BICARA THERAPEUTICS™

Fighting cancer with precision and power.

Corporate Presentation | November 2024

Forward-Looking Statements

This presentation contains forward-looking statements that involve substantial risks and uncertainties. All statements other than historical factual information are forward-looking statements, including without limitation statements regarding our product development activities for ficerafusp alfa and ongoing clinical trials; the ability of clinical trials to demonstrate safety and efficacy of ficerafusp alfa; the beneficial characteristics, and the potential safety, efficacy and therapeutic effects of ficerafusp alfa; our ability to develop and advance our potential future product candidates and programs; our ability to pursue and execute our strategy for our indications, business, programs and technology; our ability to leverage existing programs and to progress additional programs, the timing of investigational new drug application submissions, our and our collaborators' ability to protect our intellectual property for our products; our ability to enter into future license agreements and collaborations; regulatory developments; and our ability to attract and retains key scientific and management personnel. In some cases, you can identify forward-looking statements because they contain words such as "may," "might," "will," "would," "shall," "should," "expects," "plans," "anticipates," "could," "intends," "target," "projects," "contemplates," "believes," "estimates," "looks," "seeks," "predicts," "potential," "ongoing," or "continue" or the negative of these words or other similar terms or expressions that concern our expectations, strategy, plans or intentions, although not all forward-looking statements are accompanied by such words. Forward-looking statements are based on assumptions and assessments made by our management in light of their experience and perceptions of historical trends, current conditions, expected future developments and other factors they believe to be appropriate, and speak only as of the date of this presentation.

Forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or other events to be materially different from any future results, performance or other events expressed or implied by the forward-looking statements. Given these uncertainties, you should not place undue reliance on forward-looking statements. Our actual future results, performance or other events may be materially different from what we expect. Except as required by law, we assume no obligation to update these forward-looking statements, or to update the reasons actual results could differ materially from those anticipated in these forward-looking statements, even if new information becomes available in the future. Factors that could cause actual results to differ from those predicted in our forward-looking statements include, among others, risks and uncertainties related to product development, including delays or challenges that may arise in the development and regulatory approval of our current and future product candidates or programs; uncertainties as to the availability and timing of results and data from preclinical and clinical studies; the timing of and our ability to submit and obtain regulatory clearance for investigational new drug applications, initiate additional clinical trials, and submit new drug applications or biologics license applications; our ability to initiate and complete our current and expected clinical trials; our ability to establish and maintain collaborations, strategic relationships and supply arrangements, or that we will not realize the intended benefits from such relationships or arrangements; whether our cash resources will be sufficient to fund our foreseeable and unforeseeable operating expenses and capital expenditure requirements; our ability to raise additional funding on favorable terms, or at all; the rate and degree of market acceptance and clinical utility of our product candidates; the ability and willingness of our third-party collaborators to continue research and, development and manufacturing activities relating to our product candidates; the accuracy of our data analyses or estimates for the potential and market for our products; our ability, and the ability of our collaborators, to protect our intellectual property and to conduct activities for the development and commercialization of our candidates in view of third party intellectual property positions; our financial performance; our ability to retain and recruit key personnel, as well as the potential contribution of our employees and board to our growth and success as a Company; developments and projections relating to our competitors or our industry; changes in general economic conditions and global instability, in particular economic conditions in the markets on which we or our suppliers operate; changes in laws and regulations; and those risks and uncertainties identified in our filings with the Securities and Exchange Commission (SEC), including under the heading "Risk Factors" in our most-recently filed Quarterly Report on Form 10-Q, and such other risks and uncertainties that may be described in subsequent filings we may make with the SEC.

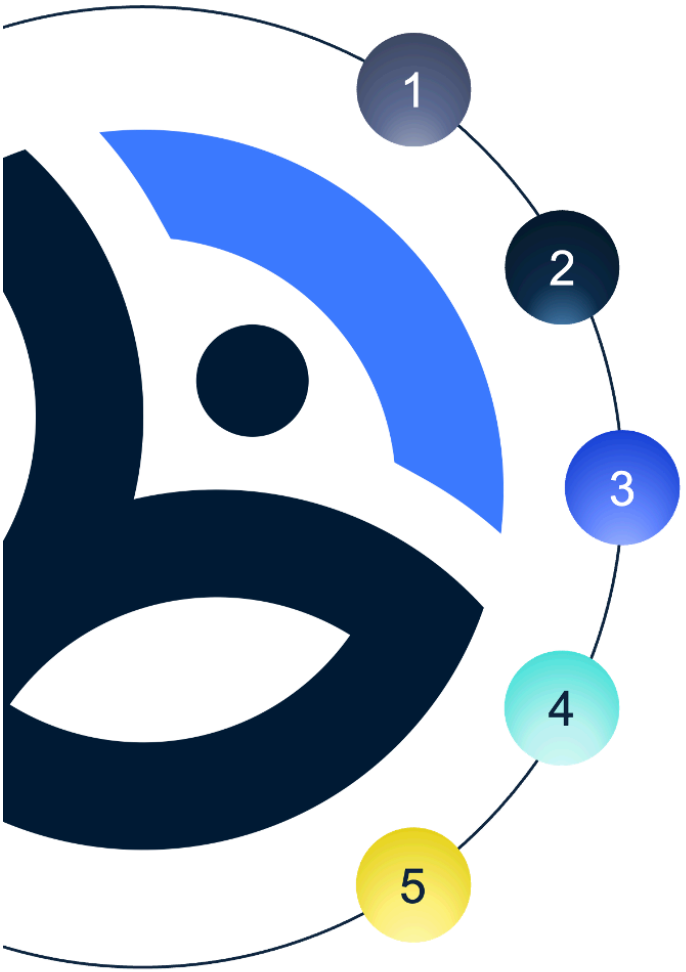
You should not rely upon forward-looking statements as predictions of future events or performance, or as a representation or warranty (express or implied) by us or any other person that we will achieve our objectives and plans in any specified time frame, on such specified terms, or at all. Although our management believes that the expectations reflected in our statements are reasonable, we cannot guarantee that the future results, performance or events and circumstances described in the forward-looking statements will be achieved or occur. New risks and uncertainties may emerge from time to time, and it is not possible to predict all risks and uncertainties. Except as required by applicable law, we do not plan to publicly update or revise any forward-looking statements contained herein.

Market data and industry information used throughout this presentation are based on management's knowledge of the industry and the good faith estimates of management. We also relied, to the extent available, upon management's review of independent industry surveys and publications and other publicly available information prepared by a number of third-party sources. All of the market data and industry information used in this presentation involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates. Although we believe that these sources are reliable as of their respective dates, we cannot guarantee the accuracy or completeness of this information, and we have not independently verified this information. Projections, assumptions and estimates of our future performance and the future performance of the industry in which we operate are necessarily subject to a high degree of uncertainty and risk due to a variety of factors. These and other factors could cause results to differ materially from those expressed in our estimates and beliefs and in the estimates prepared by independent parties.

This presentation discusses potential future product candidates that are investigational only and have not yet been approved for marketing by the U.S. Food and Drug Administration. No representation is made as to the safety or effectiveness of these potential future product candidates for the use for which such potential future product candidates are being studied.

