COMPASS THERAPEUTICS

Corporate Presentation

February 2023

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This presentation includes forward-looking statements regarding our drug candidates, the timing of the start and conclusion of ongoing or planned clinical trials, including the potential impact of the ongoing COVID-19 pandemic on our business, the timing and outcome of regulatory decisions, future availability of clinical trial data, our collaborations for our product candidates and the maintenance of those collaborations, business and results from operations, and other matters. Actual results could differ materially from those contained in any forward-looking statements as a result of various factors, including without limitation: that our drug candidates do not advance in development or result in approved products on a timely or cost effective basis or at all; the cost, timing and results of clinical trials; our ability to manage and mitigate the impact of the ongoing COVID-19 pandemic; that many drug candidates that have completed early-stage trials do not become approved drugs on a timely or cost effective basis or at all; the ability to enroll patients in clinical trials; possible safety and efficacy concerns; regulatory developments; our ability to protect our intellectual property rights, and unexpected costs, charges or expenses that reduce cash runway. Our pipeline programs are in various stages of pre-clinical and clinical development, and the process by which such pre-clinical or clinical therapeutic candidates could potentially lead to an approved therapeutic is long and subject to significant risks and uncertainties. These and other risks and uncertainties that we face are described in our most recent Annual Report on Form 10-K, and in other filings that we make with the Securities and Exchange Commission from time to time. We undertake no obligation to update forward-looking statements as a result of new information or otherwise.

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This presentation concerns drugs that are under clinical investigation, and which have not yet been approved for marketing by the U.S. Food and Drug Administration (FDA). It is currently limited by Federal law to investigational use, and no representation is made as to its safety or effectiveness for the purposes for which it is being investigated.

Corporate Highlights

We are a clinical stage biotech company developing antibody therapeutics for cancer

LEAD ASSETS

- CTX-009: DLL4 x VEGF-A bispecific antibody
- CTX-471: CD137 agonist antibody
- CTX-8371: PD-1 x PD-L1 bispecific antibody

CORE SCIENCE

- StitchMabs™ platform designed to identify synergistic bispecific antibodies
- Common Light Chain technology enables multi-specificity and manufacturability
- Pre-clinical discovery

RESOURCES

- Cash runway into 2026 (Dec 2022: $187M in cash & marketable securities, $80M PIPE Nov 2022)
- Funded by leading life-science investors
- ~25 FTEs based in Boston, MA with experienced leadership team

Focused Pipeline with Multiple Value Inflection Points

Program	Target	Discovery	Lead Optimization	IND Enabling Pre-Clinical	Phase 1b Clinical	Phase 2 Clinical	Next Milestone
CTX-009	**DLL4 x VEGF-A**	BTC					Initiate Phase 2/3 in U.S. Q1 2023
		Colorectal					Top line data in U.S. Q3 2023
		Ovarian / Other					Initiate Phase 2 in U.S. H2 2023
CTX-471	**CD137**	CD137 agonist (monotherapy)					
		CD137 + PD-1 (combination)*					Top line data in U.S. Q4 2023
CTX-8371	**PD-1 x PD-L1**	Solid Tumors					Submit IND H1 2023
Undisclosed	**Autoimmune/ Oncology**						

*Clinical collaboration with Merck & Co. Inc., Rahway NJ USA in combination with anti-PD-1 therapy Keytruda®

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Leadership Team Experienced in Drug Discovery and Development

Senior Executive Team

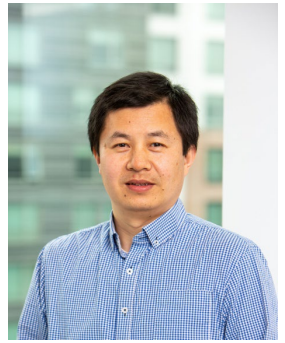
Thomas J. Schuetz, MD, PhD
Co-Founder, CEO and Director

Vered Bisker-Leib, PhD, MBA
President and COO

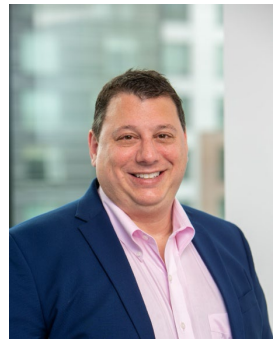
Peter Moesta
Interim Head of CMC

Vice Presidents

Jon Anderman
VP, Head of Legal



Bing Gong, PhD
VP of Protein Sciences



Neil Lerner, CPA, MIM
VP of Finance

OrbiMed Healthcare Fund Management · Cydan · Bristol-Myers Squibb · Biogen · Pfizer · Psychemedics Corporation

TKT · Bristol-Myers Squibb · abbvie · Intarcia · Merck · Johnson & Johnson

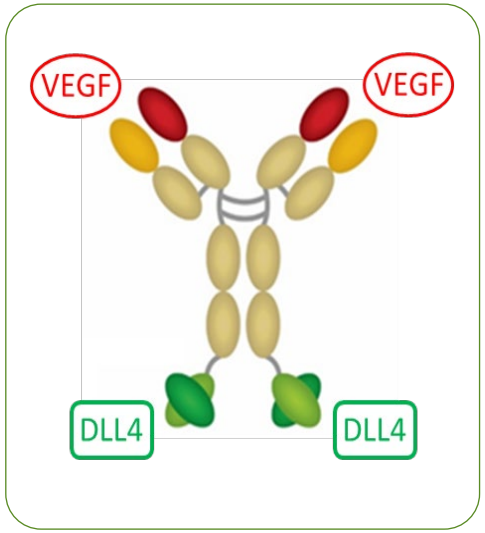
Carl L. Gordon, Chairman of the Board | OrbiMed Healthcare Fund Management

CTX-009

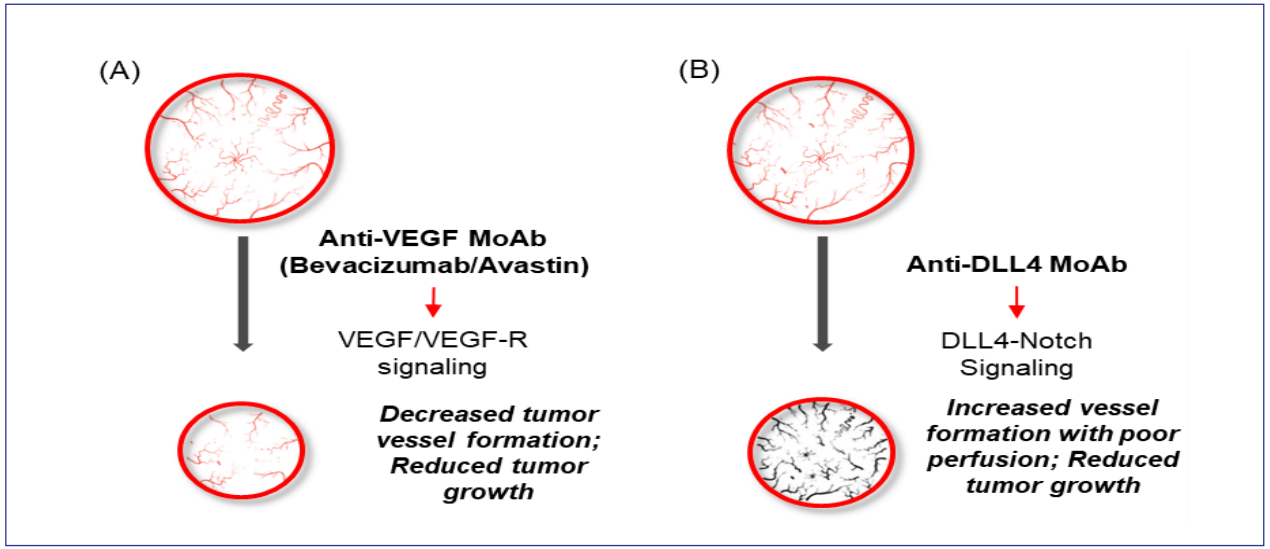
DLL4 X VEGF-A bispecific antibody

Overview of CTX-009

- Bispecific antibody blocking DLL4 (Notch-1 ligand) and VEGF-A (soluble ligand)
- Does not lead to ADCC, Fc inactive
- Binds to its targets with 2:2 valency
- At 10 mg/Kg, CTX-009 has approximately the same VEGF-A capturing ability as bevacizumab (Avastin)
- The only DLL4 X VEGF bispecific that demonstrated monotherapy activity in the clinic in colorectal and gastric cancer
- Durable responses in patients with cholangiocarcinoma seen in Phase 1b study of CTX-009 in combination with paclitaxel



