Corporate Overview

September 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 Q3 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 VCN-X oncolytic virus discovery engine enable development of a distinct product pipeline

Financial Snapshot	
Exchange	NYSE American
Ticker	TOVX
Cash (06/30/2024)	$16.6M
Projected cash runway	Q2 2025
Average Daily Volume (3M Ave)	715,000
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	Phase 3	Collaborators	Status*
VCN-01 Selective, Stroma Degrading OV	Pancreatic Cancer (IV) with gemcitabine/nab-paclitaxel						Phase 2b Study On-going Orphan Drug Designation US, EU Fast Track Designation US
	Retinoblastoma (IVit)					Sant Joan de Déu	Phase 1 Complete, CSR in preparation Orphan Drug Designation US Rare Pediatric Disease Designation US
	HNSCC (IV) + durvalumab					ICO Institut Català d'Oncologia	Phase 1 Complete, CSR in preparation
	Solid Tumors – Brain, Ovarian, PDAC (IV)					LEEDS, Penn	Phase 1 Studies On-going
VCN-X and Albumin Shield OVs	Solid tumors (IV)					ICO Institut Català d'C, IDI BELL	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 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. CSR clinical study report. IAP recombinant bovine intestinal alkaline phosphatase. HNSCC head and neck squamous cell carcinoma. IV intravenous. IVit intravitreal.

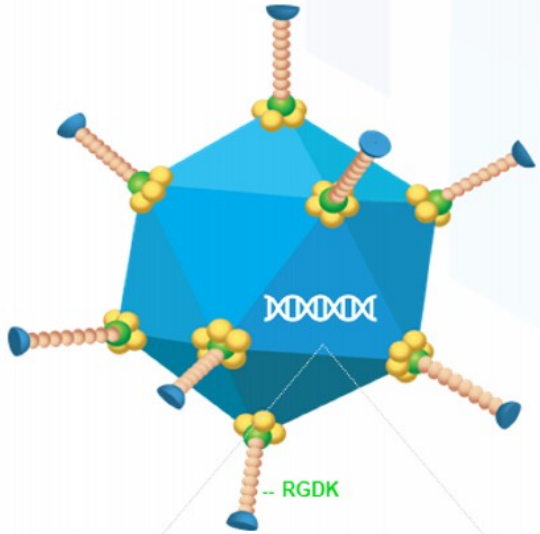
VCN-01 IS A UNIQUELY ENGINEERED HUMAN ADENOVIRUS 5

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 potential **biomarker**
for virus replication in tumors



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

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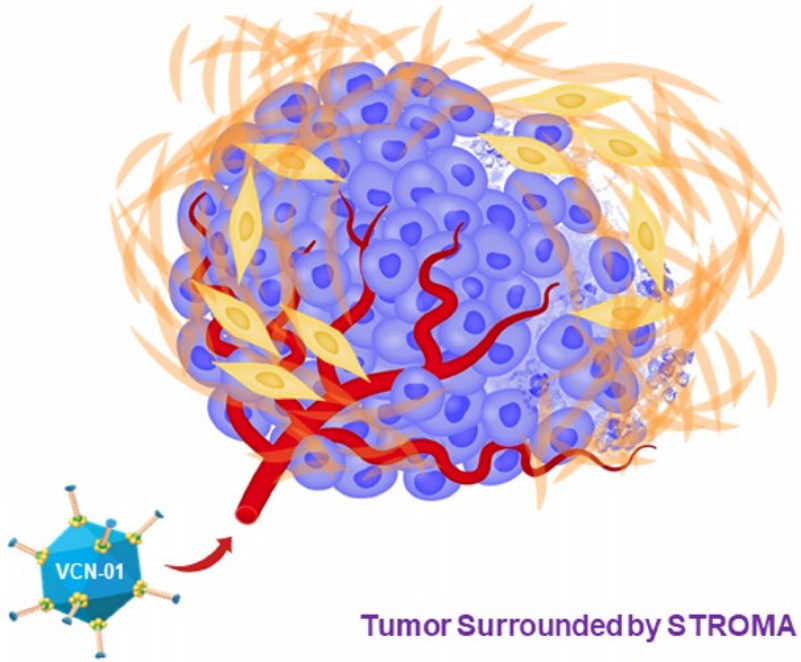
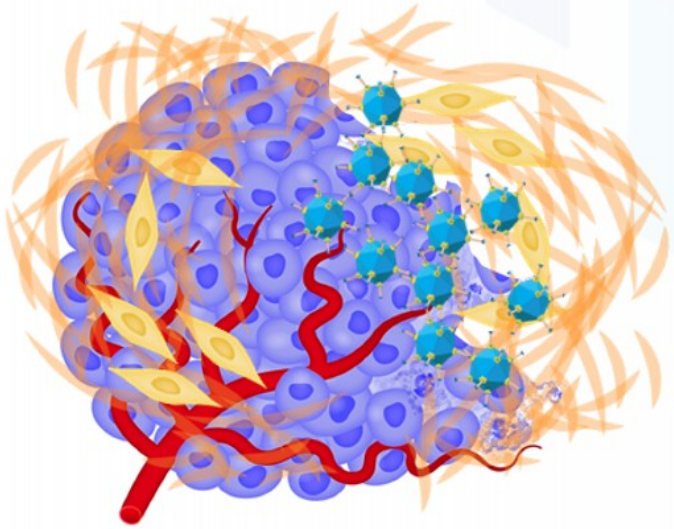
Replication enhanced by significantly increased E2F binding. E1a-δ24 gene deletion means replication only in cells with a defective Rb-E2F pathway. Fiber shaft RGDK modification. PH20 soluble human testicular hyaluronidase enzyme expression is under control of the virus major late promoter (MLP).

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



Tumor Surrounded by STROMA

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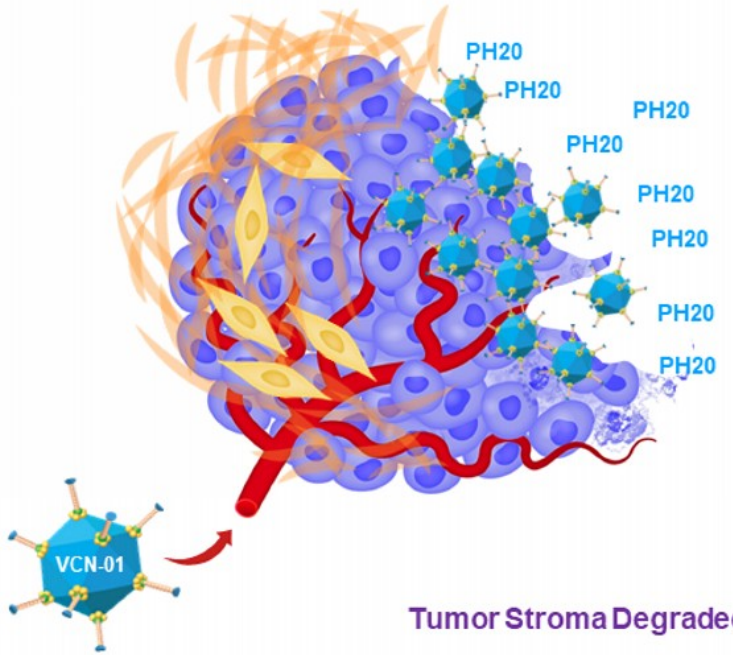
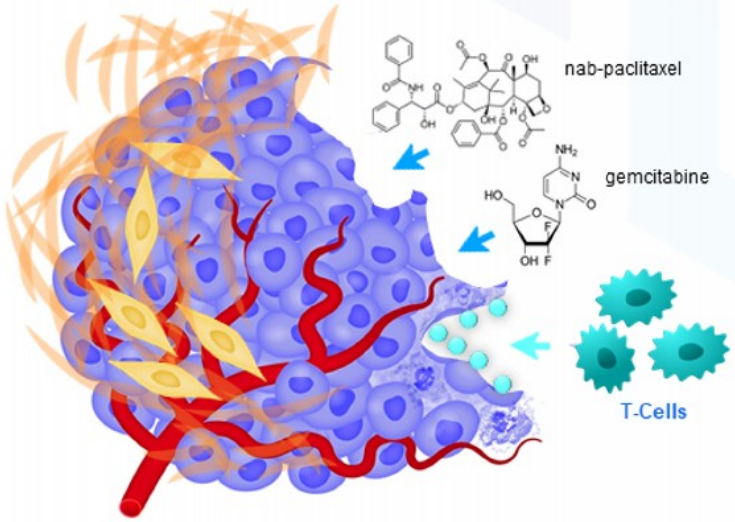
VCN-01 DESIGNED TO HAVE MULTIPLE ANTI-TUMOR ACTIONS