Bicara Therapeutics Investment Highlights

Advancing ficerafusp alfa – a bifunctional EGFR-directed antibody x TGF-β ligand trap



Ficerafusp alfa + pembrolizumab offers a potential new chemo-free 1L therapy for HPV-negative R/M HNSCC that may meaningfully improve upon current standard of care

Potential registration-enabling Ph. 2/3 trial expected to begin by end of 2024 or early 2025; potential accelerated approval pathway in combination with pembrolizumab based on an interim ORR analysis

Significant market opportunity with ~23,000 cases of R/M HNSCC annually in the U.S. and a significant unmet need for better treatment options (13% 5yr survival)

Opportunity to expand into other squamous cell carcinomas and solid tumors, with encouraging clinical activity observed in Ph. 1b expansion cohorts to date

Seasoned and driven management team with a strong track record of execution; robust financial position with ~$521M in cash and cash equivalents, including ~$362M in gross proceeds from upsized IPO, expected to fund operations into the first half of 2029

Bicara Therapeutics is led by a seasoned and energetic management team

Claire Mazumdar, Ph.D., MBA
Chief Executive Officer

THIRD ROCK VENTURES · RHEOS MEDICINES

Ryan Cohlhepp, Pharm.D.
President & Chief Operating Officer

Takeda · RHEOS MEDICINES

Ivan Hyep, MBA
Chief Financial Officer

THIRD ROCK VENTURES · MOMA THERAPEUTICS · BainCapital

Lara Meisner, J.D.
Chief Legal Officer

VIRIDIAN · VERASTEM ONCOLOGY · astria THERAPEUTICS

David Raben, M.D.
Chief Medical Officer

AMGEN · Genentech · Cancer Center, NCI-DESIGNATED COMPREHENSIVE CANCER CENTER

Rachel Salazar, D.H.Sc.
SVP, R&D Strategy & Operations

EMD SERONO · Takeda · Pfizer

Jeltje Schulten, M.D., MBA
SVP, Clin. & Med. Affairs

MERCK

Sathish Hasige, Ph.D.
SVP, Technical Ops & Supply Chain

MedImmune · Pfizer · AstraZeneca

Jean-Paul Rodrique
SVP, Quality

Selecta Biosciences · aura · VERASTEM ONCOLOGY

MOA

Ficerafusp alfa's bifunctional design targets EGFR and TGF-β directly in the TME to drive a differentiated clinical profile

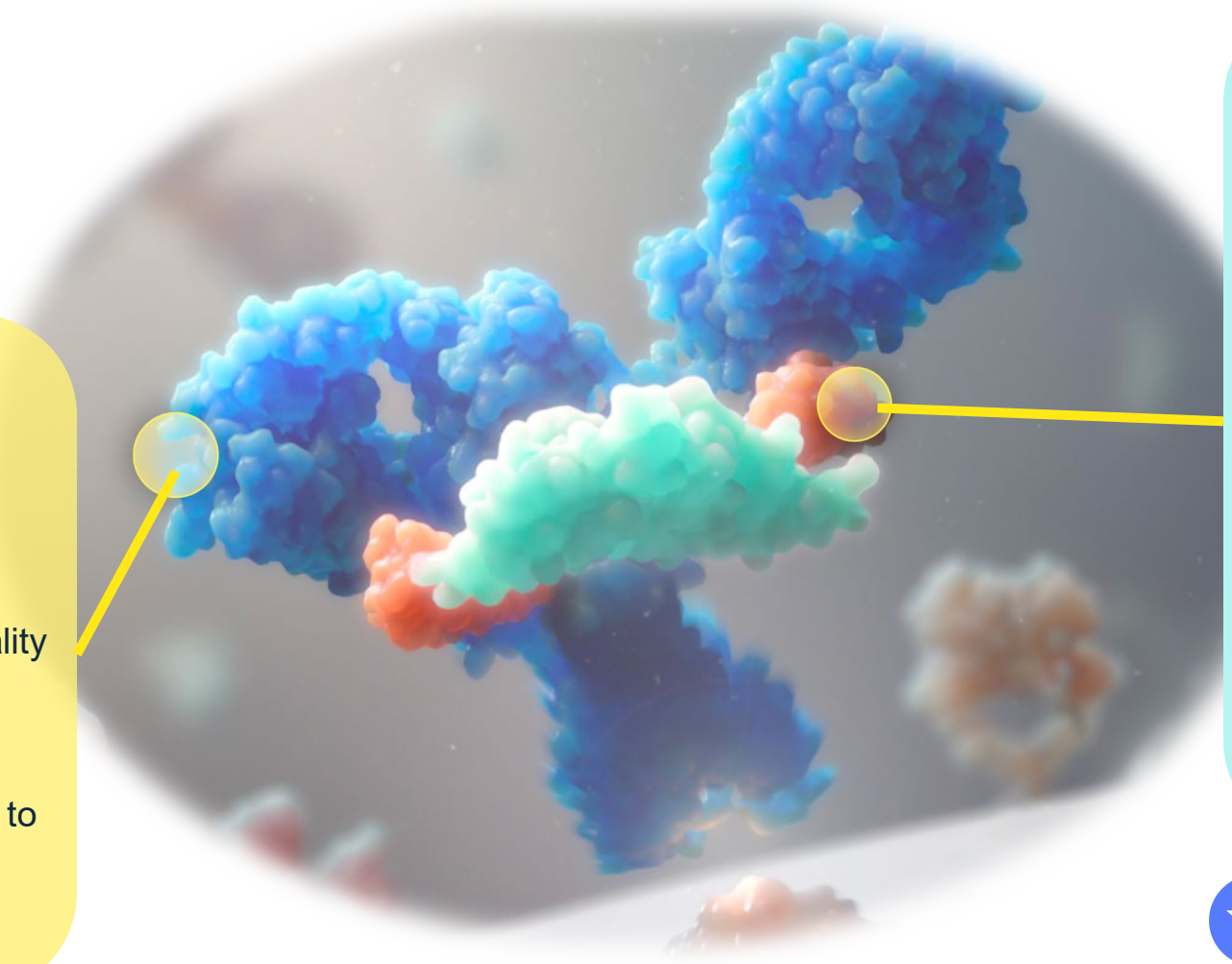
Improve tolerability

Improve anti-tumor activity

Action 1

Targeting EGFR

1. **Direct anti-tumor effect**
   - Inhibits EGFR signaling, killing cells
   - Maintains ADCC functionality to EGFR+ cells
2. **Drives tumor targeting**
   - Localizes TGF-β inhibition to the TME



Action 2

Trapping TGF-β

1. **Improves immune response (anti-PD-1 Synergies)**
   - Relieves immune suppression by blocking Tregs and MDSCs, and repolarizing macrophages
   - Blocks cancer associated fibroblasts, reducing fibrosis and T-cell exclusion
2. **Enhances EGFR inhibition (anti-EGFR Synergies)**
   - Prevents known EGFR resistance mechanism (via epithelial-mesenchymal transition or EMT)