Dual blockade of DLL4 and VEGF overcomes VEGF resistance



CTX-009 – Vision and Potential

Best-in-class DLL4 x VEGF-A bispecific

Phase 2/3 nearing initiation with ongoing Phase 2 parallel development in S. Korea and China

Oncology

Has demonstrated compelling activity in the 3rd line and 4th line settings in patients with Cholangiocarcinoma, Colorectal Cancer, Gastric Cancer and Pancreatic Cancer

Could become front line therapy in multiple solid tumors

Other potential indications based on DLL4 expression such as Ovarian Cancer & Renal Cell

Ophthalmology

Potential to address AMD and DME based on mechanism

Consideration for partnership

CTX-009 Phase 1 Program Summary

Phase 1a: dose-escalation monotherapy study

N=45: Gastric, CRC, Other

Nine dose-escalation cohorts (0.3-17.5 mg/kg)

Four dose-expansion cohorts (7.5-15 mg/kg)

Phase 1b: combination study with chemotherapy

N=17: 4 arms

1. CTX-009 10.0 mg/kg + paclitaxel
2. CTX-009 10.0 mg/kg + irinotecan
3. CTX-009 12.5 mg/kg + paclitaxel
4. CTX-009 12.5 mg/kg + irinotecan

Phase 1 Results »

Safety: well-tolerated; MTD has not been determined

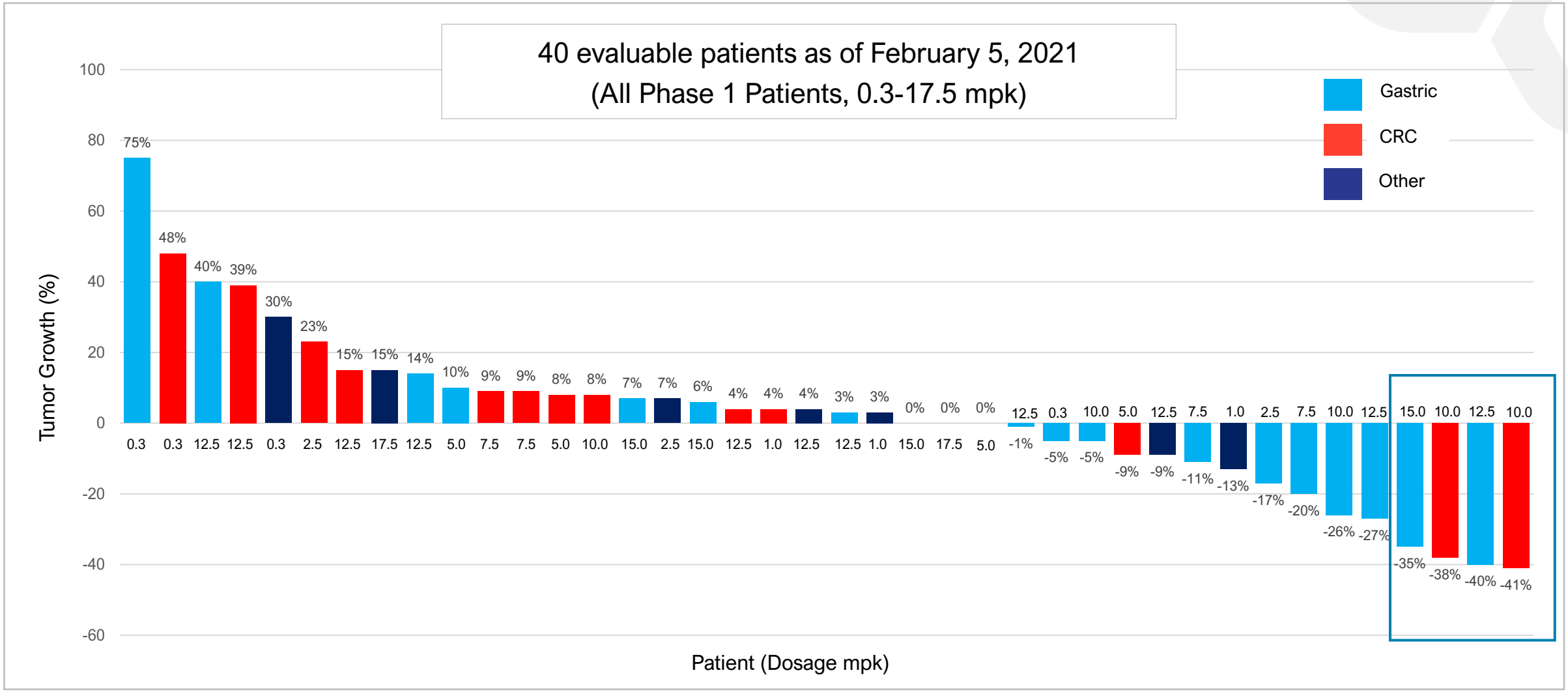
Activity: 8 PRs, 6 confirmed by RECIST in 33 advanced solid tumor patients treated

Responses as a monotherapy: colorectal and gastric

Responses in combination with chemotherapy: cholangiocarcinoma, pancreatic

Cholangio ORR= 50%; Clinical benefit rate = 75% with a median duration of response of 9.7 months

Phase 1a CTX-009 Monotherapy (all doses)

