Astria STAR-0215 Phase 1a Trial Preliminary Results

December 2022

Forward Looking Statements

This presentation and various remarks we make during this presentation contain forward-looking statements of Astria Therapeutics, Inc. ("Astria," the "Company," "we", "our" or "us") within the meaning of applicable securities laws and regulations, including statements with respect to: the Company's projected cash runway; expectations regarding the nature, timing and potential significance of the preliminary results from the Phase 1a STAR-0215 trial, the plans to add additional cohorts to the trial and the anticipated nature and timing of receipt of the data from such additional cohorts; expectations regarding the timing of initiation, design and timing and nature of the anticipated proof of concept results from the planned Phase 1b/2 clinical trial of STAR-0215; the longer term development plans for STAR-0215; the potential attributes and differentiated profile of STAR-0215 as a treatment for HAE, including its potential best-in-class pharmacokinetic profile, potential dosing frequency, clinical benefit and those suggested by the preliminary results from the STAR-0215 Phase 1a trial, preclinical and pharmacokinetic modeling data; the potential commercial opportunity for STAR-0215 in HAE, including its potential to be a best-in-class and most patient friendly treatment option for HAE; the need for effective treatments for HAE; the size and anticipated growth of the HAE market; the expected patent protection of patents directed at STAR-0215; potential every six-month dosing for STAR-0215; and the Company's goal to meet the unmet needs of patients with rare and niche allergic and immunological diseases, and expand its pipeline. We use words such as "aims," "anticipate," "believe," "estimate," "expect," "goals," "hope," "intend," "may," "opportunity," "plan," "predict," "project," "target," "potential," "would," "vision," "can," "could," "should," "continue," and other words and terms of similar meaning to help identify forward-looking statements, although not all forward-looking statements contain these identifying words. Actual results may differ materially from those indicated by such forward-looking statements as a result of various important factors, including risks and uncertainties related to: changes in applicable laws or regulations; the possibility that we may be adversely affected by other economic, business, and/or competitive factors, including the COVID-19 pandemic; risks inherent in pharmaceutical research and development, such as: adverse results in our drug discovery, preclinical and clinical development activities, the risk that the results of pre-clinical studies may not be replicated in clinical studies, that the preliminary results from the Phase 1a trial may be change once the final results are received and analyzed, that the results of early stage clinical studies may not be replicated in later stage clinical studies, the risk that we may not be able to enroll sufficient patients in our clinical trials on a timely basis, and the risk that any of our clinical trials may not commence, continue or be completed on time, or at all; decisions made by, and feedback received from, the U.S. FDA ("FDA") and other regulatory authorities on our regulatory and clinical trial submissions and other feedback from potential clinical trial sites, including investigational review boards at such sites, and other review bodies with respect to STAR-0215 and any other future development candidates; our ability to manufacture sufficient quantities of drug substance and drug product for STAR-0215 and any other future product candidates on a cost-effective and timely basis, and to develop dosages and formulation for STAR-0215 and any other future product candidates that are patient-friendly and competitive; our ability to develop biomarker and other assays, along with the testing protocols therefore; our ability to obtain, maintain and enforce intellectual property rights for STAR-0215 and any other future product candidates; our potential dependence on collaboration partners; competition with respect to STAR-0215 or any of our other future product candidates; the risk that survey results and market research may not be accurate predictors of the commercial landscape for HAE and the anticipated position and attributes of STAR-0215 in HAE based on its clinical data to date, pre-clinical profile, pharmacokinetic modeling and other data; our ability to manage our cash usage and the possibility of unexpected cash expenditures; our ability to obtain necessary financing to conduct our planned activities and to manage unplanned cash requirements; the risks and uncertainties related to our ability to recognize the benefits of any additional acquisitions, licenses or similar transactions; and general economic and market conditions; as well as the risks and uncertainties discussed in the "Risk Factors" section of our Annual Report on Form 10-K for the period ended December 31, 2021, and in other filings that we may make with the Securities and Exchange Commission ("SEC"). These forward-looking statements should not be relied upon as representing our view as of any date subsequent to the date of this presentation, and we expressly disclaim any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by law.

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This presentation contains estimates and other statistical data made by independent parties and by us relating to market size and other data about our industry. This data involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such data and estimates. In addition, projections, assumptions and estimates of our future performance and the future performance of the markets in which we operate are necessarily subject to a high degree of uncertainty and risk.