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



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VCN-01 COMPARED TO OTHER ONCOLYTIC VIRUSES IN DEVELOPMENT

COMPANY	THERIVA BIOLOGICS	CG ONCOLOGY	GENELUX	ONCOLYTICS BIOTECH	REPLIMMUNE
Ticker	NYSE MKT: TOVX	NASDAQ: CGON	NASDAQ: GNLX	NASDAQ:ONCY	NASDAQ: REPL
Market Cap[1]	$4M	$2.5B	$85M	$71M	$757M
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 (3)
Route	IV	IVESIC	IP	IV	IT
Dose	$1x10^{13}$ vp[2]	$1x10^{12}$ vp	$3x10^{9}$ pfu	$4.5x10^{10}$ $TCID_{50}$	$1x10^{7}$ pfu/mL
Stroma Degrading	Yes	No	No	No	No
Biomarker	PH20	..	β-GAL, β-GLU, GFP	..	..

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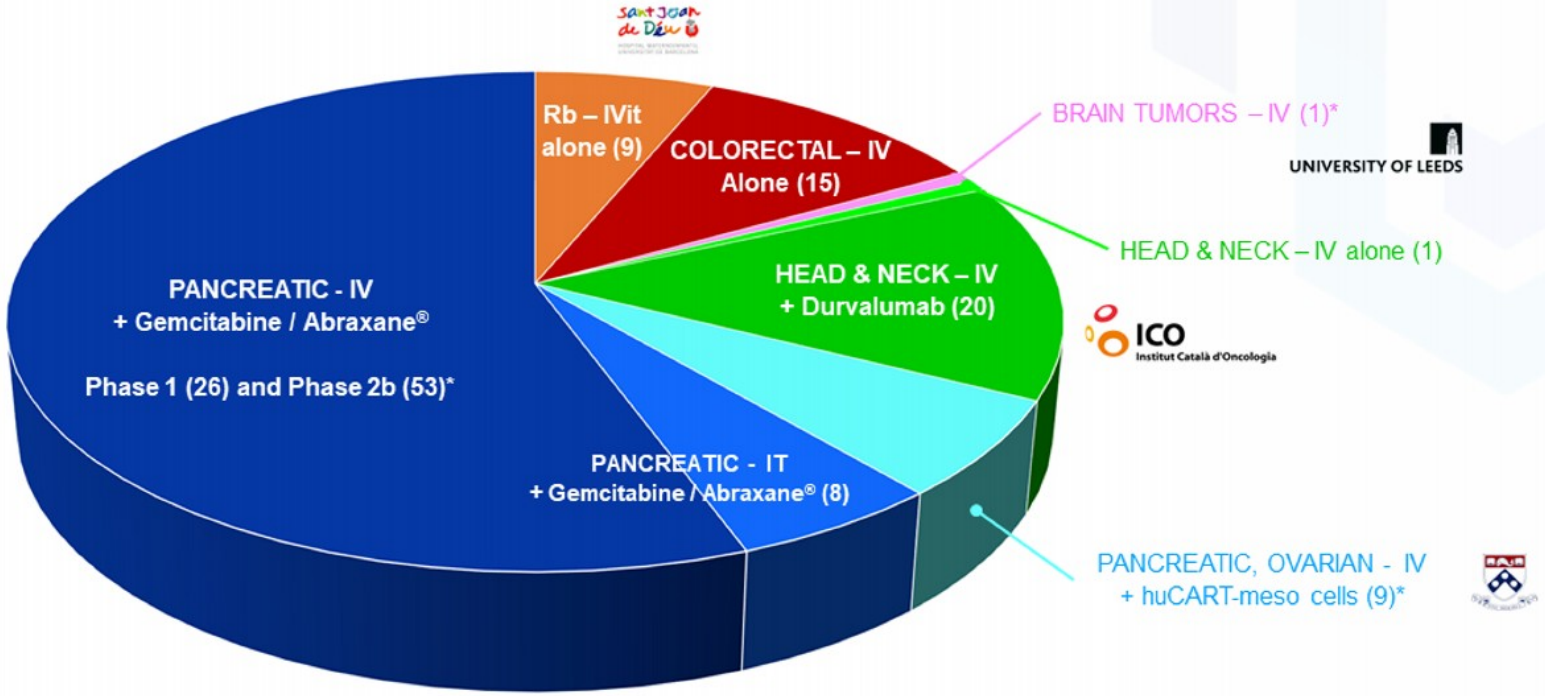
[1]At 18Sep2024. [2]Approximately $7x10^{11}$ $TCID_{50}$. References describing the different OV product candidates are provided in the appendix; information is also available on each company's website and clinicaltrials.gov

VCN-01 EXTENSIVE CLINICAL PROGRAM

142 patients treated with VCN-01 to date in multiple indications and combinations



(Number of VCN-01 Patients Treated in Parentheses)

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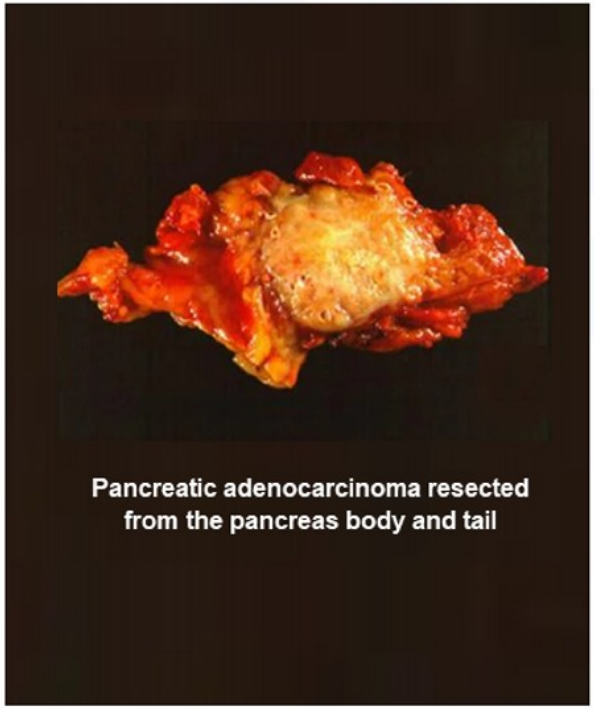
*On-going study. Abraxane® - nab-paclitaxel. Durvalumab (IMFINZI®, AstraZeneca) is an anti-PD-L1 mAb immune checkpoint inhibitor. huCART-meso are autologous T cells engineered to express an extracellular single chain variable fragment (scFv) with mesothelin specificity. IT - intratumoral. IV - intravenous. 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[1,2]
  - USA est. 66,440 new cases and 51,750 deaths in 2024[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
  - Est. treatment market ~$2.5B (2022) ~$7.0B (2030)[5]