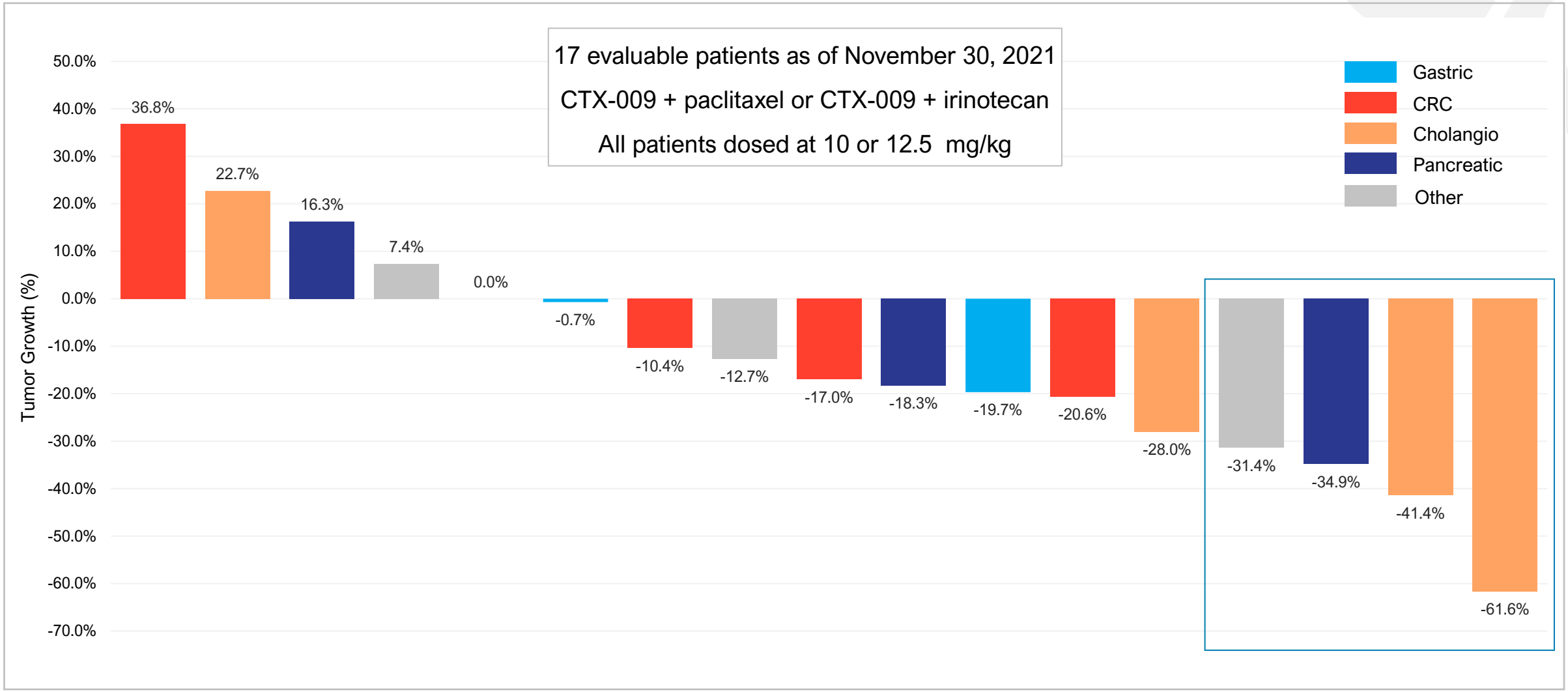


Phase 1a CTX-009 Monotherapy Data

Clinical activity at RP2D dosages (10 and 12.5 mg/kg)

	Prior VEGF Targeted Therapy	Partial Response (PR)	Stable Disease (SD)	Clinical Benefit Rate (PR + SD)	Median Time to Progression (TTP) (Months)
All patients (n=16)	75%	**19%**	50%	69%	**3.9**
Colorectal Cancer (n=6)	100%	**33%**	33%	67%	**6.7**
Gastric Cancer (n=8)	63%	**13%**	63%	75%	**3.9**

Phase 1b CTX-009 Combination Study



Phase 1 CTX-009 Safety Data

Phase 1a Monotherapy (n=45)

Drug-related adverse events observed in > 5% of patients	Total (n)	Total (%)	Grade 3 (n)	Grade 3 (%)
Hypertension*	17	38	7	16
General disorders (fatigue, fever, asthenia, edema, etc.)	7	16	1	2
Nervous system disorders (headache, dizziness)	7	16	1	2
Gastrointestinal disorders (nausea, vomiting, etc.)	6	13	2	4
Pulmonary hypertension	4	9	0	0
Proteinuria	3	7	0	0

Phase 1b Combination (n=17)

Drug-related adverse events observed in > 1 patient	Total (n)	Total (%)	Grade 3 (n)	Grade 3 (%)
Hypertension	8	47	4	24
Nausea	8	47	1	6
Fatigue	6	35	1	6
Neutropenia** Anemia** Thrombocytopenia**	6 4 2	35 24 12	2 3 2	12 18 12
Diarrhea	5	29	0	0
Anorexia	5	29	0	0
Proteinuria	5	29	0	0
Pulmonary hypertension (all grade 1)	5	29	0	0
Dyspnea	4	24	0	0
Gingival edema (mucositis)	2	12	0	0
Anal hemorrhage	2	12	0	0

* In clinical trials of bevacizumab, incidence of Grade 3-4 hypertension ranged between 5%-18% (Avastin label). It is typically managed by anti-hypertensive drugs

**Labeled Grade 3/4 cytopenia events for concomitant chemotherapy agent:
Irinotecan: 31.4% neutropenia, 4.5% anemia, 1.7% thrombocytopenia. Paclitaxel: 52% neutropenia, 16% anemia, 7% thrombocytopenia

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CTX-009 – Phase 1 Clinical Studies Summary

Overall Response Rate at the Efficacious Dose
(10-12.5 mg/kg)

Monotherapy	Combination
18.8% ORR (3/16)	**23.5% ORR (4/17)**

Clinical Benefit Rate at the Efficacious Dose
(10-12.5 mg/kg)

Monotherapy	Combination
68.8% (11/16)	**76.5% (13/17)**

Phase 2 CTX-009 Combination Study (S. Korea)

Patients with biliary tract cancers after one or two prior therapies

Simon 2 Stage adaptive design

Stage 1

CTX-009 at 10 mg/kg biweekly
Paclitaxel 80 mg/m^2 weekly 3 of 4 weeks

N = 21

3 or more PRs

Stage 2

CTX-009 at 10 mg/kg biweekly
Paclitaxel 80 mg/m^2 weekly 3 of 4 weeks

N = 45 additional patients

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Phase 2 CTX-009 Combination Study – Patient Demographics

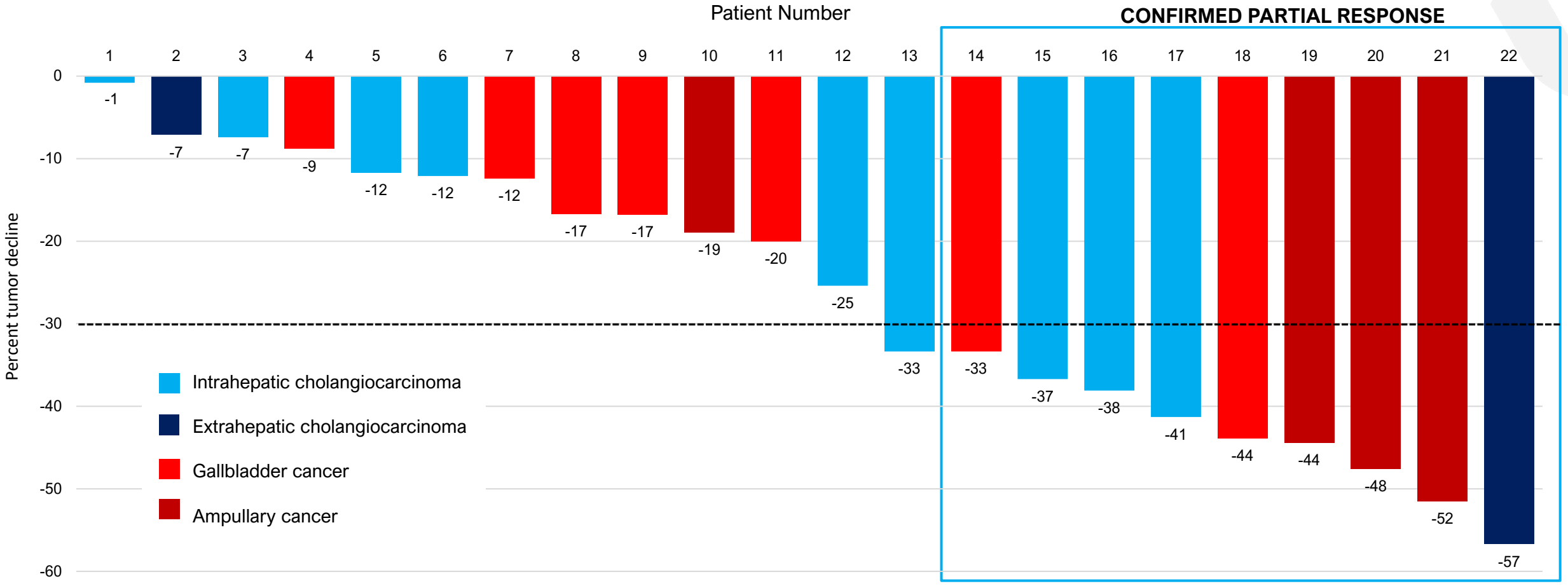
	24 Total Patients
Age	
Median (years)	61.5
Gender, n(%)	
Male	14 (58%)
Female	10 (42%)
ECOG performance status, n(%)	
0	13 (54%)
1	11 (46%)