Executive Summary

STAR-0215 has shown early proof of concept for its target profile: long-acting preventative therapy for HAE, best-in-class PK profile, and dosing once every 3 months or less frequently

Positive preliminary results from Phase 1a trial in healthy subjects

- Well-tolerated and favorable safety profile
- Rapid and sustained drug levels with estimated half-life up to 110 days
- Target engagement with durable plasma kallikrein inhibition for at least 3 months

Near-term clinical development plans

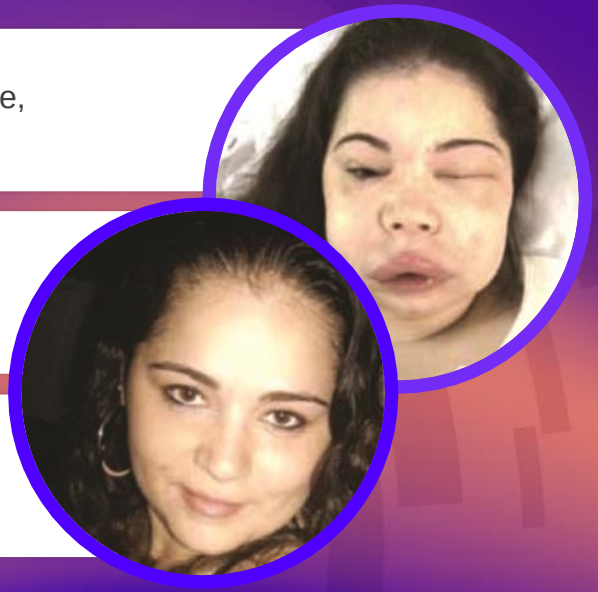
- Initiating Phase 1b/2 ALPHA-STAR trial in HAE patients, expected in Q1 2023
  - Initial proof-of-concept results in HAE patients expected in mid-2024
- Planning to evaluate potential for 6-month dosing in Phase 1a healthy subject trial expected to commence in Q1 2023, with initial results expected in Q4 2023

Hereditary Angioedema (HAE): A Rare, Disfiguring, and Potentially Life-Threatening Disease

Rare genetic disorder charactered by severe, unpredictable, sometimes **life-threatening** swelling[1]

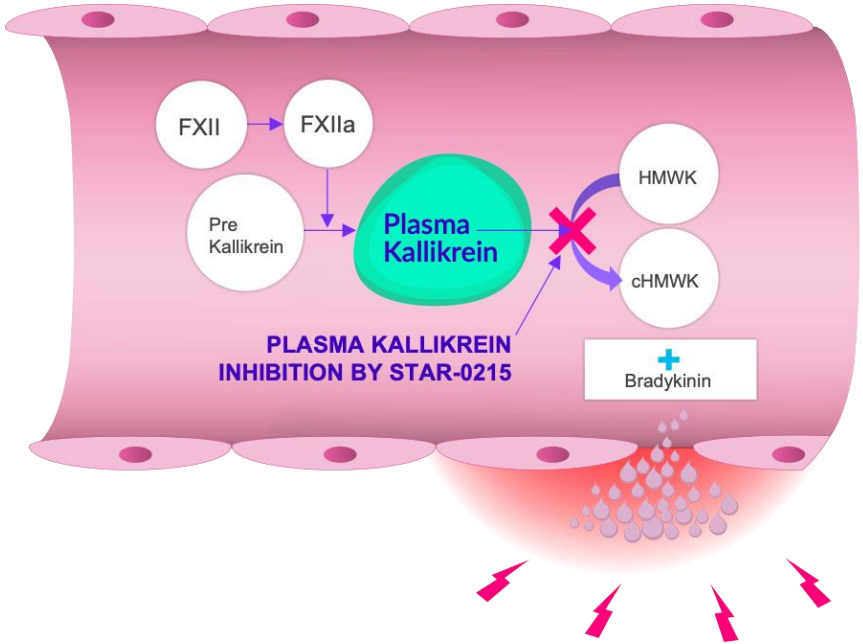
Affects **<8,000 in the U.S. and <15,000 in Europe,**[2, 3, 4] average age of onset is 11 years old[5]

Standard of care has evolved to both **on-demand** and **preventative treatments** with room for improvement



1. Zuraw BL. N Engl J Med. 2008;359:1027-36.
2. Busse, P.J. et al. N Engl J Med. 2021; 132-150.
3. Lumry, W.R. Front Med. 2018; 5, 22.
4. Aygören-Pürsün, E. et.al. Orphanet j Rare Dis. 2018; 13:73.
5. Bork K, et al. Am J Med. 2006;119;267-274.
6. Images obtained by haeimages.com