Pancreatic adenocarcinoma resected from the pancreas body and tail

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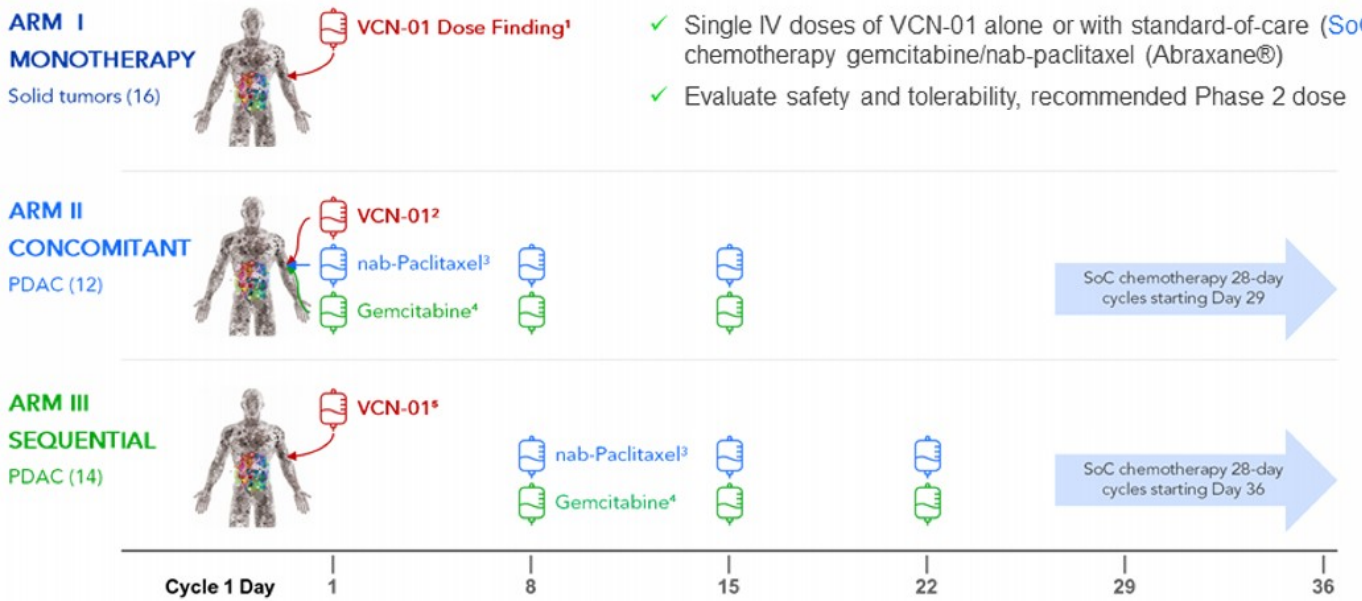
[1]Michael (2019) BMC Palliat Care 18:13, Bengtsson (2020) Sci Rep 10:16425, Carioli (2021) Ann Oncol 32:478, ASCO Pancreatic Cancer Statistics.
[2]SEER Cancer Stat Facts: Pancreatic Cancer website. [3]American Cancer Society. Cancer Facts & Figures 2024. Atlanta: American Cancer Society; 2024.
[4]Tahkola (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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¹Single dose of VCN-01 ($1x10^{11}$ to $1x10^{13}$ vp/dose) administered by 10 min IV infusion. ²VCN-01 doses $3.3x10^{12}$ vp (n=6) and $1x10^{13}$ vp (6). ³nab-Paclitaxel (Abraxane®; 30 min infusion) administered at least 4 hours after VCN-01. ⁴Gemcitabine (30 min infusion) administered immediately after Abraxane® infusion. ⁵VCN-01 doses $3.3x10^{12}$ vp (8) $1x10^{13}$ vp (6). Garcia-Carbonero (2022) J Immunother Cancer 10:e003255.

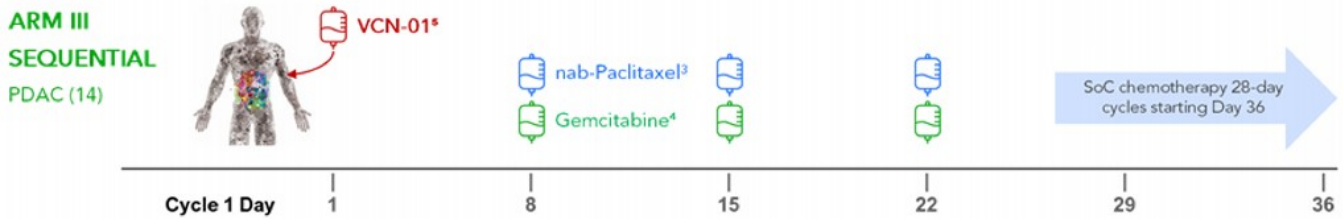
VCN-01 FAVORABLE OUTCOMES IN PHASE 1 TRIAL

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	6.3	6.7	5.5
Survival ≥12 months	.	.	67%	35%

KOLs advise that Hazard Ratio <0.7 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%)	-

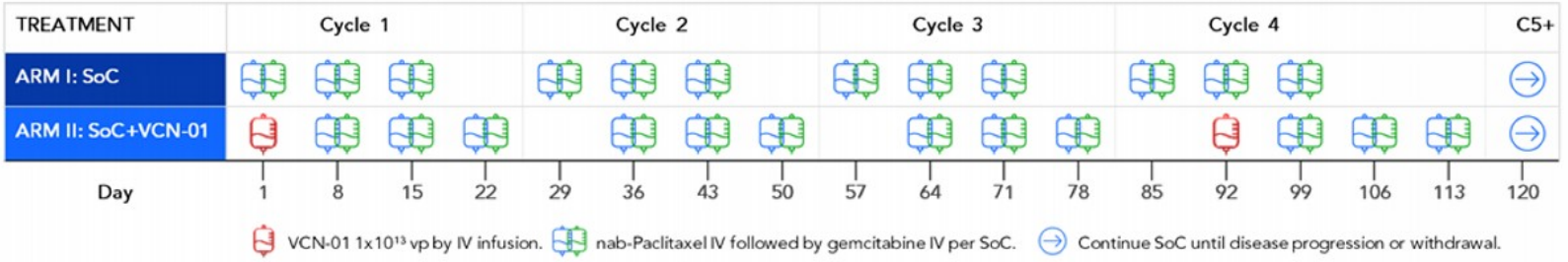


[1]Single dose of VCN-01 ($1x10^{11}$ to $1x10^{13}$ vp/dose) administered by 10 min IV infusion. [2]VCN-01 doses $3.3x10^{12}$ vp (n=6) and $1x10^{13}$ vp (6). [3]nab-Paclitaxel (Abraxane®; 30 min infusion) administered at least 4 hours after VCN-01. [4]Gemcitabine (30 min infusion) administered immediately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

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

- Study on-going in patients with first-line metastatic pancreatic ductal adenocarcinoma (PDAC)
- Achieved target of 92 patients (46 in each arm) 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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Study is intentionally based on the design of prior Phase 3 PDAC clinical trials to enable potential expansion. SoC standard of care