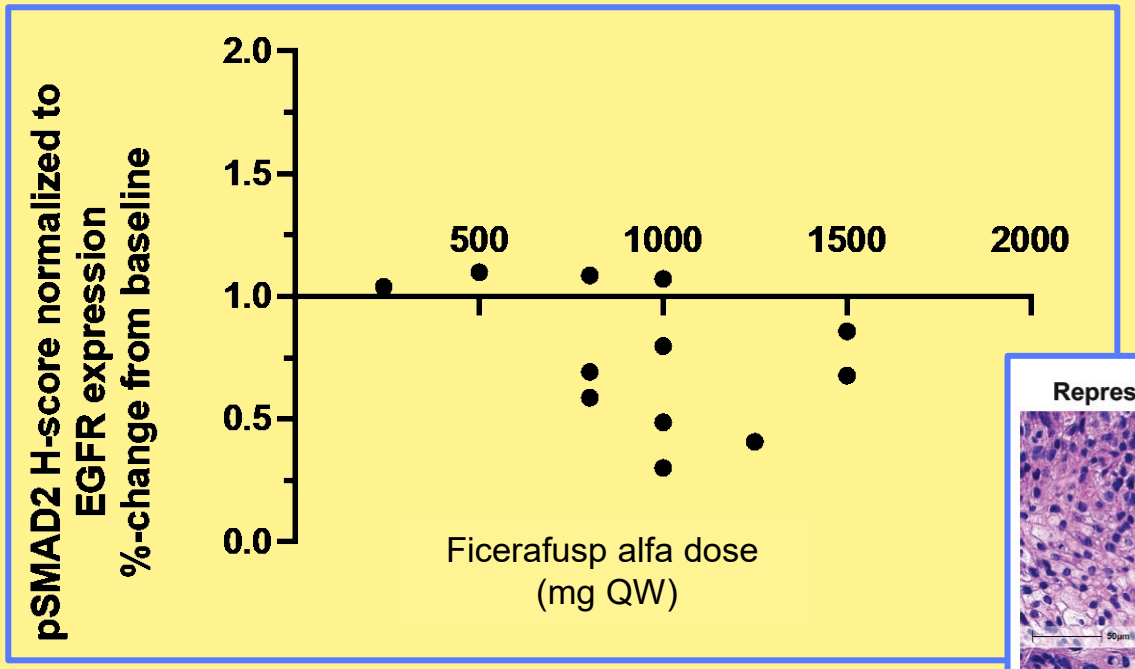
Increase depth and duration of response

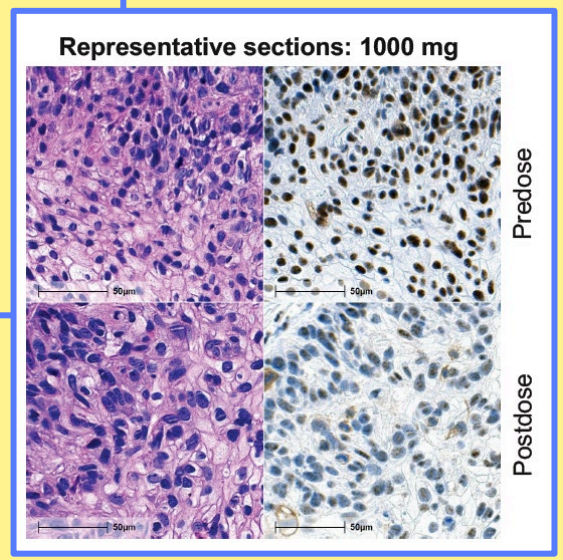
MOA = mechanism of action, EGFR = epidermal growth factor receptor, ADCC = antibody dependent cell-mediated cytotoxicity, MDSC = myeloid-derived suppressor cells, TME – Tumor Microenvironment

MOA

Ficerafusp alfa clinical biomarkers demonstrated tumor target engagement in Ph. 1/1b and predicted MOA

Statistically significant inhibition of tumor TGF-β observed at ficerafusp alfa doses >750mg via pSMAD2 levels





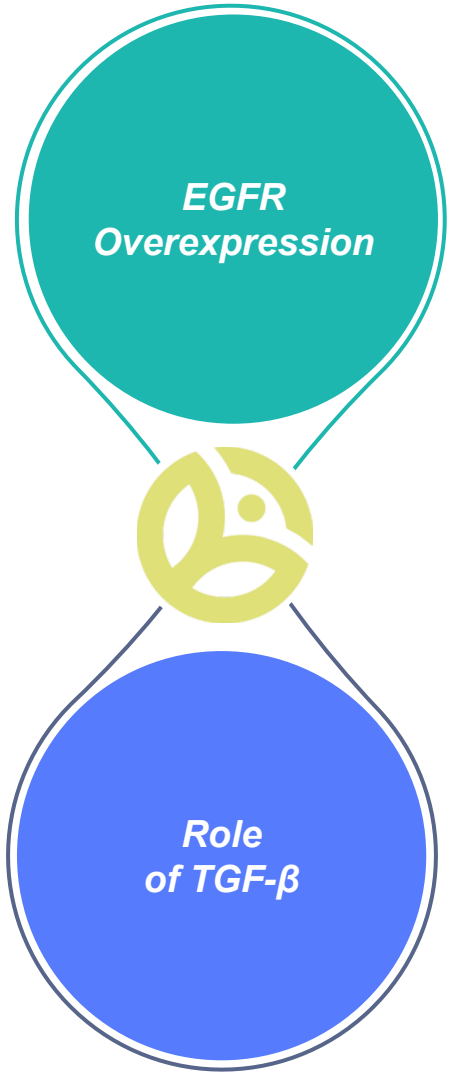
First definitive demonstration of pSMAD2 knockdown in patient tumors by a TGF-β inhibitor

Dose Expansion

Ficerafusp alfa dose expansion strategy driven by strong biologic rationale for the dual inhibition of both EGFR and TGF-β

Based on preliminary efficacy and safety & tolerability data, **1500mg QW ficerafusp alfa** was chosen as recommended dose to take into dose expansion cohorts

MTD was not reached



Dose Expansion

ficerafusp alfa monotherapy

2L+ CSCC
*n = 12 + 25**

ficerafusp alfa – 1500mg QW

ficerafusp alfa + pembrolizumab

☑ R/M 1L HNSCC
*n = 13+ 26**

☑ 2L+ SCAC

ficerafusp alfa – 1500mg QW

**Simon 2-stage design*

☑ *Enrollment complete*

MTD = Maximum Tolerated Dose

Market Opportunity

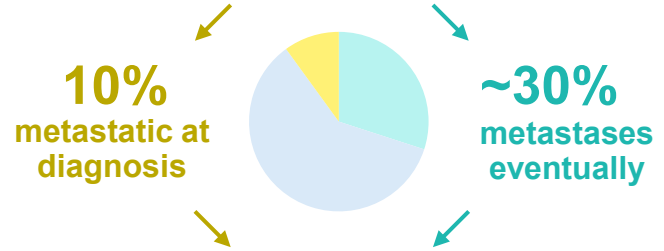
HNSCC is a common cancer with significant unmet need for improved treatment options that extend survival

Overview of head & neck cancers

- Head and neck cancer accounts for **~4% of all cancers in the U.S.**
- **Squamous cell carcinomas represent ~90% of H&N**
- Oropharyngeal lesions are typically **tested for HPV**
  - **HPV-positive** caused by HPV infection
  - **HPV-negative** typically caused by smoking and chewing tobacco **represents 80%** of HNSCC in the R/M setting and **carries a worse prognosis** vs. HPV-positive
- **Treatment decisions are guided by CPS or PD-L1 expression** and options are limited to cetuximab, anti-PD1, chemotherapy

~67,000

cases of HNSCC each year in the U.S.