	24 Total Patients
Prior systemic therapies, n(%)	
1	11 (46%)
2	13 (54%)
Prior Gem/Cis regimen	23 (96%)
BTC subtype, n (%)	
Intrahepatic cholangiocarcinoma	9 (38%)
Extrahepatic cholangiocarcinoma	3 (13%)
Gallbladder cancer	7 (29%)
Ampullary cancer	5 (21%)

Phase 2 CTX-009 Data

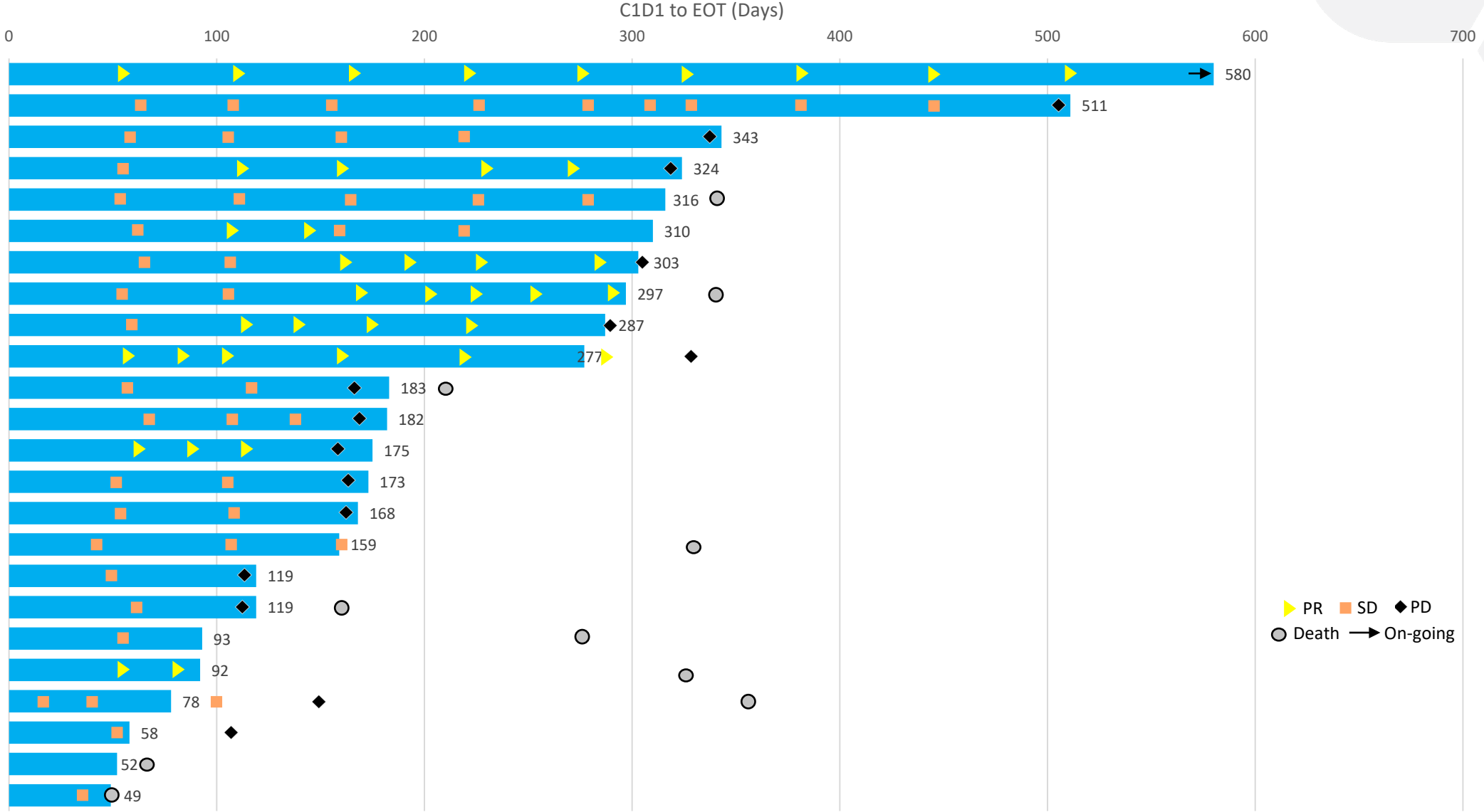
Responses achieved across multiple BTC subclasses. Data as of November 9, 2022

ORR = 37.5%
CBR = 91.5%



2 patients were not evaluable (one missing post baseline scan; one had a scan outside of protocol window)

CTX-009 Swimmer Plot (November 9, 2022, data cutoff)



CTX-009 Phase 2 Results (Median follow-up of 12.1 months)

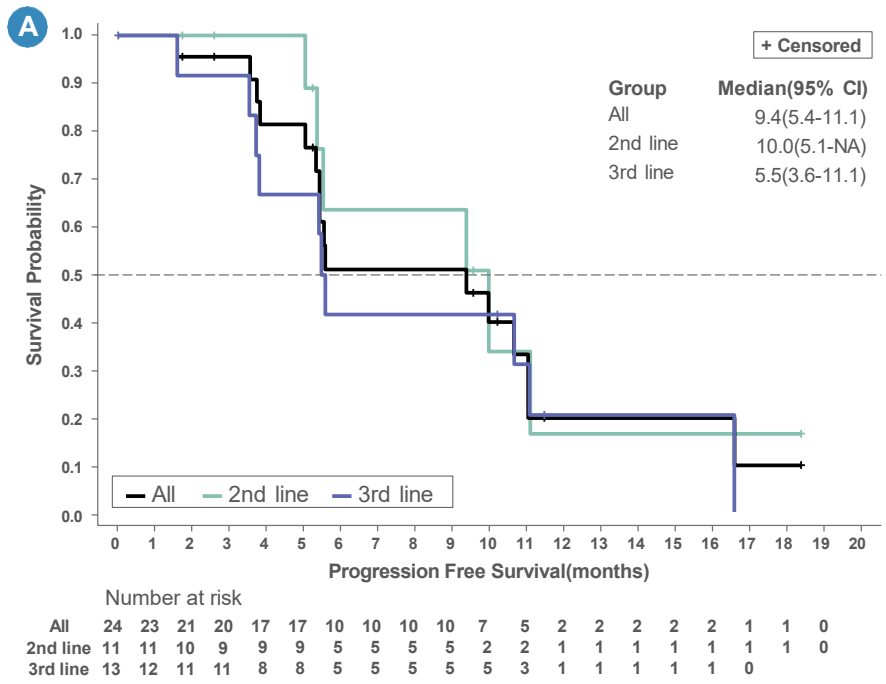
- 24 patients enrolled and dosed
- 1 patient remains on study

Endpoint	Value (95% CI)
Overall Response Rate (ORR)	**37.5%**
Stable Disease (SD)	**54.2%**
Progression Free Survival (PFS)	**9.4 m** (5.4 – 11.1)
Overall Survival (OS)	**12.5 m** (10.9 – NA)
Duration of Response	**6.9 m** (3.5 – NA)