Plasma Kallikrein is an Established Target in HAE



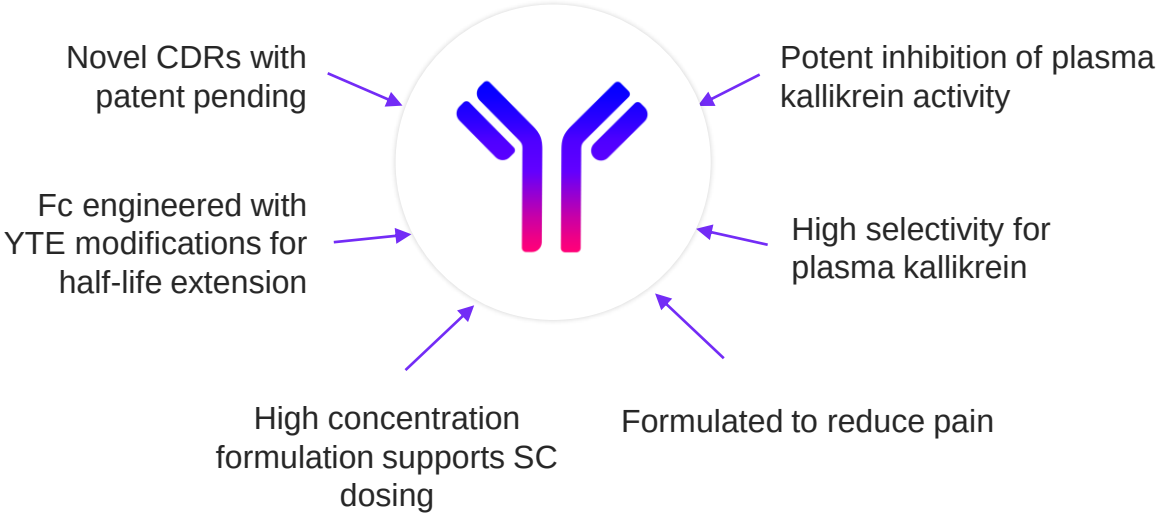
- In HAE, missing C1 inhibitor allows plasma kallikrein to process HMWK, which generates cleaved HMWK (cHMWK) and releases bradykinin
- Bradykinin binds to receptors allowing fluid to leak through blood vessel walls and causes edema/pain

STAR-0215 inhibits plasma kallikrein, even in the absence of C1 inhibitor, reducing bradykinin production and preventing edema and pain

HMWK = high molecular weight kininogen
cHMWK = cleaved high molecular weight kininogen
FXII = Factor XII
FXIIa = activated Factor XII

STAR-0215: Designed to Normalize Life with HAE

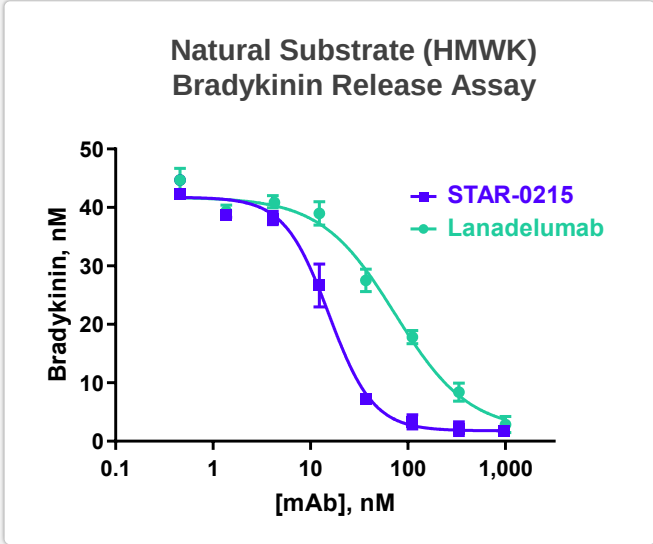
Key Features of STAR-0215

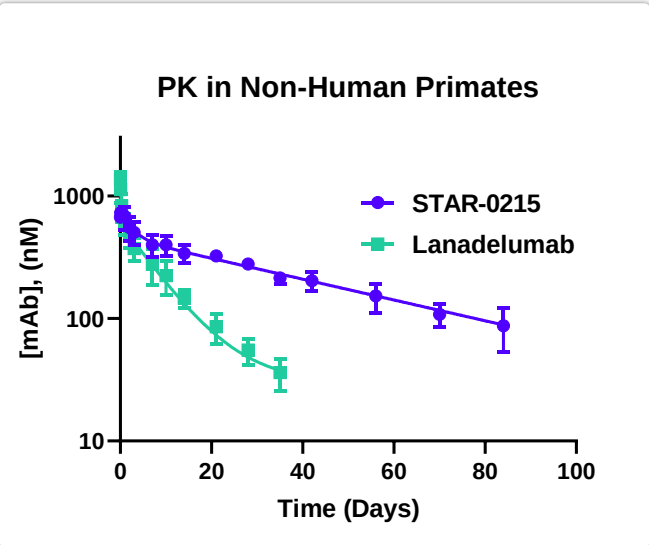


Astria wholly owns an international patent application directed to STAR-0215 with potential patent term into 2042, excluding any potential patent term extension.[1]

1. If this application is nationalized in PCT member states ex-U.S., the term of any resulting patents would also be to 2042, exclusive of any available term extensions.