~23,000

cases of R/M HNSCC each year in the U.S.

~12 months
median survival

13%
5-year survival

Sources: Cancer.net, Cleveland Clinic (2022); SEER 2012-2018 data; Cerner (2022); Bedi et al. Mol Cancer Ther. 2012; Acta Otorhinolaryngol Ital. 2020, KeyNote-048 ph.3 trial; ASCO (2022); DRG HNSCC (2019)

Market Opportunity

The patient journey in HNSCC

1 Symptoms

Patient presents to primary care/ENT with symptoms:
Pain, swallowing difficulty, mucosal bleeding, asthenia, weight loss

2 Testing and Staging

Work-up may include:
Laryngoscopy, biopsy, imaging (CT scan, MRI)
HPV/p16 testing in Oropharynx

Diagnosis of cancer

3 MDT & Treatment

Multi-disciplinary (med-onc, rad-onc, surgeon) decision:
Locally Advanced HNSCC: Curative-intent surgery and/or chemo-radiation
M1 disease: palliative treatment & Molecular testing: PD-L1 CPS

LA HNSCC

50% Relapse within 2 years after treatment for LA HNSCC[1]

4 Relapse

Metastatic at diagnosis

1L R/M HNSCC

CPS = 0

Platinum-based + cetuximab

Study

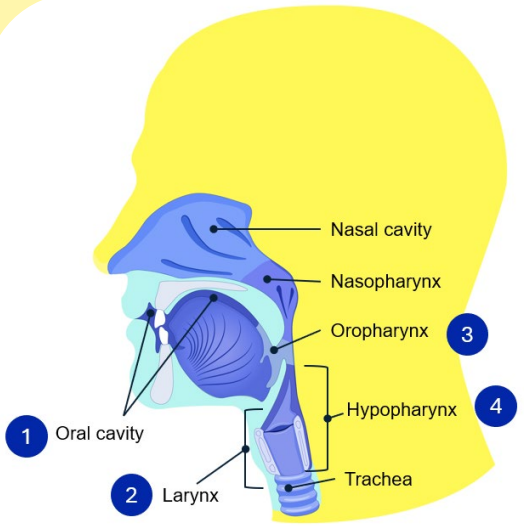
CPS≥1

Pembrolizumab mono

Platinum + 5FU + Pembro[2]

Study

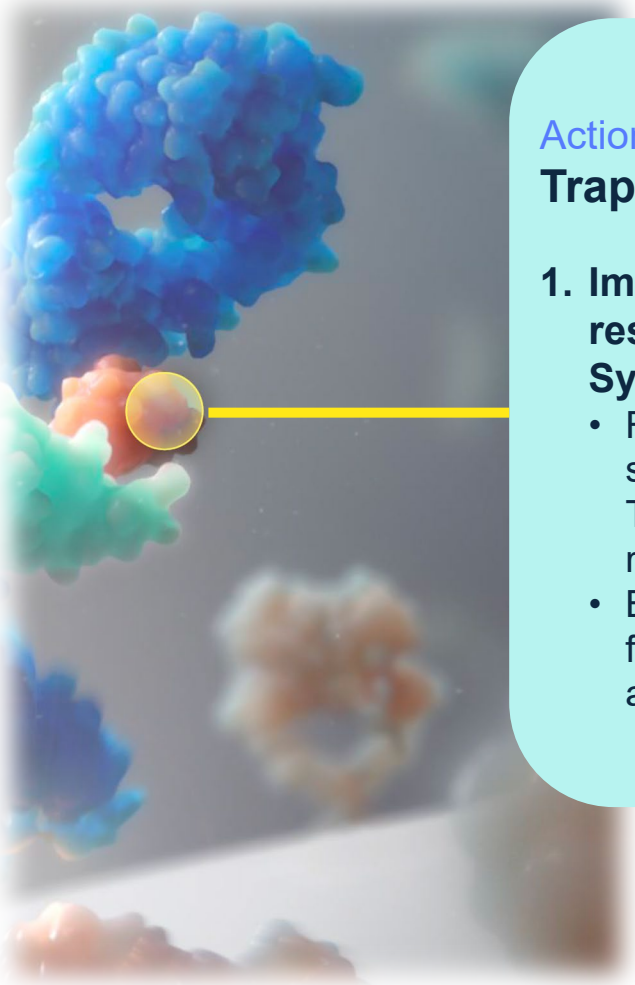
Initial focus



LA = Locally advanced
1. HNSCC population who relapse <6 months after CRT receive nivolumab as 1L treatment
2. Choice of pembro + chemo (platinum + 5FU) is at the physician's discretion and is typically more common in the CPS<20 group and/or rapidly progressing disease.

HNSCC

Ficerafusp alfa + pembrolizumab studied in a R/M HNSCC expansion cohort based on mechanistic synergies with anti-PD-1 and IST precedent



Action 2

Trapping TGF-β

1. **Improves immune response (anti-PD-1 Synergies)**
   - Relieves immune suppression by blocking Tregs and MDSCs, and repolarizing macrophages
   - Blocks cancer associated fibroblasts, reducing fibrosis and T-cell exclusion

Two ISTs exploring anti-PD-1 + cetuximab help inform ficerafusp alfa registration path

Sacco, et al 2021

THE LANCET Oncology

Design

- Open-label, single-arm
- Phase 2 in 1L R/M HNSCC (n=33)
- **Cetux + pembro**

Efficacy Data:

- ORR = 48%
- CR = 3%
- mPFS = 6.5 months
- mOS = 18.4 months

Chung, et al 2022

CLINICAL CANCER RESEARCH

Design

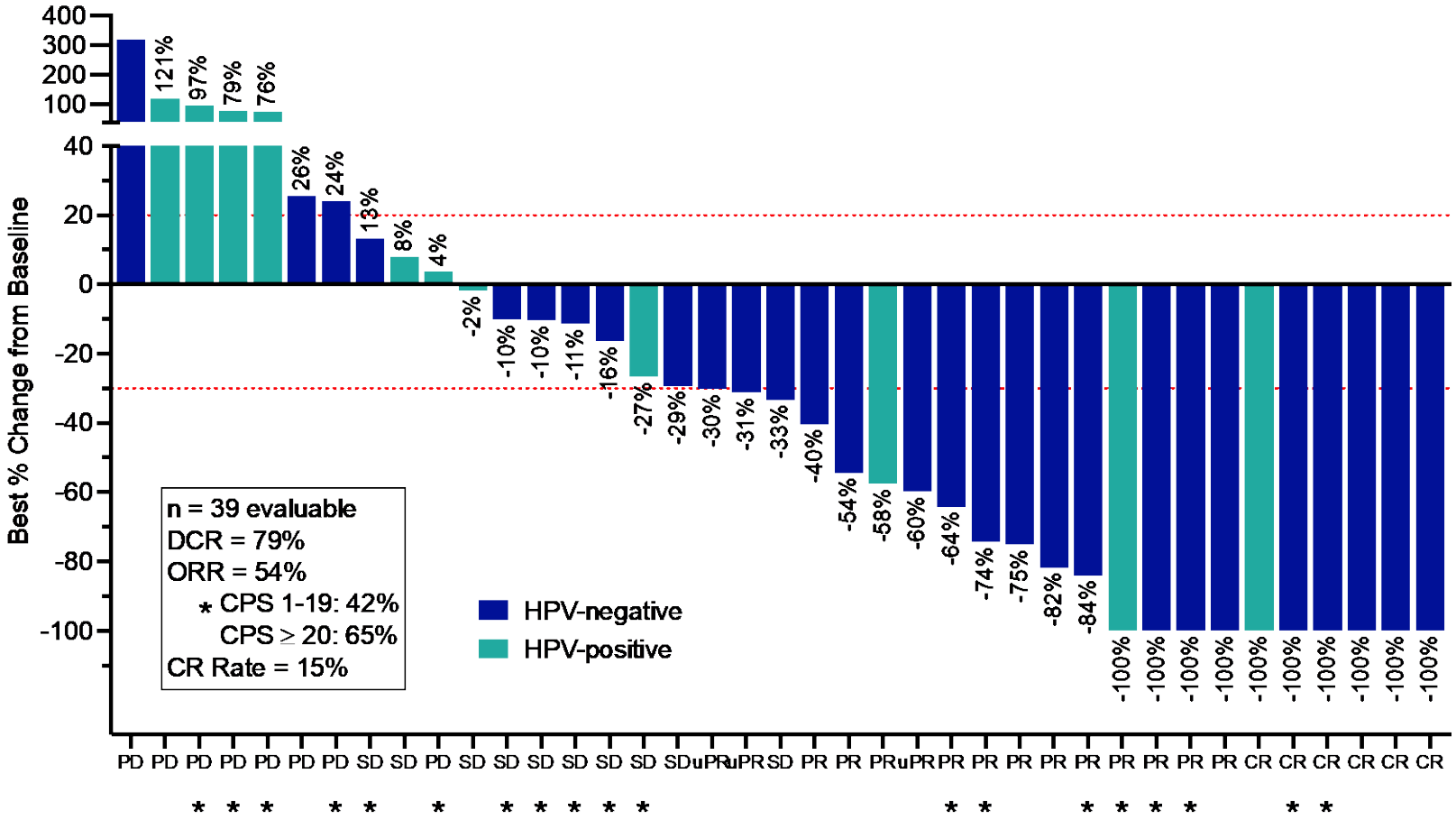
- Open-label, single-arm
- Phase 1/2 in 1L R/M HNSCC (n=43)
- **Cetux + nivo**

Efficacy Data:

- ORR = 37%
- CR = 2%
- mPFS = 6.2 months
- mOS = 20.2 months

HNSCC

Ficerafusp alfa + pembrolizumab demonstrates compelling preliminary activity and depth of response in 1L R/M HNSCC regardless of HPV status



ficerafusp alfa + pembro expansion in R/M HNSCC

- **Population**
  - 1L R/M HNSCC
  - Oral cavity, oropharynx, hypopharynx & larynx
  - HPV testing required for oropharyngeal cancer
  - CPS≥1
- **54% (21/39) ORR in CPS≥1 patients**
  - Historical[1] pembro mono ~19% ORR
- **15% (6/39) CR Rate in CPS≥1 patients**
  - 4 additional patients with -100% PRs**

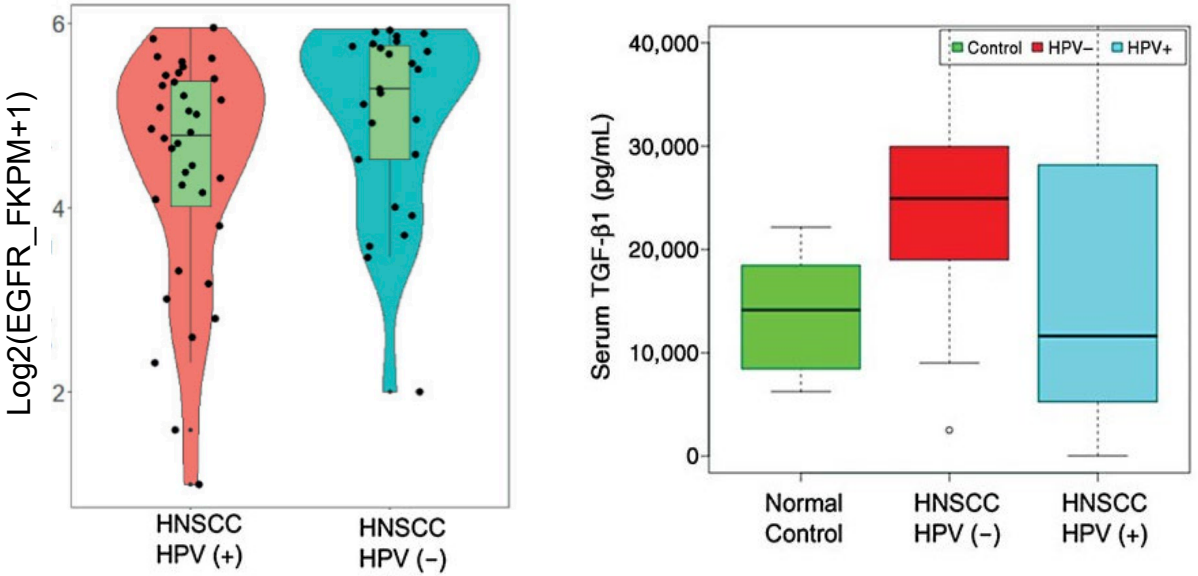
Note: Out of 42 patients, 3 patients were non-efficacy evaluable. Best overall response (investigator-assessed according to RECIST (Response Evaluation Criteria in Solid Tumors) version 1.1).
CPS=combined positive score, CR=complete response, DCR=Disease Control Rate, HPV=human papilloma virus, ORR=Overall response rate, PR=partial response, uPR=unconfirmed partial response, SD=stable disease
1. Based on historical data. No head-to-head studies have been conducted.

** May still have nodal disease

Market Opportunity

HPV-negative R/M HNSCC: a challenging tumor type associated with overexpression of EGFR and TGF-β