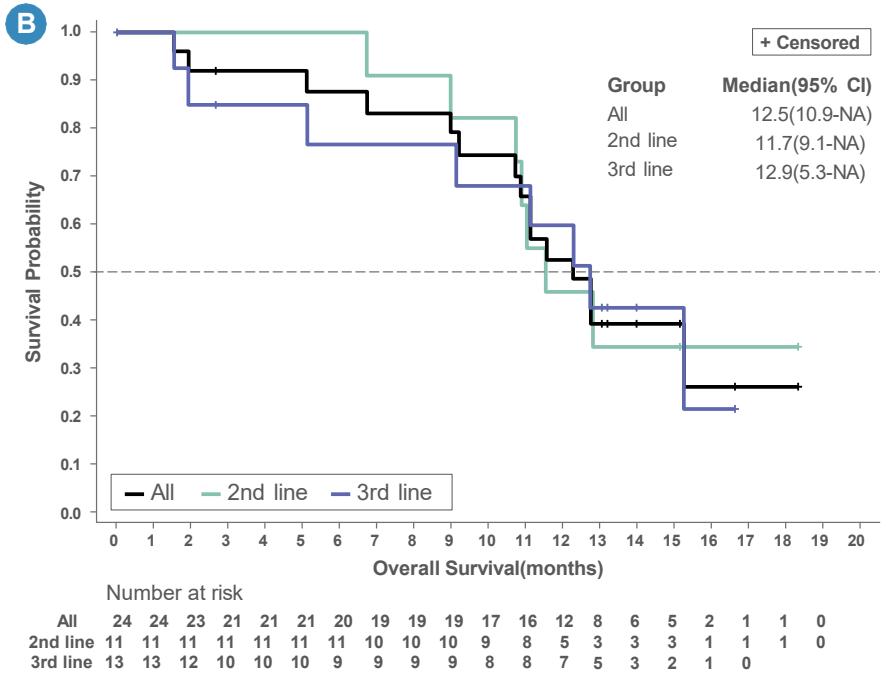
Number of previous systemic therapies	ORR
Pts treated in the 2L [n=11]	**7/11 (63.6%)**
Pts treated in the 3L [n=13]	2/13 (15.4%)

Secondary Endpoints: PFS and OS (as of Nov 9, 2022)

- **Median PFS: 9.40 m (5.4-11.1)**



- **Median OS: NA (12.5-NA)**



Treatment-Emergent ≥ Grade 3 Adverse Events (>10% of patients)

Phase 2 BTC study of CTX-009 plus paclitaxel

Event	24 total Patients N (%)
Neutropenia	20 (83.3%)
Anemia	5 (20.8%)
Hypertension	4 (16.7%)
Thrombocytopenia	3 (12.5%)

TEAE leading to discontinuation: confusion, embolism, pneumonia (grade 5), biliary fistula, large intestine perforation, blood creatinine increased, and blood urea nitrogen increased

Bevacizumab and paclitaxel label information

Event	Bevacizumab (label)	Paclitaxel (label)
Neutropenia		52%
Hypertension	5-18%	
Anemia		16%
Thrombocytopenia		7%
	Additional events: GI perforation, wound healing complications, Proteinuria, hemorrhage	Additional events: Hypersensitivity reactions, infections, bleeding, neuropathy

How Does CTX-009 Data Compared to Other BTC Studies?

Parameter	CTX-009 Mixed 2L and 3L N=24	FOLFOX (ABC-06) [1] Only 2L N=81	Gem/Cis [2] 1L N=204	Gem/Cis + Durv [3] Only 1L N=341
ORR	37.5% [64% 2L; 15% 3L]	5%	26%	26.7%
OS	12.5 m	6.2 m	11.7 m	12.9 m
PFS	9.4 m	4.0 m	8.0 m	7.2 m
Any AE	100%	99%	55%	99.4%
Gr 3/4 AEs	92%	60%	71%	74%
Deaths (as Gr 5)	1 (4%)	10 (12%)	17 (8%)	13 (4%)
AEs leading to discontinuation	25%	~ 12%	10%	13%

1. Lamarca D, *Lancet Oncol* 2021; March 30
2. Valle, J. et al., *N ENGL J MED*, 362; 14 Apr 8, 2010, p. 1273
3. Oh, D. et al., *ESMO Poster 56P 2022*

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CTX-009 Interim Phase 2 Study Summary

24 patients with BTC have been enrolled and dosed

10 partial responses (PRs) for a 37.5% ORR in patients treated in the second- and third-line settings (**64% ORR** of patients treated in the 2nd line setting)

Median PFS 9.4 months

Median OS 12.5 months

Adverse event profile similar to Phase 1 studies

Other regimens in BTC

FOLFOX (NCCN guidelines):

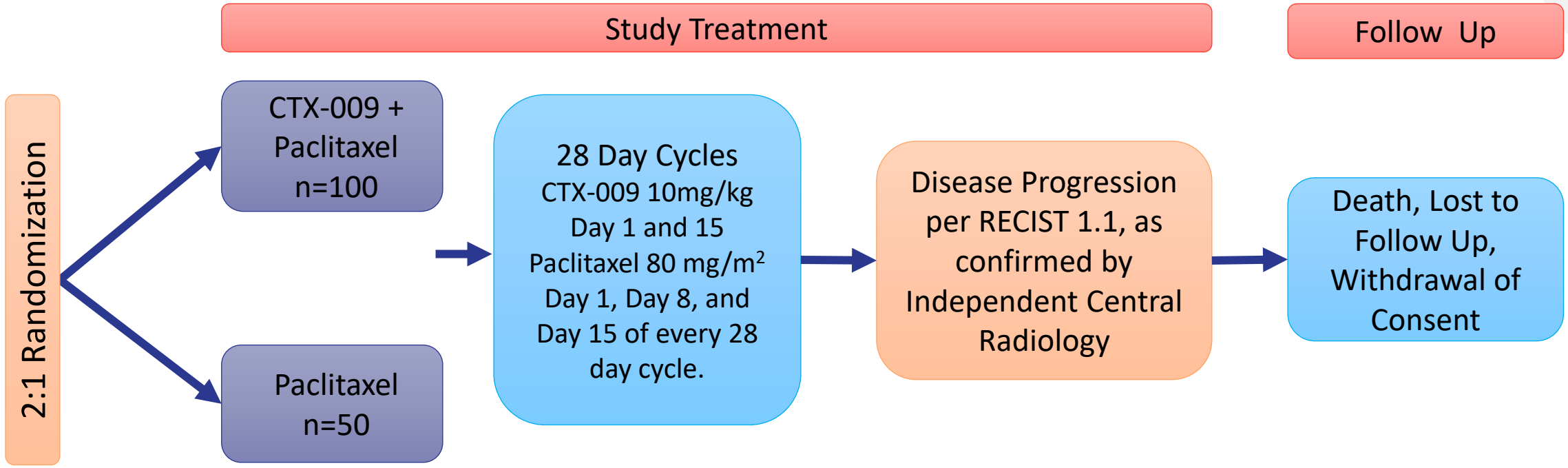
- 5% ORR in the second-line setting
- 4.0 month median PFS
- 6.2 month median OS

TOPAZ-1 (Phase 3 study):

- 26.7% ORR for Gem/Cis/Durvalumab (anti PD-L1) in the first-line setting

Phase 2/3 U.S. BTC Study Design

Patients who have received one prior line of therapy



CTX-009: *BTC* Patient Demographics and Current Treatments

	US	EU5	Japan	Worldwide
Incident Cases	18,400[1]	21,800[2]	14,329[2]	>200,000[3]

1L Treatment

Doublet chemo of gemcitabine + cisplatin (ABC-02 study)
Or
Gemcitabine/cisplatin + durvalumab (recently approved for 1L)

2L Treatment

FOLFOX
5% ORR
0.9 Mos OS Δ

FGFR2 mutation
Pemigatinib
(10-15% of CCA)