STAR-0215 Shows Long Half-Life and High Potency in Preclinical Studies

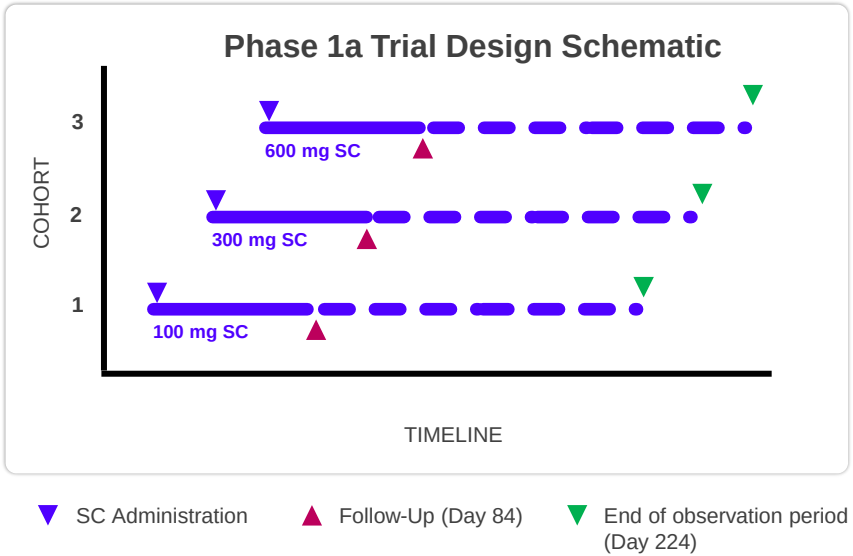




- STAR-0215 inhibits plasma kallikrein at least as potently as lanadelumab
- STAR-0215 has a half-life of three times as long as lanadelumab in non-human primates

STAR-0215 Phase 1a Trial

- **Randomized, double-blind[1], placebo-controlled**
  - Healthy adult subjects
  - 3 single ascending doses, delivered SC
  - 6 active to 2 placebo randomization
- **Preliminary data include safety (84 days for 3 cohorts), PK and PD (84 days for cohorts 1 and 2; 56 days for cohort 3)**



Preliminary, blinded data, cut-off Dec 5, 2022

1. As of this data cut-off, treatment assignments remain blinded. Presented PK, PD, and safety data are delinked from individual subject identifier.
SC = subcutaneous; PK = pharmacokinetic; PD = pharmacodynamic

Phase 1a Designed to Demonstrate Early Proof of Concept

- Safety and tolerability profile: STAR-0215 has shown a favorable safety profile and has been well-tolerated in healthy subjects
- Pharmacokinetics: Concentrations of STAR-0215 are sustained at levels consistent with clinical benefit in HAE
- Target engagement: STAR-0215 reduced cHMWK

Preliminary Results

Phase 1a Baseline Demographics

	100 mg (N = 9)[1]	300 mg (N = 8)	600 mg (N = 8)	Overall (N = 25)
Age, Mean (SD)	39.7 (10.9)	39.5 (7.3)	35.4 (12.5)	38.2 (10.2)
Female	3 (33.3)	4 (50)	4 (50)	11 (44)
Black or African American	3 (33.3)	6 (75)	8 (100)	17 (68)
Weight (kg), mean (SD)	92.33 (11.247)	85.50 (14.296)	78.70 (14.315)	85.78 (13.942)

1. Cohort 1 includes one subject who did not receive a full dose and is included in this analysis. PK and PD data from this subject will be excluded from the final analysis of this cohort. Results will be finalized after the end of the observation period.

