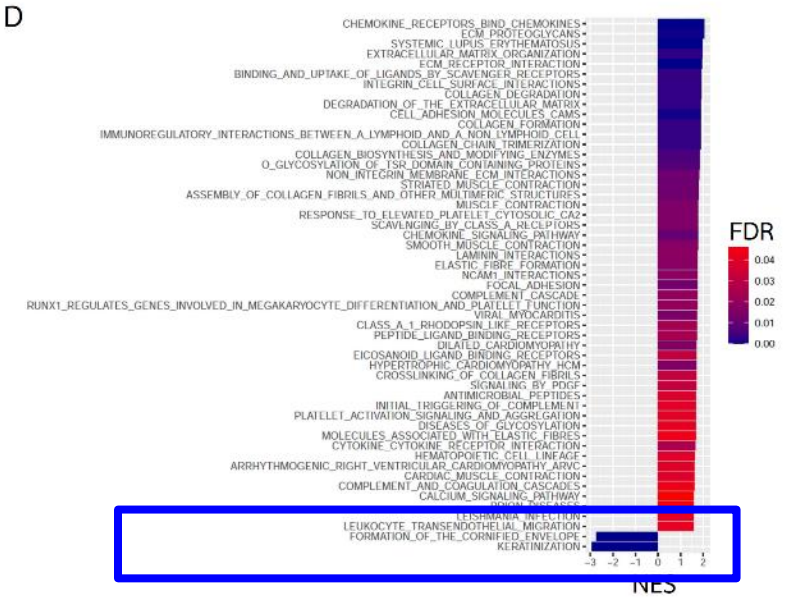


Most significant Reactome and KEGG pathways in GSEA (Gene Set Enrichment Analysis) [1]

analysis D8 vs Pre-treat.



analysis D28 vs Pre-treat.



B.

Gene	Gene product	log2FoldChange	padj	
CIDEC	Cell Death Inducing DFFA Like Effector C	5.524	0.047	Up D7
TAGLN3	Transgelin 3	1.615	0.037	
GPR3	G Protein-Coupled Receptor 3	1.157	0.039	
ABP1	Auxin-binding protein 1	-1.636	0.013	Down D7
CD207	CD207 Molecule	-1.960	0.044	
MEGF10	Multiple EGF Like Domains 10	-2.008	0.043	
OSTalpha	Organic solute transporter alpha	-2.179	0.039	
CD1E	CD1E Molecule	-2.316	0.010	
ATP10B	ATPase Phospholipid Transporting 10B	-2.556	0.044	
FCER1A	Fc Epsilon Receptor Ia	-2.687	0.006	
LOC285629	.....	-2.818	0.001	
LCE1B	Late Cornified Envelope 1B	-7.921	0.006	

Sustained differential gene expression profiles associated with downregulation of matrix-related pathways

THERIVA ONCOLYTIC VIRUSES KEY PUBLICATIONS

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Theriva BIOLOGICS

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DESCRIPTION, CLASSIFICATION, STAGING, STROMA

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TREATMENT

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DESCRIPTION, CLASSIFICATION, STAGING

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