VCN-01 STRATEGY AND PRIMARY CATALYSTS

- Strategy
  - Seek regulatory agency agreement to convert the VIRAGE Phase 2b study to a Phase 3 registration trial[1]
    - Reduce potential Phase 3 size and costs; expected to shorten time to marketing application
    - Leverage Phase 3 status (if agreed) to engage potential partners
- Primary Catalysts and Use of Funds
  - Achieved target enrollment into the VIRAGE Study — Q3 2024
  - Initiate commercial scale manufacturing process development[2] — Q4 2024
  - Regulatory feedback on Phase 3 from FDA, AEMPS (Spain) and EMA — Q1 2025
  - Conversion to Phase 3 trial (subject to regulatory agreement)[2] — Q2 2025

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[1]Interim analysis to be conducted to support Phase 3 trial design (subject to regulatory agreement), but data will not be released if agreement to proceed to Phase 3 to avoid biasing the study. [2]Primary use of funds VCN-01 manufacturing scale-up and clinical trial activities

ACHIEVEMENTS AND PROJECTED MILESTONES

Q3 2024

- **VCN-01 PDAC**
  - Ph2 enrollment achieved ✓
  - Spanish Government Public-Private Loan-Grant ✓
  - Meeting with AEMPS (potential pivotal trial design)
- **VCN-01 RETINOBLASTOMA**
  - RPDD granted ✓
- **SYN-004 aGVHD**
  - Cohort 2 DSMC Outcomes

Q4 2024

- **VCN-01 PDAC**
  - Meeting with FDA (potential pivotal trial design)
  - Initiate commercial scale manufacturing process development
- **VCN-01 RETINOBLASTOMA**
  - ODD from EMA
- **VCN-01 + CAR-T**
  - U. Penn ASGCT poster

Q1 2025

- **VCN-01 PDAC**
  - EMA Scientific Advice (potential pivotal trial design)
- **VCN-01 RETINOBLASTOMA**
  - Finalize Phase 2 study design[1]
- **VCN OV DISCOVERY**
  - VCN-12 candidate selection[2]

H2 2025

- **VCN-01 PDAC**
  - Conversion to Phase 3 trial (*if regulatory agreement*)[1]
  - Establish feasibility of commercial scale VCN-01 manufacture
- **THERICEL**
  - Commercial availability of proprietary suspension cell line for manufacturing viral products

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[1]Contingent on Theriva obtaining required funding for a clinical trial and subject to regulatory agreement. [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). ISS investigator sponsored Phase 1 study. AEMPS Agencia Española de Medicamentos y Productos Sanitarios. ASGCT American Society of Gene and Cell Therapy. EMA European Medicines Agency. ODD Orphan Drug Designation. RPDD rare pediatric disease designation. SIOP International Society of Paediatric Oncology

TOVX CAPITALIZATION TABLE

Common Shares Issued at September 6, 2024			1,382,672
Less: Treasury Shares			(28,809)
Common Shares Issued and Outstanding at September 6, 2024			**1,353,862**
Stock Options Issued (2007, 2010, 2020 Plans)	175,191	12.9%	
Common Shares Available for Future Grants 2020 Plans	112,640	8.3%	
	287,831		
Total Reserved Common Shares			287,831
Remaining Master Common Stock Reserve			12,358,307
Total Common Shares Authorized			**14,000,000**
Treasury Shares			28,809

Note: Numbers are post-split values, rounded for fractional shares

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APPENDIX

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 · Theriva BIOLOGICS

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

INTELLECTUAL PROPERTY

Hyaluronidase OV	Albumin Shield™	Oral β-Lactamase	Oral IAP
VCN-01, VCN-11	**VCN-11, Discovery**	**SYN-004, -006, -007**	**SYN-020**
Composition of Matter (exp 2030)	Composition of Matter (exp 2034)	Composition of Matter (exp 2031-5)	Manufacturing Know-how (Trade Secret)
Methods of Use and Novel Formulations (examination)	Methods of Use and Novel Formulations (examination)	Methods of Use and Novel Formulations (exp 2035-6)	Methods of Use and Novel Formulations (applications filed)
Use in Rb (exp 2036)			Option to additional IP from MGH
ODD EU (PDAC)			
ODD US (PDAC & Rb)			

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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.

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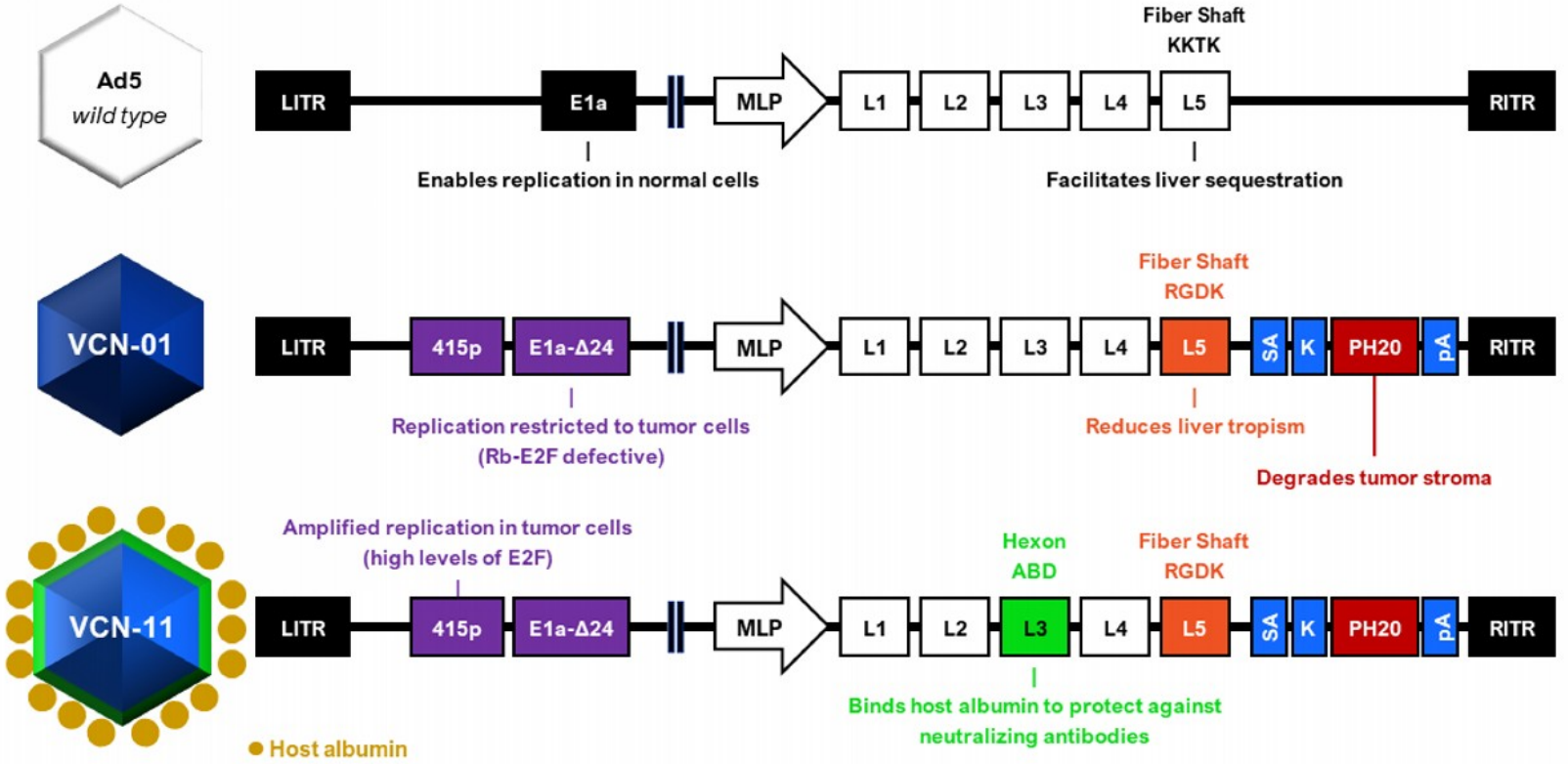
VCN-01 IN PANCREATIC CANCER