Results Suggest that STAR-0215 is Well-Tolerated and has a Favorable Safety Profile

3-Month Timepoint Blinded Adverse Event Results

STAR-0215[1]:

- 8 (32%) subjects (STAR-0215 or placebo) had related TEAEs
- No SAEs and all related TEAEs were mild (Grade 1) and resolved. No Grade 2, 3, or 4 TEAEs.
- 6 subjects had ISRs (all mild), most commonly site redness; no reports of pain

Lanadelumab[2]:

The most common adverse reactions associated with lanadelumab are:

- Injection site reactions, most commonly pain (52%)
- Upper respiratory tract infection (29%)
- Headache (21%)

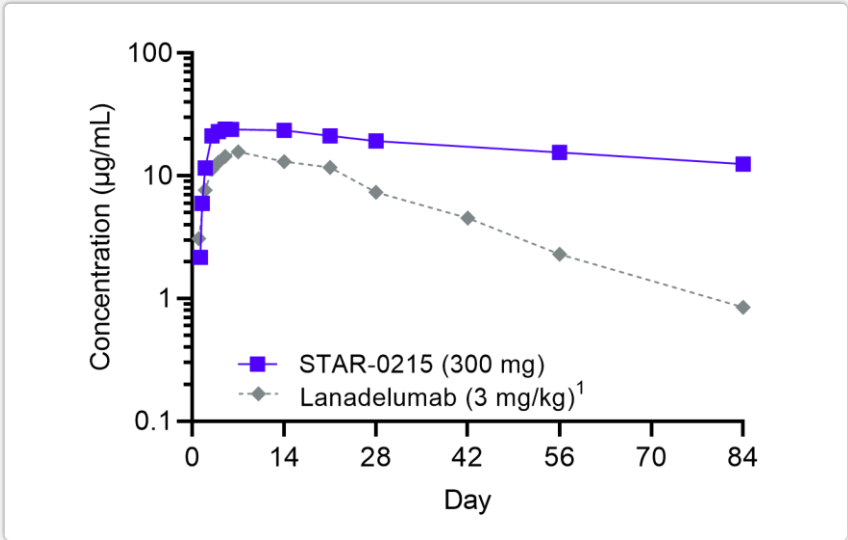
TEAE= Treatment-emergent adverse event; ISR = injection site reaction; SAE = serious adverse events

1. Other related TEAEs were headache (1 subject) and unexplained weight gain (1 subject), both in Cohort 1 (100 mg). There were no clinically relevant changes in vital signs, ECG parameters, or laboratory values. 15 Grade 1 (mild) ISRs occurred in 6 subjects, including erythema (site redness), pruritus, swelling and inflammation. No clinically relevant changes in liver enzymes or coagulation parameters. No deaths, or adverse events leading to study discontinuation. Results will be finalized after the end of the observation period

2. TAKHZYRO US Prescribing Information, Feb 2022.

The comparison presented between STAR-0215 and lanadelumab represents a cross-trial comparison and does not involve data from a head-to-head clinical trial

Results Show STAR-0215 has a Potential Best-In-Class PK Profile



STAR-0215:

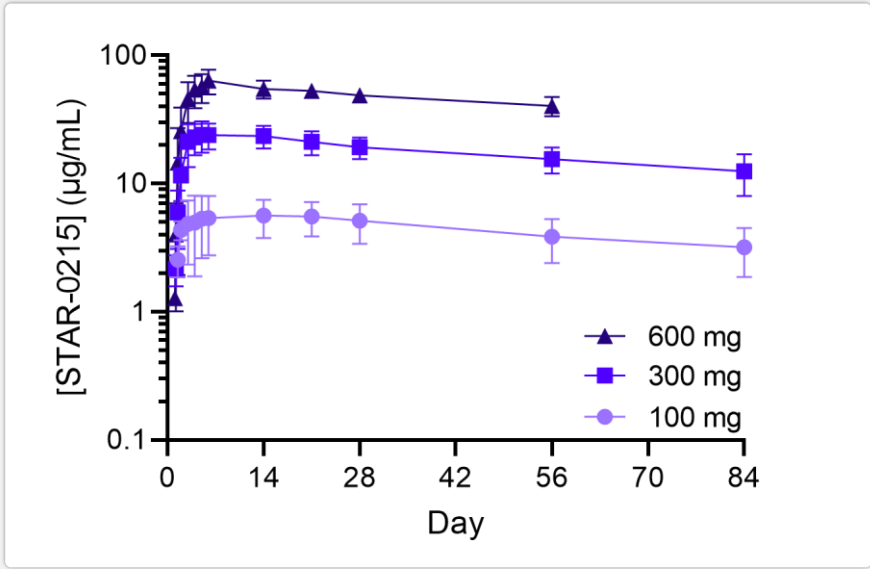
- Estimated half-life is **up to 110 days**, >5 times longer than lanadelumab
- Rapid achievement of maximum concentration
- Sustained concentrations at levels consistent with clinical benefit

Results will be finalized after the end of the observation period

1. Chyung et al 2014. Weight (SD) in this dose cohort = 83.08 (9.459) kg. Mean dose is 249.2 mg SC.

The comparison presented between STAR-0215 and lanadelumab represents a cross-trial comparison and does not involve data from a head-to-head clinical trial.