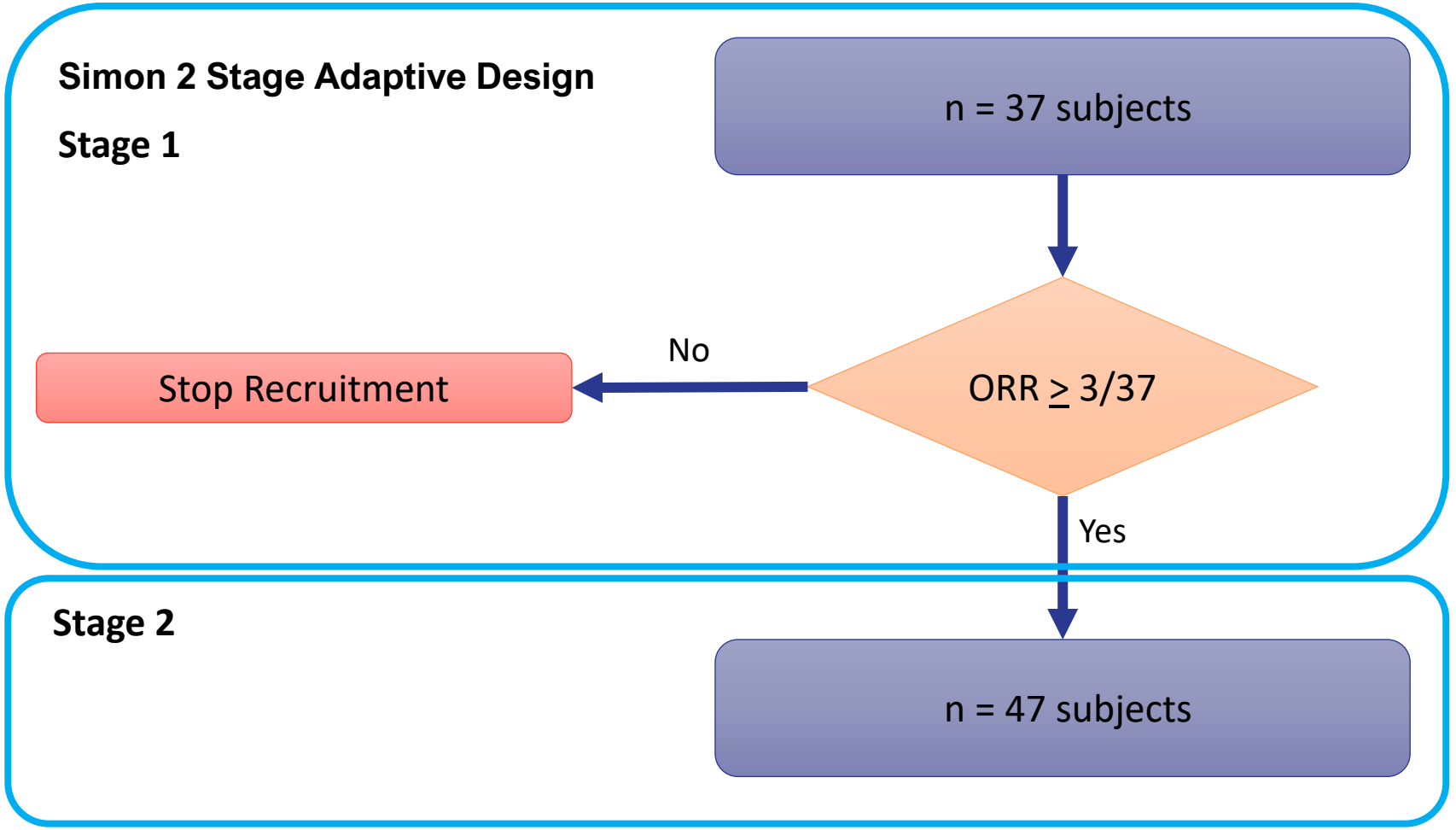
IDH1 mutation
Ivosidenib
(1-3% of BTC)

MSI-H tumors
PD-1 Inhibitor
(<1% of BTC)

Clinical trial

1. NCI Surveillance, Epidemiology, and End Results (SEER) program
2. Delveinsight/company estimates
3. International Agency for Research on Cancer/GLOBOCAN

Phase 2 U.S. CRC Study Design



CTX-009: *CRC* Patient Demographics and Current Treatments

	US	EU5	Japan	Worldwide
Incident Cases	153,020[1]	246,734[2]	148,505[2]	1,931,590[2]
~50% Metastatic[3] 50-70% reach 3L[4]	38,000-53,000 patients			

1L Treatment

Chemotherapy FOLFOX/FOLFIRI

Bevacizumab or EGFR inhibitor + chemotherapy

Anti-PD-1 with MSI-H/dMMR mutation

~5% of CRC

2L Treatment

Bevacizumab or EGFR + chemo

BRAF/EGFR with V600E mutation

5-8% of CRC

3L Treatment

Regorafenib

ORR 1%, Median PFS 2.0 months

Trifluridine/ tipiracil

ORR 1-2% Median PFS ~2 months

1. NCI Surveillance, Epidemiology, and End Results (SEER) program
2. International Agency for Research on Cancer/GLOBOCAN
3. L Biller, D Schrag , JAMA 2021 Feb 16
4. Bekaii-Saab, Clin advances in Hem and Onc, Supp Jan 2021

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CTX-009 Development Plans

Evaluating additional indications for CTX-009 both as a monotherapy and in combination with chemotherapy

CTX-471

CD137 monoclonal antibody

CTX-471: Potential Best-in-Class CD137 Agonist

CTX-471: next generation CD137 agonist

Fully human, IgG4, optimized affinity for agonistic antibody

Unique epitope: non-ligand blocking

Phase 1 Study Update

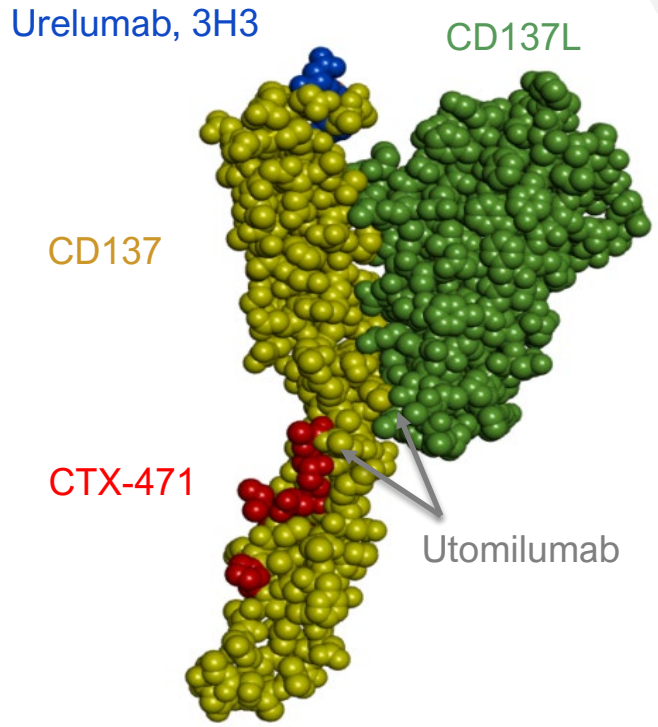
Monotherapy in post checkpoint inhibitor patients

Monotherapy Phase 1a multiple ascending dose study completed

- Near PR in a patient with mucosal melanoma
- Prolonged stable disease in two patients with NSCLC
- MTD defined by immune thrombocytopenia

Monotherapy Phase 1b dose expansion study nearing completion

- 4 PRs observed so far: small cell lung cancer, mucosal melanoma, metastatic melanoma, and mesothelioma