Overexpression of EGFR and TGF-β in HNSCC

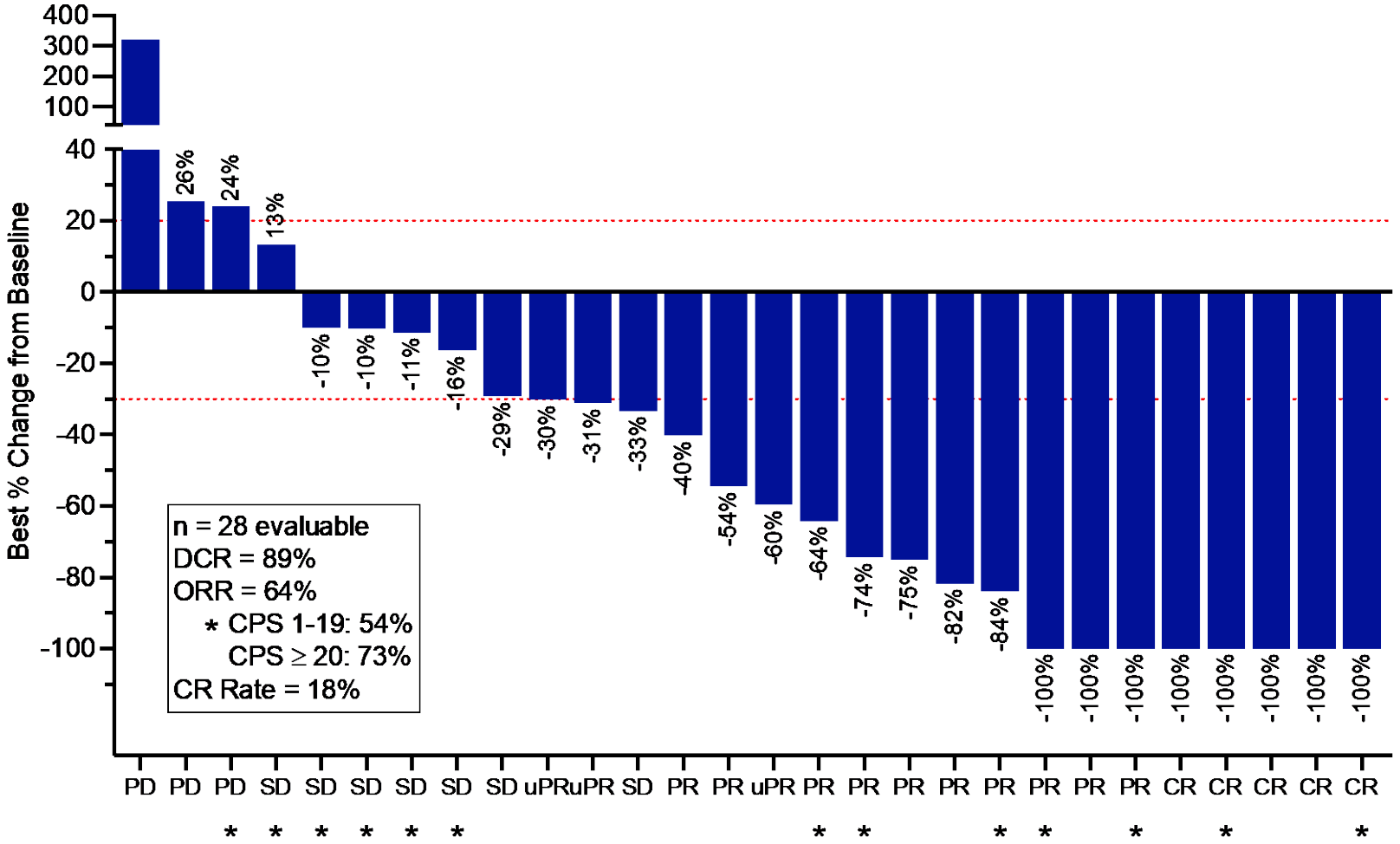


HPV-negative disease demonstrates distinct biological and mutational features correlated with a poor prognosis

- **HPV-negative** disease is etiologically distinct from HPV-positive disease and associated with:
  - ***Increased EGFR expression* compared to HPV-positive HNSCC patients**
  - ***Elevated levels of TGF-β1* in serum**
  - ***High rate of therapeutic resistance (including to anti-PD-1 checkpoint inhibitors)***
  - ***High tumor burden and symptomatic disease***

HNSCC

Ficerafusp alfa + pembrolizumab demonstrates significantly improved activity and depth of response in HPV-negative CPS≥1 1L R/M HNSCC



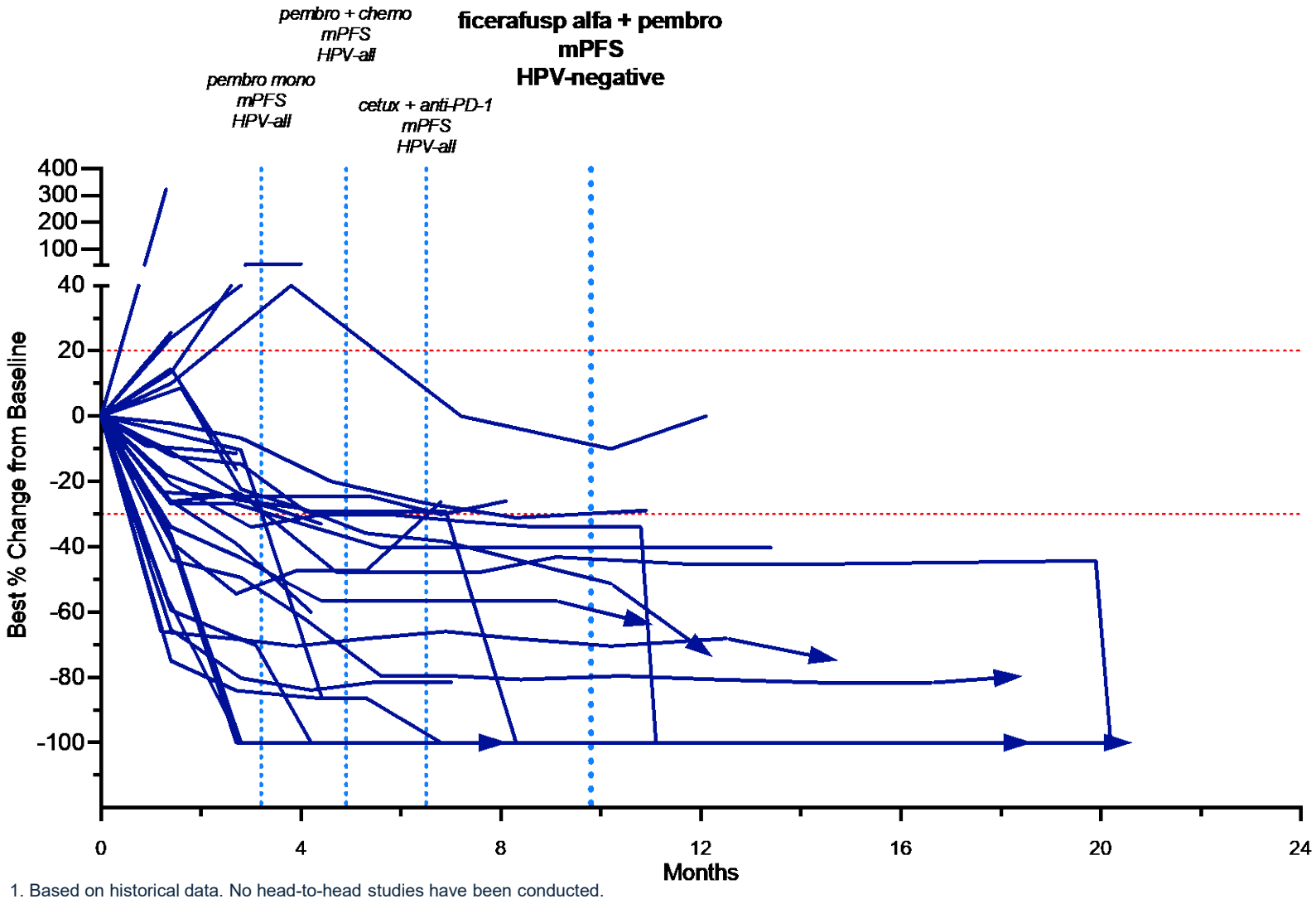
In HPV-negative patients:

- **64% (18/28) ORR observed, CPS≥1 patients**
  - Historical[1] pembro mono expected to be ~19% ORR
  - 15/18 confirmed responses
- **High response rates in subgroups that are typically refractory to checkpoint therapy:**
  - 70% (14/20) ORR in patients with locoregional disease involvement
  - 54% (7/13) ORR in CPS low (1-19)
- **18% (5/28) Complete Response (CR) rate**
  - Pembro and pembro + cetux have historically[1] achieved a ~3-5% CR rate

Note: Best overall response (investigator-assessed according to RECIST (Response Evaluation Criteria in Solid Tumors) version 1.1).
CPS=combined positive score, CR=complete response, DCR=Disease Control Rate, HPV=human papilloma virus, ORR=Overall response rate, PR=partial response, uPR=unconfirmed partial response, SD=stable disease
1. Based on historical data. No head-to-head studies have been conducted.