Results Show Rapid and Sustained STAR-0215 Concentrations After Single Subcutaneous Doses

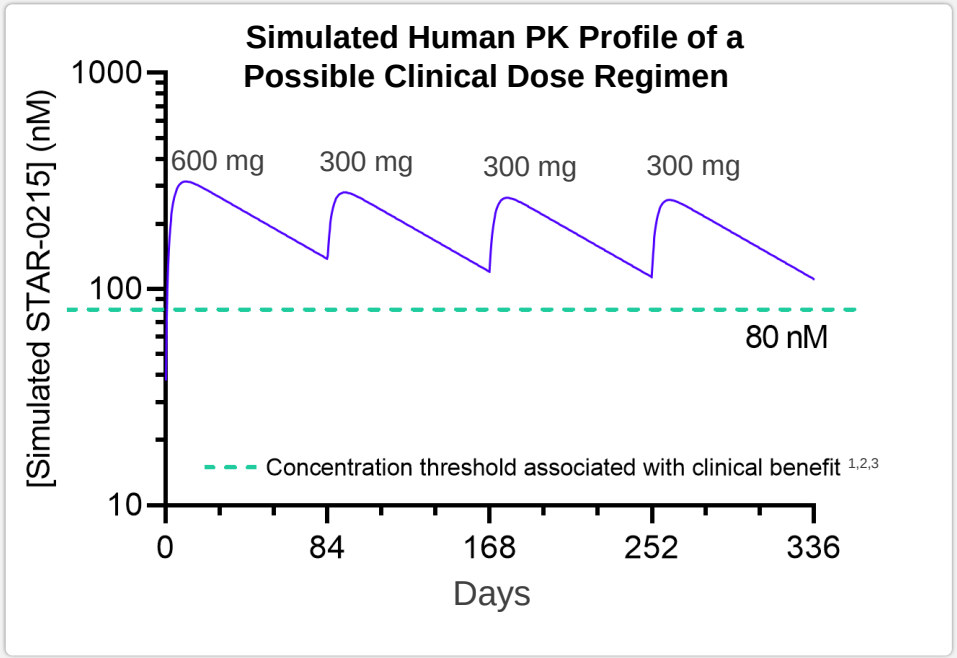


STAR-0215:

- Concentrations are proportional to dose
- Long elimination phase consistent with YTE-modification
- Estimated half-life of up to 110 days

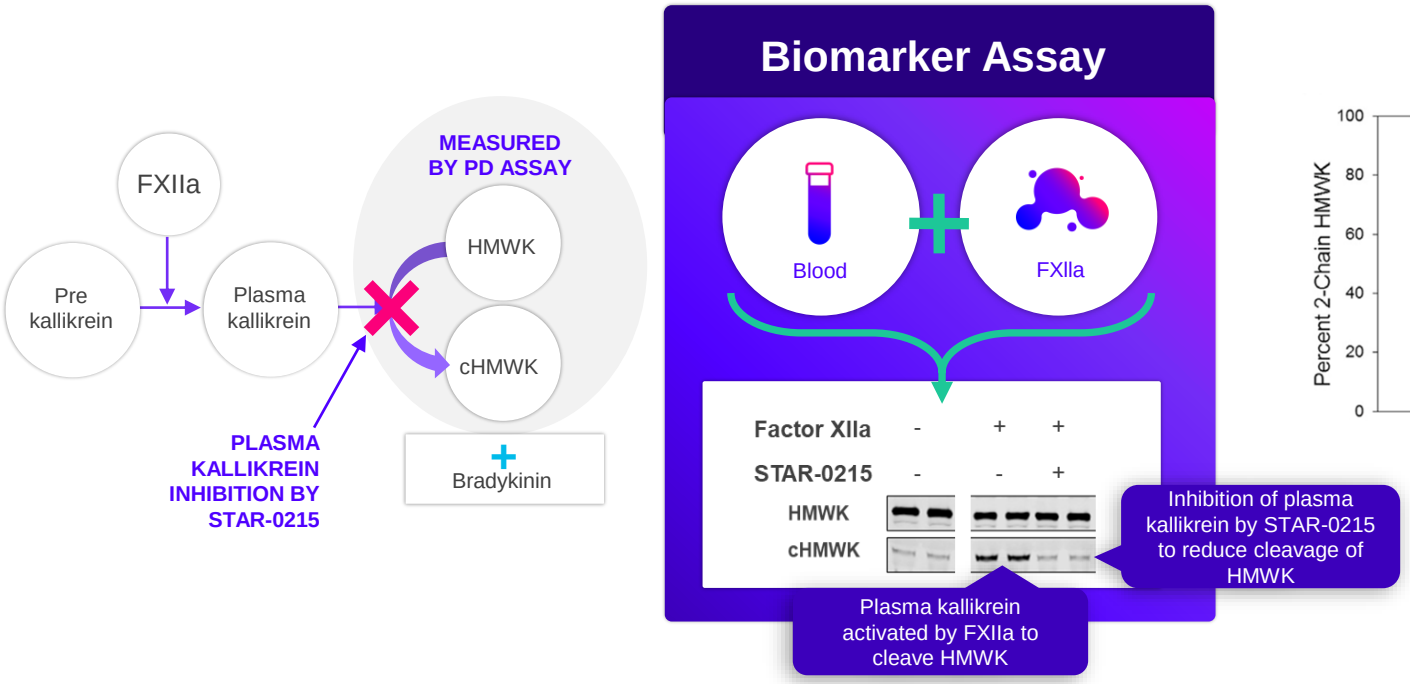
Mean (SD) concentrations over time
Results will be finalized after the end of the observation period