VCN ONCOLYTIC VIRUS GENETIC MODIFICATIONS



ABD albumin binding domain (streptococcal protein G)[1]

Ad5 Adenovirus type 5

E1a-Δ24 deletion of 24 base pairs within the E1a promoter; further modified by insertion of 8 extra E2F binding sites and one Sp1-binding site at nucleotide site 415 (**415p**)

MLP major late promoter[2]

PH20 soluble human testicular hyaluronidase[3]

KKTK Lys-Lys-Thr-Lys putative HSPG binding domain on fiber shaft

RGDK Arg-Gly-Asp-Lys inserted in place of KKTK on fiber shaft

VCN-12 VCN-11 armed with additional therapeutic transgene

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[1]Since this is a transgene, progeny virus will also be albumin coated. [2]MLP control means transgenes will only be expressed after replication, which occurs selectively in tumor cells. Transgene expression (PH20 in blood) can be a biomarker for viral replication in the tumor. [3]PH20 cassette inserted downstream of the fiber gene contains a splice acceptor (SA), a kozak sequence (K) and a polyadenylation stop sequence (pA)

EXTENSIVE VCN-01 PHASE 1 CLINICAL EXPERIENCE

88 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	Complete; CSR in prep	NCT03284268
Institut Català d'Oncologia (ICO)	1	HNSCC	Durvalumab	IV	Complete; CSR in prep	NCT03799744
U. Leeds	1	Adult brain tumors	None	IV	Ongoing	ISRCTN 517624869
U. Pennsylvania	1	PDAC, Ovarian	huCART-meso[3]	IV	Ongoing	NCT05057715

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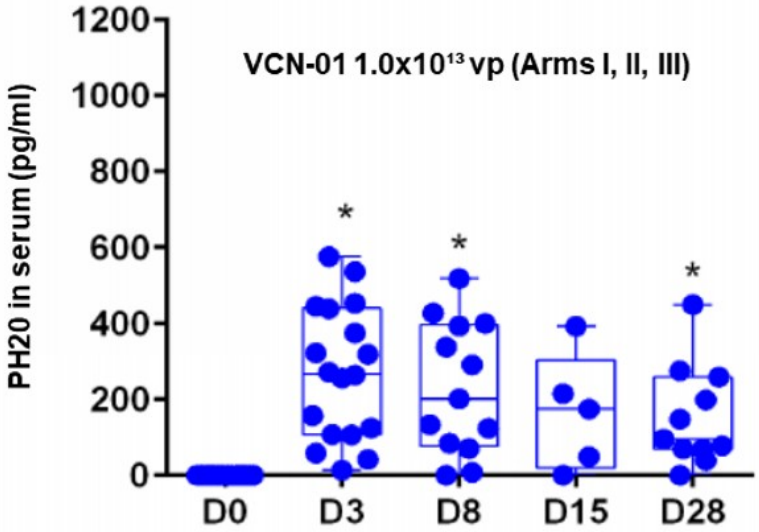
[1]Garcia-Carbonero (2022) J Immunother Cancer 10:e003255. [2]Bazan-Peregrino (2021) J Immunother Cancer 9:e003254. [3]huCART-meso are autologous T cells engineered to express an extracellular single chain variable fragment (scFv) with mesothelin specificity. HNSCC head and neck squamous cell carcinoma.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

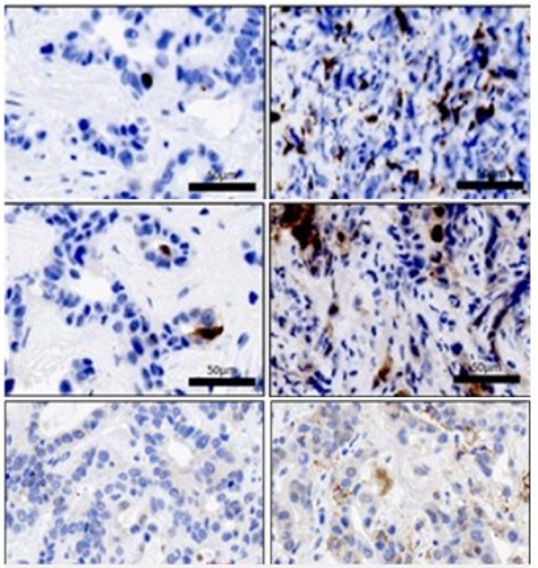
CLINICAL DATA SUPPORT VCN-01 MODE-OF-ACTION

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

Potential 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].

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.

VIRAGE PHASE 2 CLINICAL TRIAL DIFFERENTIATORS

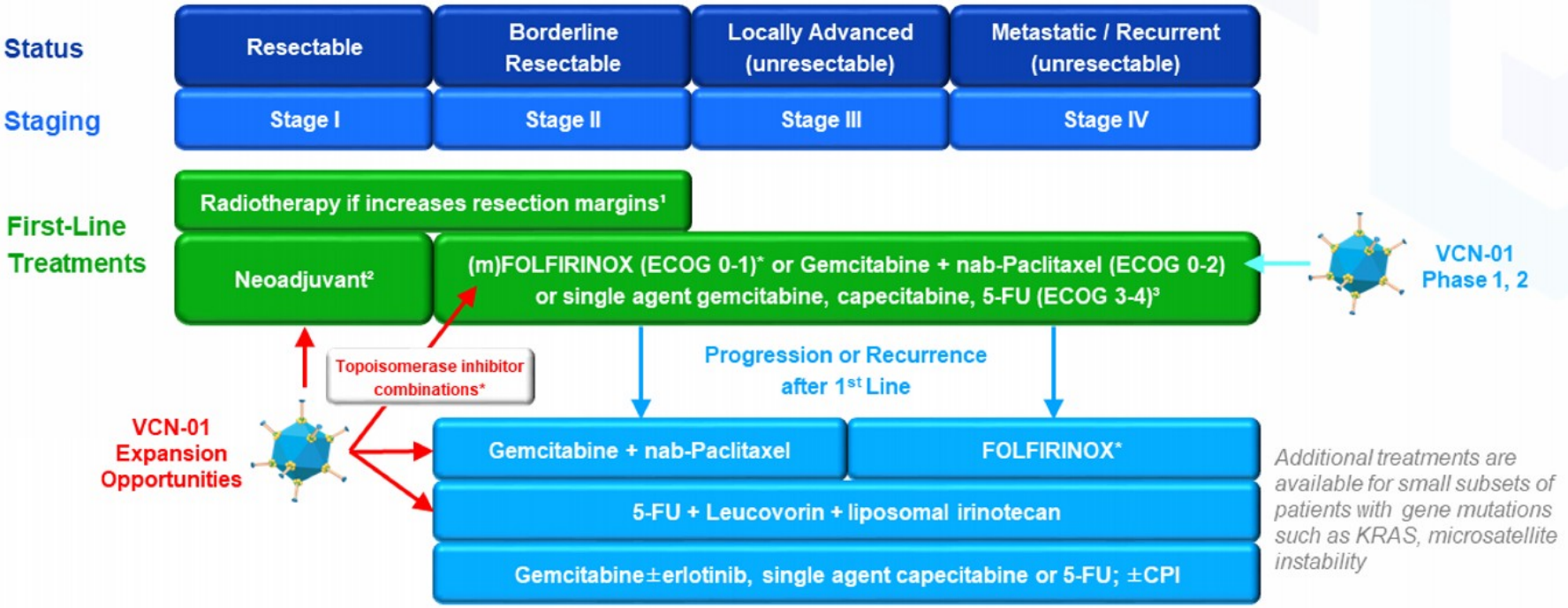
- ✓ First-line treatment of metastatic PDAC patients
- ✓ Direct comparison with standard-of-care chemotherapy in the same trial
- ✓ Repeated dosing of VCN-01 may improve treatment outcomes
- ✓ Open label provides real-time opportunity to review emerging VCN-01 treatment effects
- ✓ Orphan Drug Designation to facilitate regulatory interactions and provide market exclusivity
- ✓ Fast Track Designation for more frequent communication with FDA and eligibility for Accelerated Approval and Priority Review