HNSCC

HPV-negative 1L HNSCC suggests improved median PFS over pembro monotherapy supportive of TGF-β hypothesis



- **Median PFS of 9.8 months** in **HPV-negative** subgroup
  - 57% (16/28) of pts with PFS>6 months
- Median duration of response (DOR) not yet reached
- Median overall survival (OS) not yet reached

Historical data for pembrolizumab in this population (KEYNOTE-048):

mPFS[1]: 3.2 mo (HPV-pos & HPV-neg)

1. Based on historical data. No head-to-head studies have been conducted.

HNSCC

Ficerafusp alfa has been generally well-tolerated with no treatment-related deaths

ficerafusp alfa + pembro 1L HNSCC safety profile:

- EGFR-related AEs:
  - 76% had dermatitis acneiform, majority are Grade 1-2 in severity
- Hypothesized TGF-β-related AEs:
  - Nearly all AEs were transient Grade 1-2 local mucosal bleeds or epistaxis
- No treatment related deaths were reported

Most common (>10%) related adverse events – summary by preferred term and maximum grade

	All 1L R/M HNSCC subjects received 1500mg QW and Pembrolizumab (n=42)		
Preferred term	All Grades	Grade 3-4	Grade 5
Any Related AE	**40 (95%)**	**17 (40%)**	**0 (0%)**
Dermatitis acneiform	32 (76%)	5 (12%)	0 (0%)
Fatigue	18 (43%)	2 (5%)	0 (0%)
Pruritus	17 (40%)	0 (0%)	0 (0%)
Anaemia	15 (36%)	6 (14%)	0 (0%)
Hypophosphataemia	16 (38%)	0 (0%)	0 (0%)
Hypomagnesaemia	15 (36%)	0 (0%)	0 (0%)
Dry skin	13 (31%)	0 (0%)	0 (0%)
Stomatitis	10 (24%)	1 (2%)	0 (0%)
Infusion related reaction	8 (19%)	1 (2%)	0 (0%)
Hypokalaemia	8 (19%)	0 (0%)	0 (0%)
Nausea	7 (17%)	0 (0%)	0 (0%)
Proteinuria	7 (17%)	0 (0%)	0 (0%)
Epistaxis	6 (14%)	0 (0%)	0 (0%)
Lipase increased	6 (14%)	0 (0%)	0 (0%)
Skin fissures	6 (14%)	0 (0%)	0 (0%)
Decreased appetite	6 (14%)	1 (2%)	0 (0%)
Headache	5 (12%)	1 (2%)	0 (0%)
Rash maculo-papular	5 (12%)	1 (2%)	0 (0%)
Diarrhoea	5 (12%)	0 (0%)	0 (0%)
Aspartate aminotransferase increased	5 (12%)	0 (0%)	0 (0%)
Gingival bleeding	5 (12%)	0 (0%)	0 (0%)

HNSCC

Ficerafusp alfa 1L HNSCC Ph.1b expansion supports a pivotal trial with path to accelerated approval

Ficerafusp alfa has demonstrated a strong clinical profile

- **64% ORR in HPV-negative**, CPS≥1 R/M HNSCC in combination with pembro vs. ~19% historical[1] pembro monotherapy
- **18% complete response rate** vs. ~3-5% with available therapies (pembro and pembro + cetux)
- **mPFS of 9.8 months** (vs. 3.2 months for pembro monotherapy in HPV+/-)
- **Generally well tolerated safety profile**

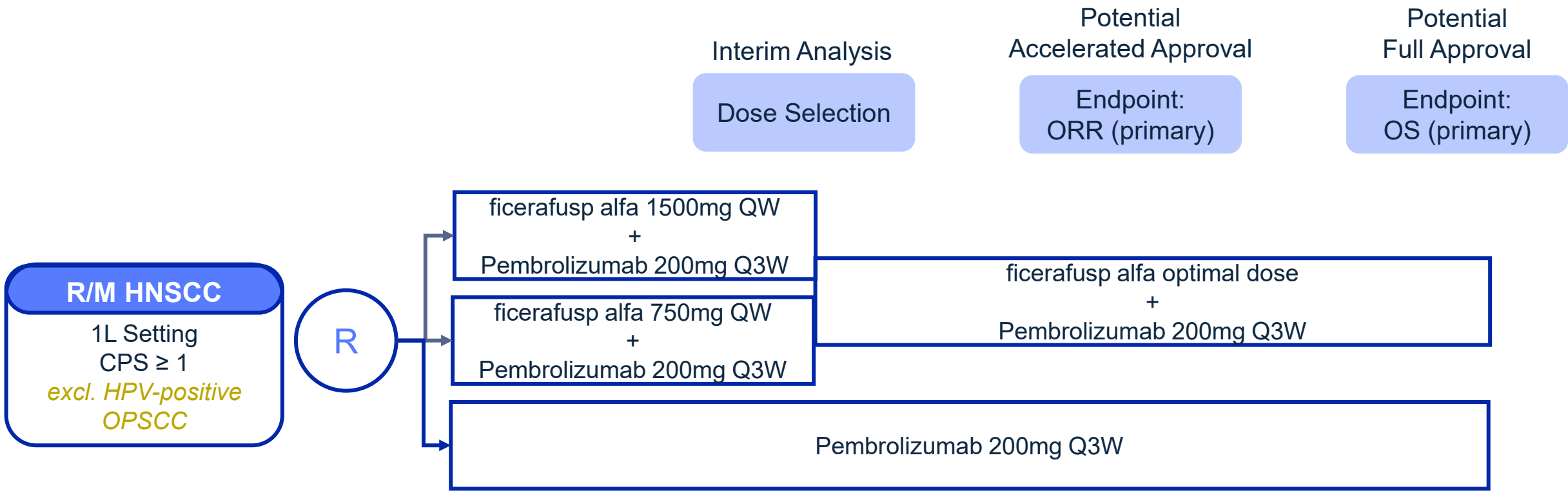
Alignment with FDA on registrational trial design

Feedback supports potential accelerated approval pathway

1. Based on historical data. No head-to-head studies have been conducted.

HNSCC

FORTIFI-HN01 Phase 2/3 trial design allows for efficient path-to-market



Design	Total Sample Size
Interim Analysis 1 (Dose Optimization)	n ~ 60
Interim Analysis 2 (ORR)	n ~ 415
Primary Analysis (OS)	n ~ 650

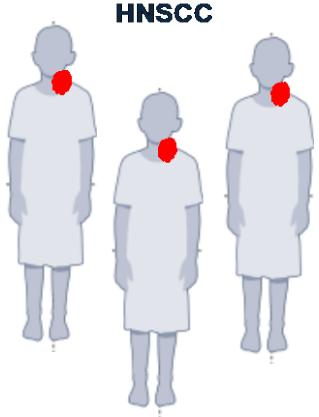
Anticipated data availability are based on current expectations and may be subject to delay.