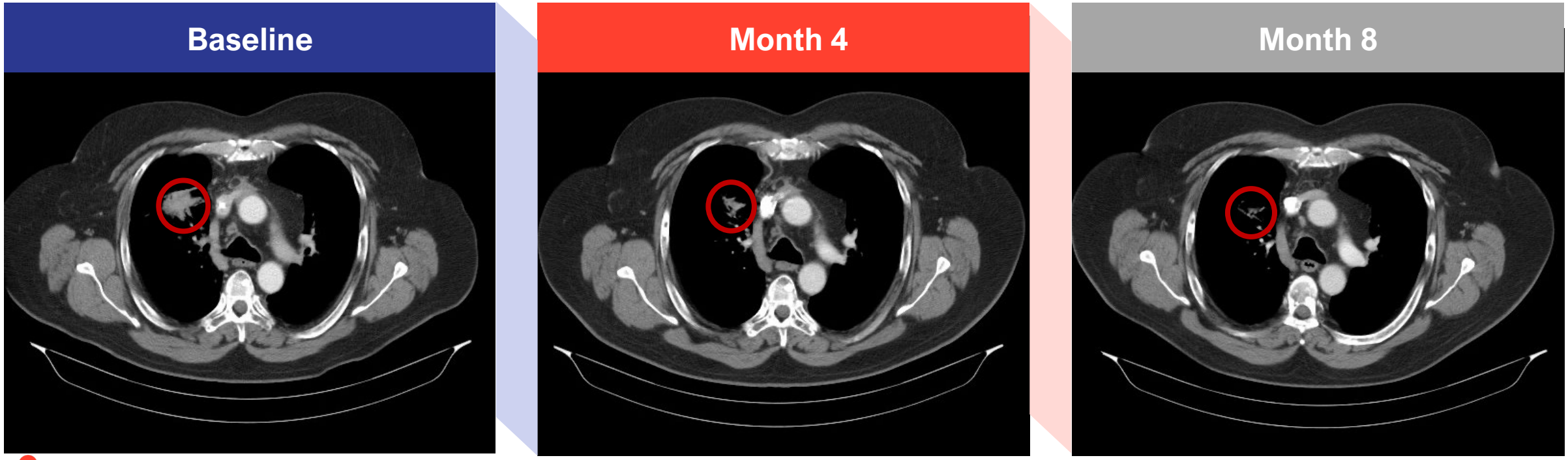


*Eskiocak, et al. *JCI Insight*. 2020;5(5):e133647

CTX-471: Partial Response in a Patient with Small Cell Lung Cancer

after progression on atezolizumab/chemo and nivolumab

- 66 y.o. man with advanced SCLC: Carboplatin/etoposide plus atezolizumab first line; nivolumab second line
- Multiple metastases: Largest mass (RUL Lung) shown below, ~ 4 cm at baseline → 40% total decline
- Confirmed and durable PR at Month 24



CTX-471 Clinical Development Plans

Phase 1b study fully enrolled

Generally well tolerated

Four partial responses as a monotherapy agent in the post PD-1/PD-L1 patient population

Small cell lung cancer, mesothelioma, and melanoma (two patients)

Initiating Phase 1b of CTX-471 with Keytruda®

Abbreviated CTX-471 dose escalation into the PD-1 regimen, followed by a cohort expansion

Post PD-1/PD-L1 Salvage Study

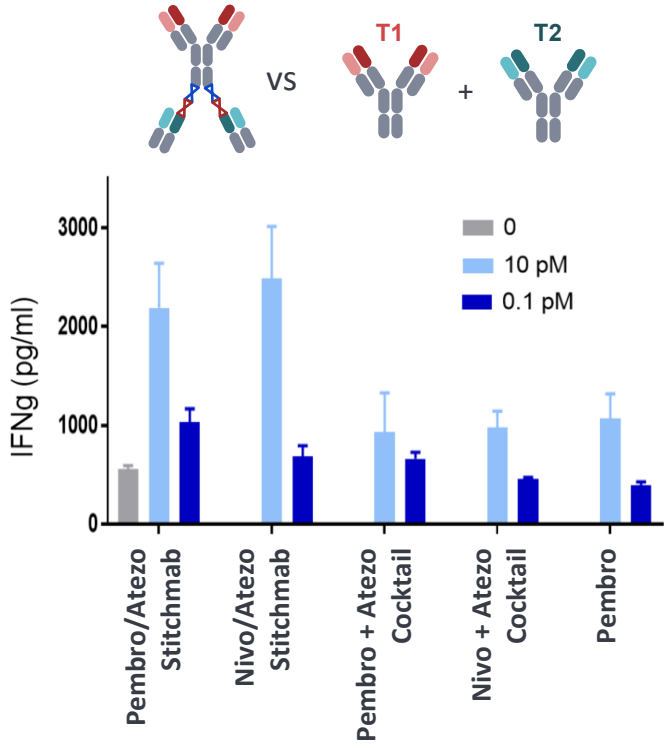
Clinical collaboration with Merck

CTX-8371

PD-1 x PD-L1 bispecific antibody

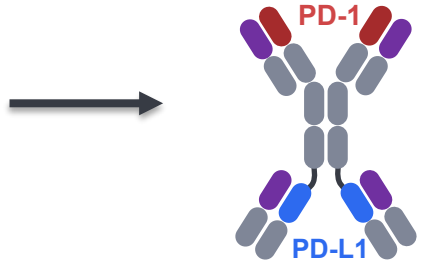
StitchMabs™ Platform was Utilized to Identify CTX-8371

Unexpected synergistic activity of PD-1/PD-L1 combination in bispecific Stitchmab format



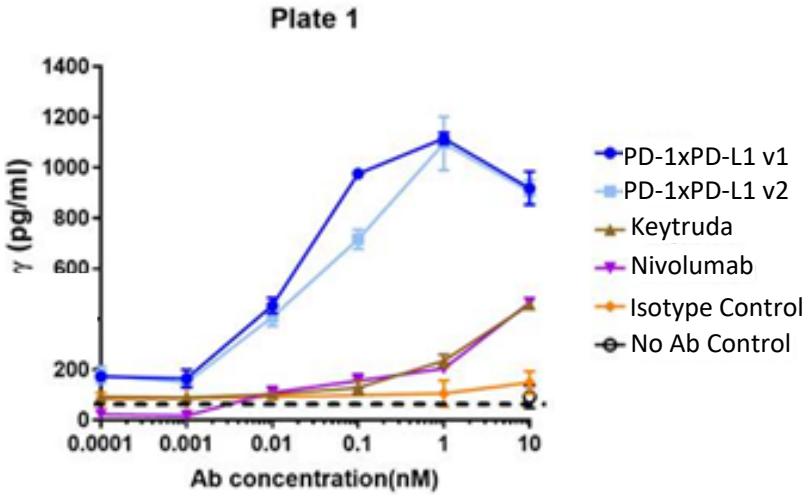
Mixed lymphocyte reaction (MLR) assay

Common Light Chain bispecifics were generated to test therapeutic hypothesis



CTX-8371

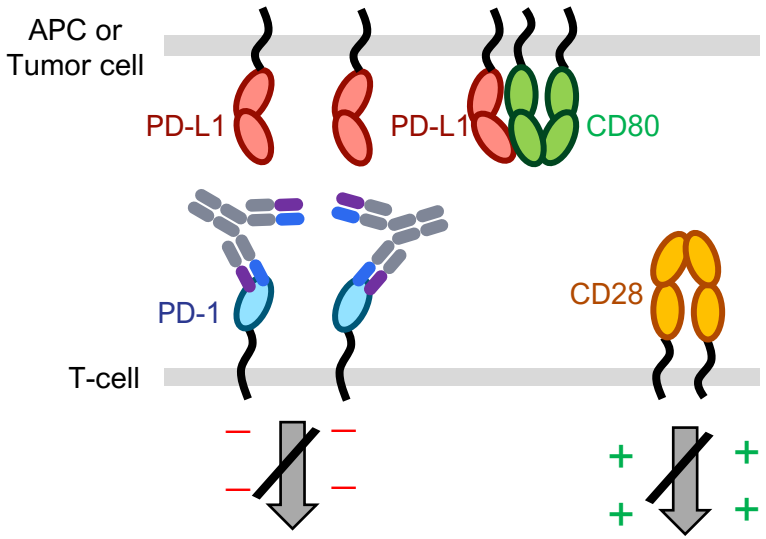
Our PD-1xPD-L1 bispecifics observed to outperform PD-1 blockers in T-cell activation assay