Theriva BIOLOGICS

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

EXPANSION OPPORTUNITIES for VCN-01 in PDAC

Alternate treatment lines and new chemotherapy combinations



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[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.

VCN-01 WITH GEMCITABINE/ NAB PACLITAXEL

Potential survival benefit compared to all first-line chemotherapy

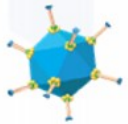
COMPANY	THERIVA BIOLOGICS (Phase 1)		PDAC FIRST LINE CHEMOTHERAPY			
Virus	VCN-01	VCN-01		..	..	..
Dose	$3.3x10^{12}$ vp x1 $1x10^{13}$ vp x 1*	$1x10^{13}$ vp x 1*	..	..	..	..
Chemotherapy	Gemcitabine + Nab Paclitaxel	Gemcitabine + Nab Paclitaxel	Gemcitabine + Nab Paclitaxel		FOLFIRINOX	NALIRIFOX
No. Patients	12 (6/dose)	6	431	387	171	383
Response Rate, %	50% [21, 79]	83% [36, 99.6]	29% [25%, 34%]	36.2% [31.4, 41.2]	31.6% [24.7, 39.1]	41.8% [36.8, 46.9]
Progression Free Survival, mos	6.7 [4.5, 11.7]	6.3 [5.7, NE]	5.5 [4.5, 5.9]	5.6 [5.3, 5.8]	6.4 [5.5, 7.2]	7.4 [6.0, 7.7]
12-Mo. Survival, %	66.7%	83.3%	35%	39.5%	48.4%	45.6%
Overall Survival, mos	13.5 [7.1, 29.0]	20.8 [12.2, NE]	8.5 [7.9, 9.5]	9.2 [8.3, 10.6]	11.1 [9.0, 13.1]	11.1 [10.0, 12.1]
	Garcia-Carbonero JITC 10:e003255	Garcia-Carbonero JITC 10:e003255	Von Hoff NEJM 369:1691	Wainberg Lancet 402:1272	Conroy NEJM 364:1817	Wainberg Lancet 402:1272

Theriva BIOLOGICS

*Approximately $2.2x10^{11}$ $TCID_{50}$ and $7x10^{11}$ $TCID_{50}$ respectively.

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
- 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
  - PDAC: Orphan Drug Designation (FDA, EMA), Fast Track designation (FDA)
  - Retinoblastoma: Orphan Drug Designation (FDA); Rare Pediatric Disease Designation (FDA: 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.

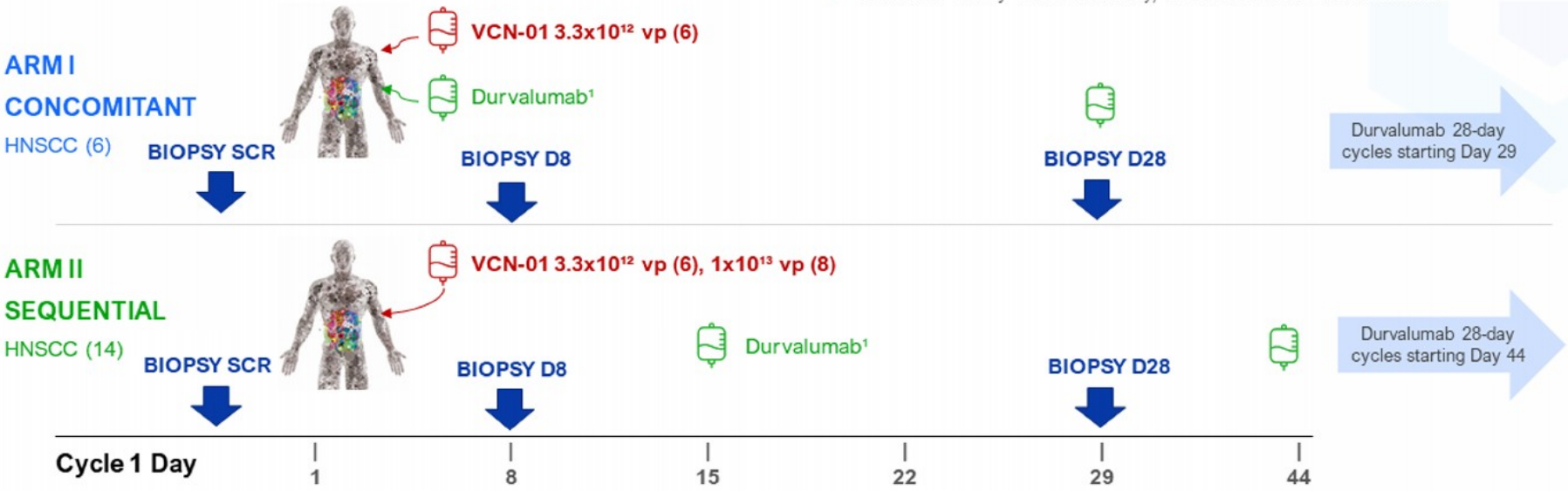
Theriva BIOLOGICS

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



Theriva BIOLOGICS

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.

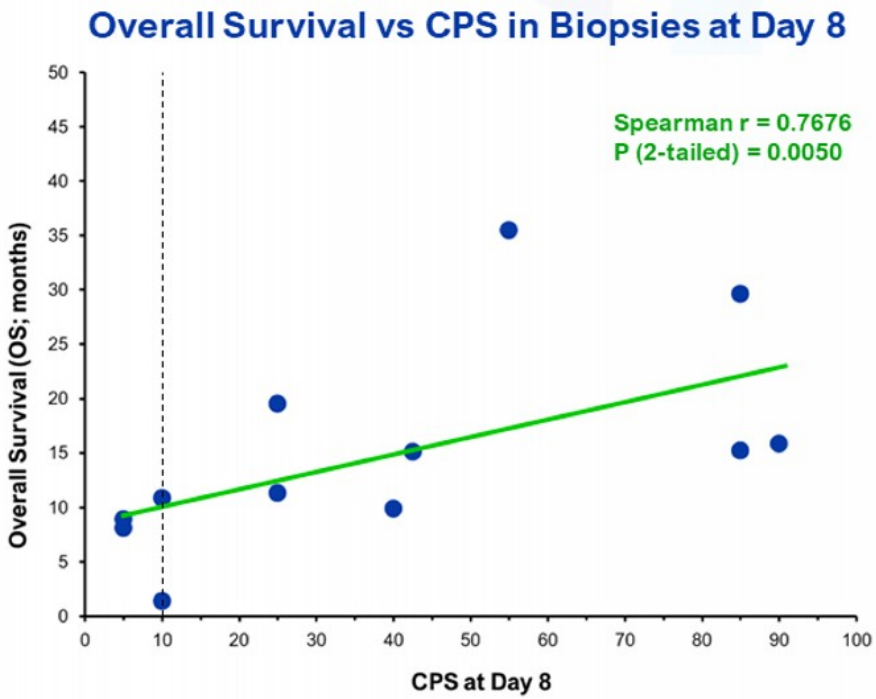
EXTENDED SURVIVAL with VCN-01+DURVALUMAB