Market Opportunity

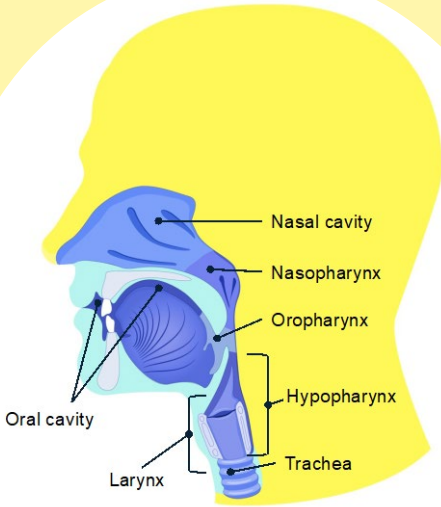
Advancing to earlier stages of HNSCC represents a significant opportunity for ficerafusp alfa

>60K
cases / year in U.S.

Locally advanced HNSCC



Recurrent / Metastatic HNSCC



LA HNSCC

50% Relapse within 2 years after treatment for LA HNSCC[1]

Relapse

Metastatic at diagnosis

1L R/M HNSCC

CPS = 0

- Platinum-based + cetuximab
- Study

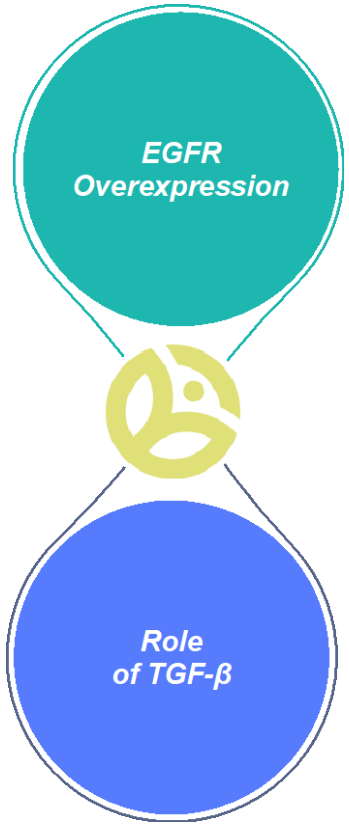
CPS≥1

- **Pembrolizumab mono**
- Platinum + 5FU + Pembro[2]
- Study

expansion opportunities

Beyond HNSCC

Plan to expand ficerafusp alfa to additional tumor types where there is strong biologic rationale and / or early signals of activity



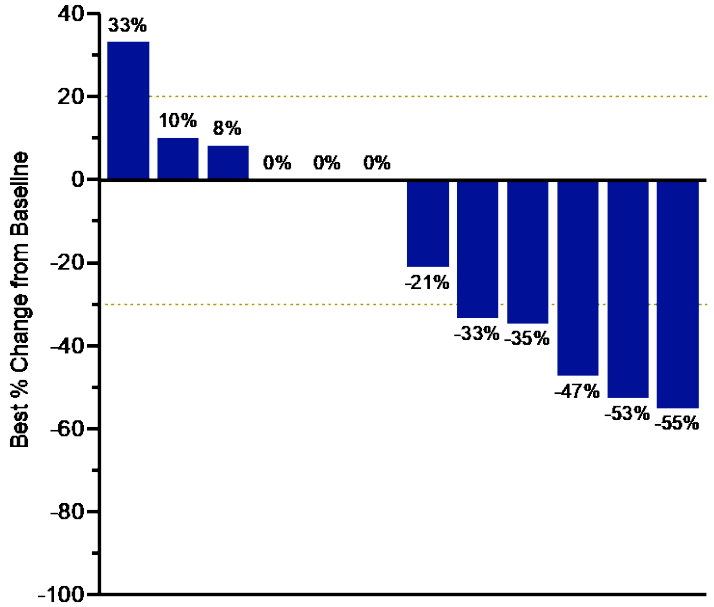
Other Solid Tumors / Squamous Cell Carcinomas

Potential expansion to areas of EGFR / TGF-β involvement:

- **Cutaneous squamous cell carcinoma (cSCC)** – preliminary 42% ORR (5/12) in 2L+ PD-1-refractory with **ficerafusp alfa monotherapy**
- **Colorectal cancer (CRC)** – cetuximab precedent
- **Squamous cancer of the anal canal (SCAC)**

cutaneous SCC (cSCC)

ficerafusp alfa monotherapy: 42% ORR across n=12 patients in 2L+ post-PD-1



Beyond HNSCC

Future clinical studies evaluating ficerafusp alfa in HNSCC and other SCCs and solid tumors

1L R/M HNSCC CPS = 0

Opportunity:

- CPS = 0 is roughly 20% of R/M HNSCC
- Significant unmet with only approved treatment = chemo +/- cetuximab
- Data from Ph. 1 dose escalation in combo with pembro in 2L+ HNSCC, PD-1-refractory support activity in patients with CPS=0

Future Studies

- Expansion cohort in combination with pembro currently enrolling

Neoadjuvant / locally advanced HNSCC

Opportunity:

- >60K cases each year in U.S. represents sizeable market opportunity
- Potential to move earlier into treatment for HNSCC and improve long-term outcomes

Future Studies

- Designing an initial cohort in combination with pembro in neoadjuvant and locally advanced HNSCC

Cutaneous SCC (cSCC)

Opportunity:

- ~1M new cases in the U.S. each year; ~2-3% develop metastases[1]
- Initial monotherapy data demonstrates 42% ORR in 2L+ PD-1 refractory patients and supports further exploration

Future Studies

- Current monotherapy cohort in 2L+ remains ongoing and continues to enroll patients

CRC

Opportunity:

- ~150K new cases in the U.S. each year
- Cetuximab approval in CRC validates EGFR approach

Future Studies

- Initiate expansion cohorts in 3L+ colorectal cancer (RAS wild type)

1. Brougham et al., J Surg Oncol. 2012 Dec.
Sources: American Cancer Society

At a Glance

Bicara Therapeutics hopes to establish ficerafusp alfa + pembro as a new first line therapy for HPV-negative R/M HNSCC, CPS>1

Focus	Key Achievements
Clinical	✓ Showed strong clinical activity of ficerafusp alfa in combination with pembro in **HPV-negative** 1L R/M HNSCC **(64% ORR, 18% CRR, 9.8mos PFS)** ✓ Demonstrated activity of ficerafusp alfa in other squamous cell carcinomas and solid tumors
Regulatory	✓ Aligned on registrational enabling Ph. 2/3 trial design and established a clear path to FDA approval based on OS, with potential for an accelerated approval upon an interim analysis based on ORR
FORTIFI-HN01 Ph. 2/3 Trial	✓ On track to initiate FORTIFI-HN01, a pivotal Ph. 2/3 trial in HPV-negative 1L R/M HNSCC in late in the fourth quarter of 2024 or early in the first quarter of 2025
Financial	✓ Robust financial position with ~$521M in cash and cash equivalents, including ~$362M in gross proceeds from upsized IPO, expected to fund operations into the first half of 2029

BICARA THERAPEUTICS™

Fighting cancer with precision and power.

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