CTX-8371: Differentiated MoA Leads to Enhanced T-Cell Activation

Converting PD-1 positive T cells into PD-1 negative T cells

PD-1 blockers release brake but don't directly promote T-cell activation

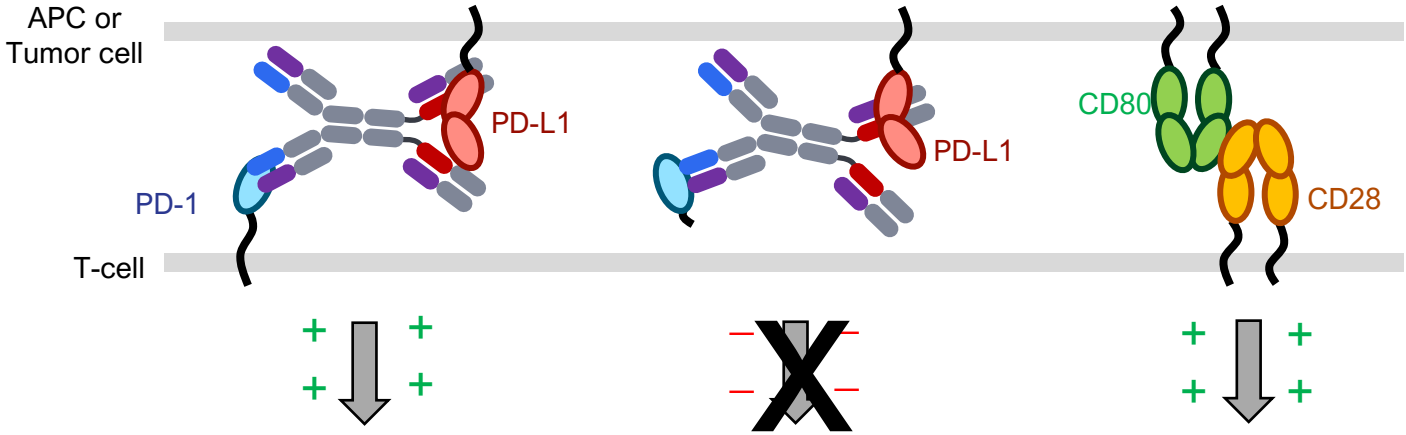


CTX-8371 activates T-Cells Through Multiple MOA's

Bridging of PD-1 expressing T-cells with PD-L1 expressing APC's or tumor cells

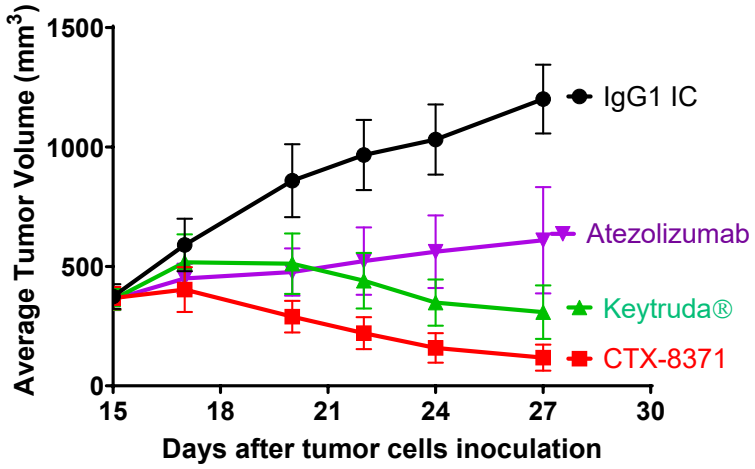
Significant reduction in cell surface PD-1 due to receptor shedding

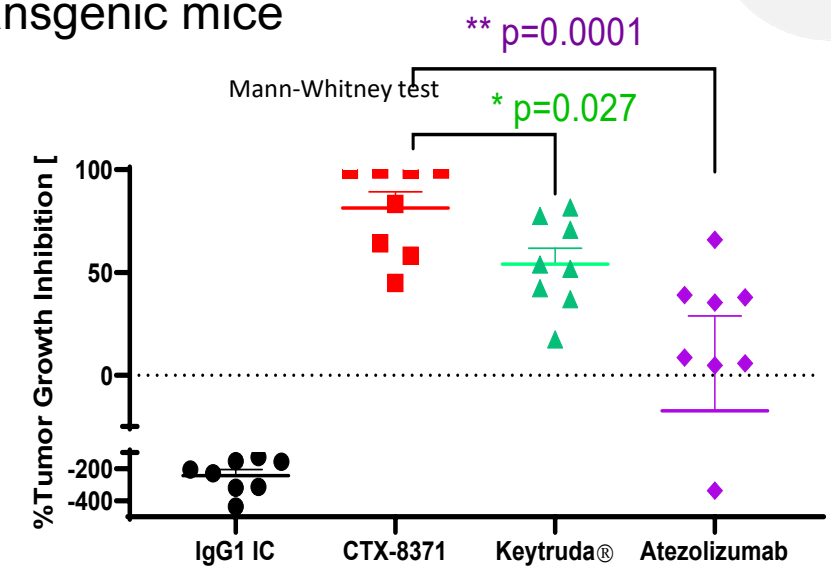
Increased pool of free CD80 able to engage costimulatory receptor CD28

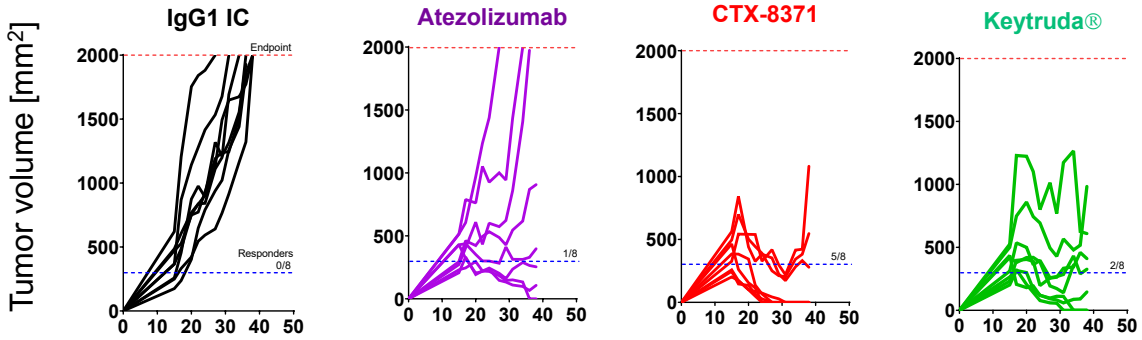


CTX-8371 Pre-Clinical Poof of Concept

Activity in MC38-hPD-L1 model implanted in hPD-1/hPD-L1 transgenic mice







Group	% Cured	Tumor free / total
CTX-8371	**62.5**	**5/8**
Atezolizumab	12.5	1/8
IgG1 IC	0	0/8
Keytruda	25	2/8

COMPASS THERAPEUTICS

CTX-8371: Development Status

IND enabling activities

NHP dose range finding study completed → PD-1 shedding confirmed in vivo

Manufacturing campaign completed

Pre-IND meeting completed

Toxicology studies underway

Phase 1 study planning

Multiple ascending dose, dose-escalation study

5 doses planned: 0.1, 0.3, 1.0, 3.0, and 10 mg/kg

Post PD-1 or PD-L1 patient population

PD-1 shedding on peripheral T cells was confirmed in NHP

IND submission targeted for H1 2023

Potential for proprietary combination regimens with CTX-009 and CTX-471

Compass Therapeutics

Summary

Program Summary

CTX-009 Novel DLL4 x VEGF-A bispecific antibody with both combination and monotherapy activity

Phase 1: Dose response established – responses in multiple indications

BTC Phase 2 results: 24 patients**:** 37.5% ORR (2L/3L), 63.6% (2L), median PFS 9.4 months, OS 12.5 months; initiating Phase 2/3 randomized study

CRC Phase 1 monotherapy activity in 3rd line: initiated Phase 2 in 4Q 2022

CTX-471 Potential best-in-class CD137 agonist antibody with monotherapy activity

Phase 1 monotherapy study fully enrolled

4 partial responses (PRs) in post PD-1 population: small cell lung cancer, metastatic melanoma, mucosal melanoma, mesothelioma

CTX-471 in combination with KEYTRUDA® study was initiated in 4Q 2022

CTX-8371 Next generation PD-1 x PD-L1 bispecific antibody

Discovered with our StitchMabs™ screening platform

Superior activity to commercial PD-1 and PD-L1 inhibitors in preclinical studies

Unique MOA – enhances T-cell activation

Key 12 Month Milestones