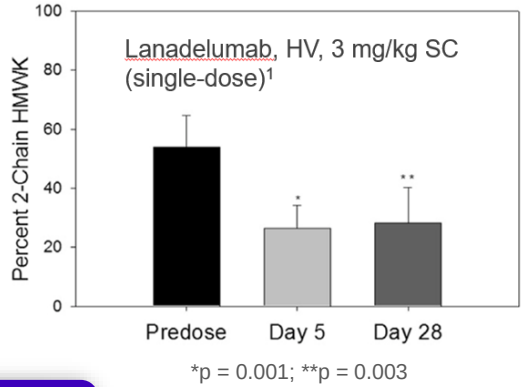
Modeling Supports Potential for Clinical Benefit with Infrequent Dosing



1. Kaufman 1991 June 15. Blood 77(12): 2660-2667
2. Wang et al. Clin Transl Sci. 2020 Nov, 13(6): 1208-1216. doi 10-1111/cts. 12806 Epub 2020 May 26.
3. Ecallantide EMA Assessment Report. 2011 June 23. EMA/CHMP/476618/2011

Target Engagement is Assessed by Change in FXIIa-Activated cHMWK



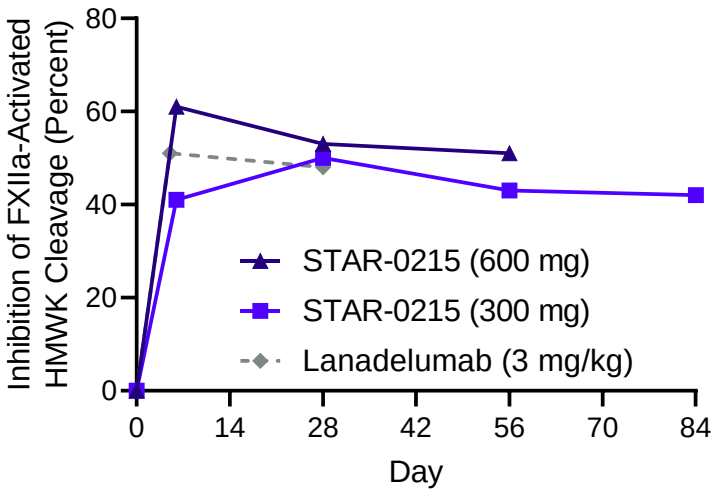


HMWK = high molecular weight kininogen
cHMWK = cleaved high molecular weight kininogen

FXIIa = activated Factor XII

1. Chyung et al, 2014
HV = healthy volunteer

Results Show STAR-0215 Achieves Sustained Inhibition of Plasma Kallikrein



- Levels of inhibition achieved (40-60% decreases in FXIIa-activated cHMWK) are consistent with the levels shown to prevent attacks in patients[1]
- Single dose of 300 mg leads to significant durable inhibition of plasma kallikrein observed through 3 months

No significant changes at any timepoints with placebo or 100 mg STAR-0215
Results will be finalized after the end of the observation period
1. Wang et al. Clin Transl Sci. 2020 Nov, 13(6): 1208-1216. doi 10-1111/cts. 12806 Epub 2020 May 26.
The comparison presented between STAR-0215 and lanadelumab represents a cross-trial comparison and does not involve data from a head-to-head clinical trial

Results Show Early Proof of Concept of STAR-0215 Achieved

- Safety and tolerability profile: STAR-0215 has shown a favorable safety profile and has been well-tolerated in healthy subjects
- Pharmacokinetics: Estimated half-life is up to 110 days, keeping concentrations of STAR-0215 sustained at levels consistent with clinical benefit in HAE for at least 3 months after a single dose
- Target engagement: STAR-0215 reduced FXIIA-activated cHMWK through at least 3 months to levels associated with clinical benefit in HAE