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



Theriva BIOLOGICS

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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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%)

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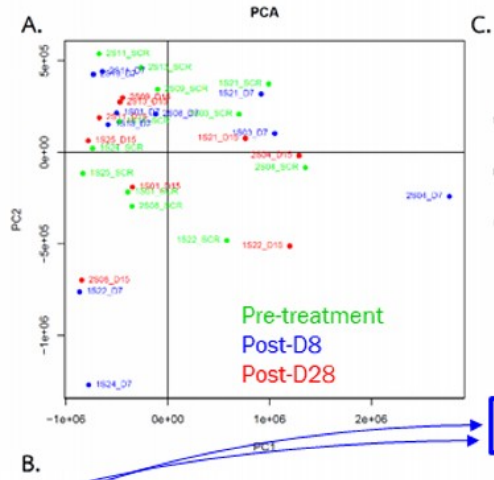
VCN-01 INDUCES TRANSCRIPTOMIC CHANGES in TUMOR MICROENVIRONMENT

RNAseq Analysis in Clinical Samples from HNSCC Patients [NCT03799744]

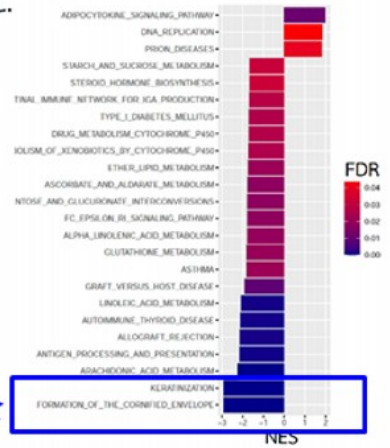
Principal Component Analysis[1]

including all the Pre- and Post-treatment samples

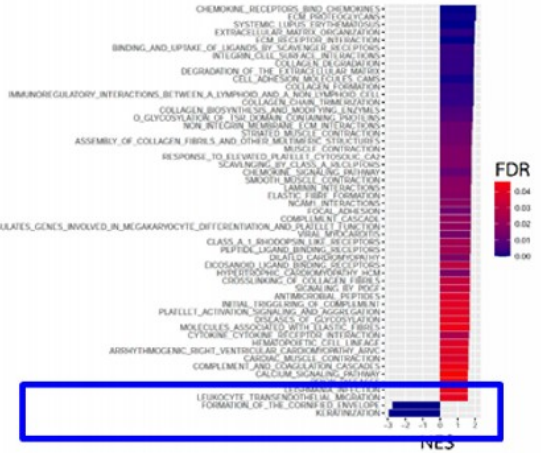


Most significant Reactome and KEGG pathways in GSEA (Gene Set Enrichment Analysis)[1]

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

VCN-01 FINDINGS in R/M HNSCC

Data support VCN-01 MOA and immune enhancing effects

- VCN-01 has an acceptable adverse event 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.

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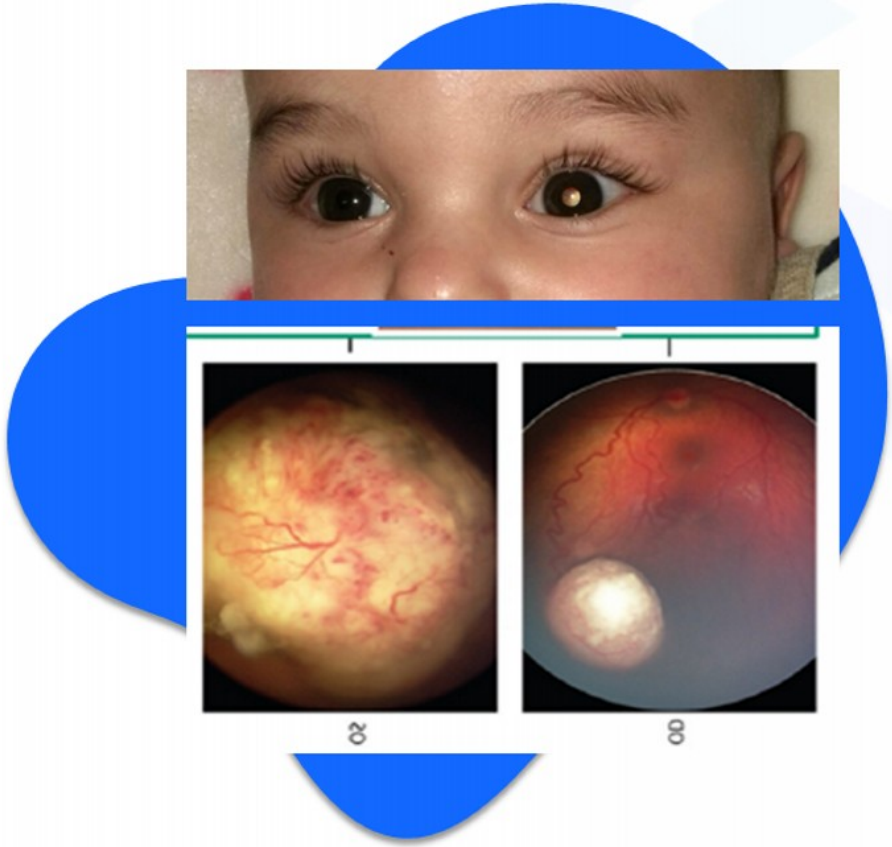
VCN-01 IN RETINOBLASTOMA

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



Theriva BIOLOGICS

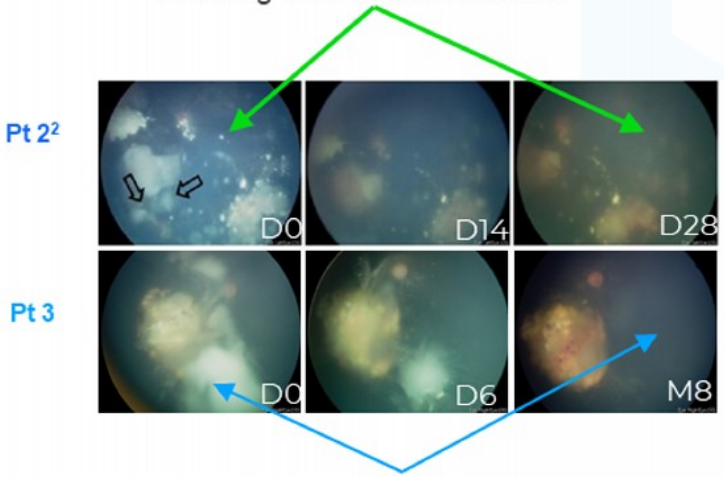
[1]https://www.cancer.org/cancer/retinoblastoma/about/key-statistics.html. [2]Stacey (2021) Ophthalmology 128:1369. [3]One Retinoblastoma World Map https://map.1rbw.org/. [4]For additional details and references see Appendix. IMAGE: Courtesy of Hospital Sant Joan de Déu, Barcelona

VCN-01 IN RETINOBLASTOMA

- 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 adverse event profile 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]

Theriva BIOLOGICS

[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.

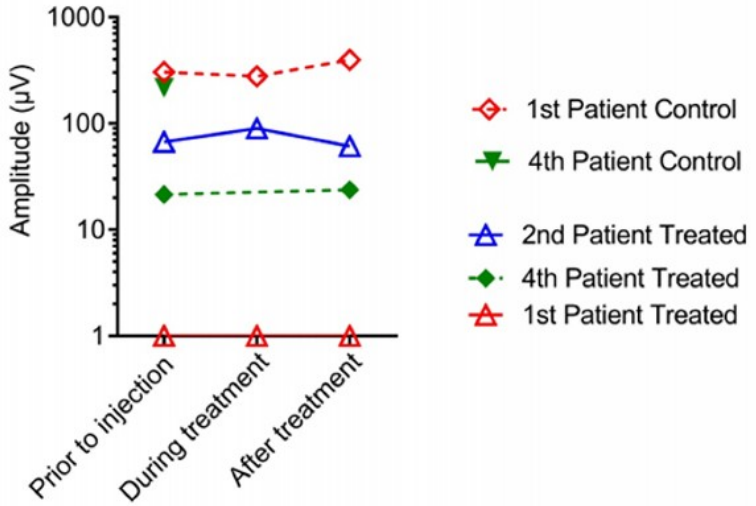
INTERIM ADVERSE EVENT DATA FOR INTRAVITREAL VCN-01

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



Theriva BIOLOGICS

[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 Completed H1 2024
  - Initial data demonstrate acceptable adverse event profile 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
  - Rare Pediatric Disease Designation (potential eligibility for Priority Review Voucher)

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

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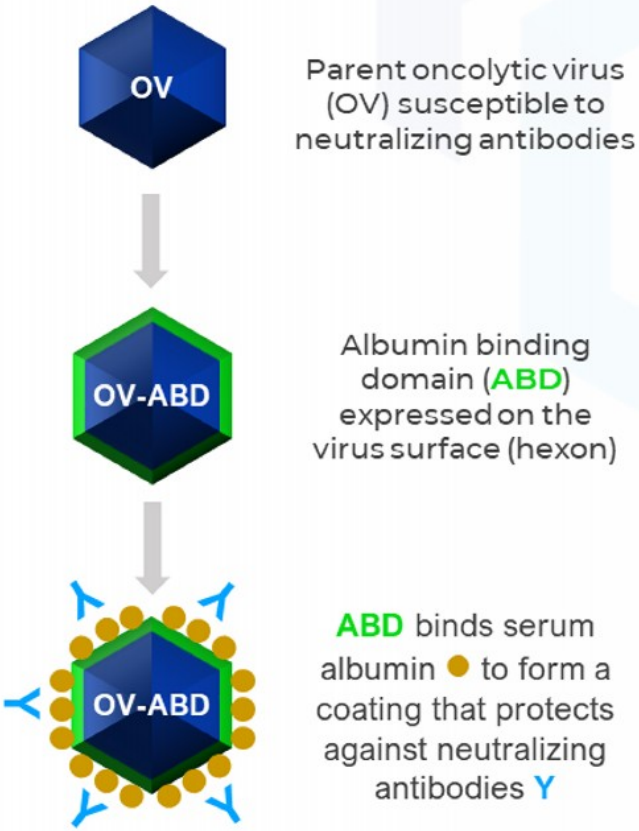
VCN-X NEXT GENERATION OV DISCOVERY PLATFORM

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



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[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

+

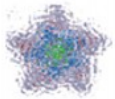
Albumin Shield™ To Prevent Neutralization by anti-viral Antibodies and Facilitate IV Multidosing

+

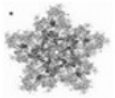
Unique Multifunctional Proteins to Turn Cold Tumors Hot and Enhance Anti-tumor Immune Response

Product Specific Features

VCN-11 Hyaluronidase alone



VCN-12 Hyaluronidase + Toxins



VCN-13 Fusion Hyaluronidase + scPD-L1

VCN-XX Hyaluronidase + other payloads

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THERIVA ONCOLYTIC VIRUSES KEY PUBLICATIONS

Bayo-Puxan N et al. (2006) Role of the putative heparan sulfate glycosaminoglycan-binding site of the adenovirus type 5 fiber shaft on liver detargeting and knob-mediated retargeting. J Gen Virol 87:2487–2495

Bazan-Peregrino M et al. (2021) VCN-01 disrupts pancreatic cancer stroma and exerts antitumor effects. J ImmunoTher Cancer 9:e003254.

Garcia-Carbonero R et al. (2019) Poster 5185: Systemic administration of the hyaluronidase-expressing oncolytic adenovirus VCN-01 in patients with advanced or metastatic pancreatic cancer: first-in-human clinical trial. European Society for Molecular Oncology conference ESMO, 29 September 2019.

Garcia-Carbonero R et al. (2022) A phase I, multicenter, open-label study of intravenous VCN-01 oncolytic adenovirus with or without nab-paclitaxel plus gemcitabine in patients with advanced solid tumors J ImmunoTher Cancer 10:e003255

Guedan S et al. (2010) Hyaluronidase expression by an oncolytic adenovirus enhances its intratumoral spread and suppresses tumor growth. Mol Ther 18:1275–1283

Hidalgo M et al. (2019) Poster 5465: Proof of concept clinical study by EUS-guided intratumor injection of VCN-01, an oncolytic adenovirus expressing hyaluronidase in patients with pancreatic cancer. European Society for Molecular Oncology conference ESMO, 28 September 2019.

Jove M et al. (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) Ann Oncol. 33:S1112. European Society for Molecular Oncology conference ESMO 2022, 10 September 2022

Kiyokawa M et al. (2021) Modification of extracellular matrix enhances oncolytic adenovirus Immunotherapy in glioblastoma. Clin Cancer Res 27:889-902

Martínez-Vélez N et al. (2019) The oncolytic adenovirus VCN-01 as therapeutic approach against pediatric osteosarcoma. Clin Cancer Res 22:2217-25

Mato-Berciano A et al. (2021) Oncolytic adenovirus with hyaluronidase activity that evades neutralizing antibodies: VCN-11. J Control Rel 332:517-528

Pascual Pasto G et al. (2019) Therapeutic targeting of the RB1 pathway in retinoblastoma with the oncolytic adenovirus VCN-01. Sci Transl Med 11:eaat9321

Pascual-Pasto G et al. (2021) Presentation: VCN-01 is an encouraging therapy against retinoblastoma. International Oncolytic Virus Conference IOVC2021, 07 November 2021, Sedona, AZ.

Rodríguez-García A et al. (2015) Safety and efficacy of VCN-01, an oncolytic adenovirus combining fiber HSG-binding domain replacement with RGD and hyaluronidase expression. Clin Cancer Res 21:1406-18

Rojas J et al. (2012) Improved systemic antitumor therapy with oncolytic adenoviruses by replacing the fiber shaft HSG-binding domain with RGD. Gene Ther 19:453–457

Rojas J et al. (2010) Minimal RB-responsive E1A promoter modification to attain potency, selectivity, and transgene-arming capacity in oncolytic adenoviruses. 2010) Mol Ther 18:1960–1971

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Theriva BIOLOGICS

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