Future Plans

alpha-star Trial

Expect to Initiate Q1 2023, Initial Results Anticipated Mid-2024

DESIGN

- Phase 1b/2
- HAE patients, multiple sites, global
- Single and multiple dose SC cohorts
- Each qualifying participant will receive at least one dose of STAR-0215
- Each participant may roll into a long-term open label trial

PROOF OF CONCEPT (POC) GOALS:

- **Aim to:**
  - Demonstrate durable activity compatible with robust clinical benefit in people living with HAE
  - Inform the dose selection for the pivotal Phase 3 trial

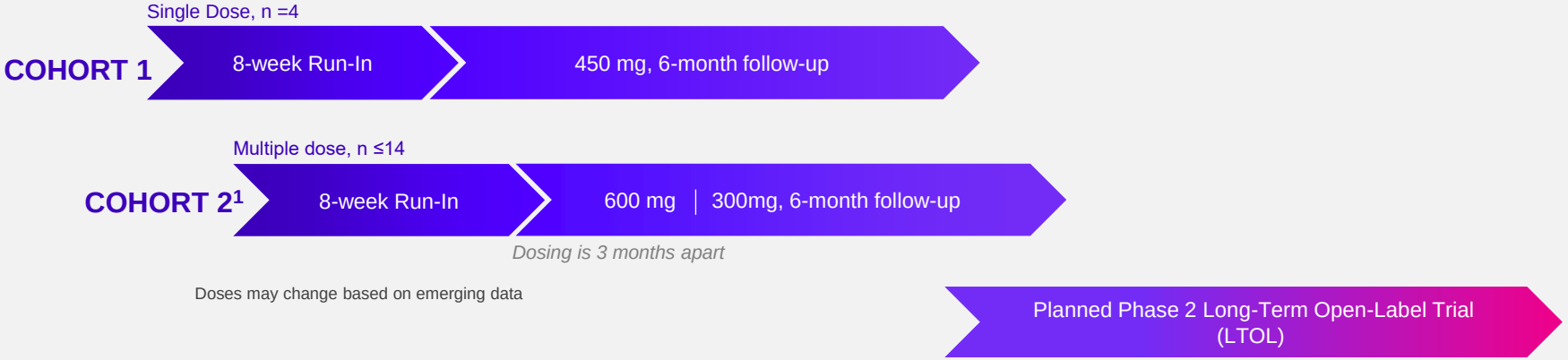
ALPHA-STAR: A Phase 1b/2 Single and Multiple Dose Study to Assess the Safety, Tolerability, Clinical Activity, Pharmacokinetics, Pharmacodynamics, and Immunogenicity of STAR-0215 in Participants with Hereditary Angioedema.

Proposed ALPHA-STAR Trial Design

Open-Label Single and Multiple Dose Phase 1b/2 POC Clinical Trial in HAE

PROOF OF CONCEPT ENDPOINTS:

PRIMARY:	Safety and Tolerability
SECONDARY:	Change from baseline in HAE attacks, PK, and PD
EXPLORATORY:	Angioedema Quality of Life Patient Reported Outcome Assessment

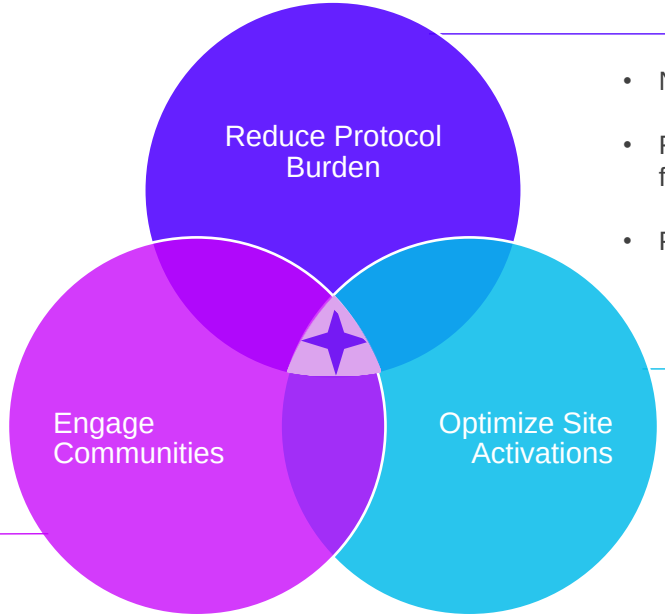


1. This cohort is expected to commence after a safety assessment of Cohort 1

ALPHA-STAR Optimizing Trial Conduct

Multifactor Approach for Operational Success

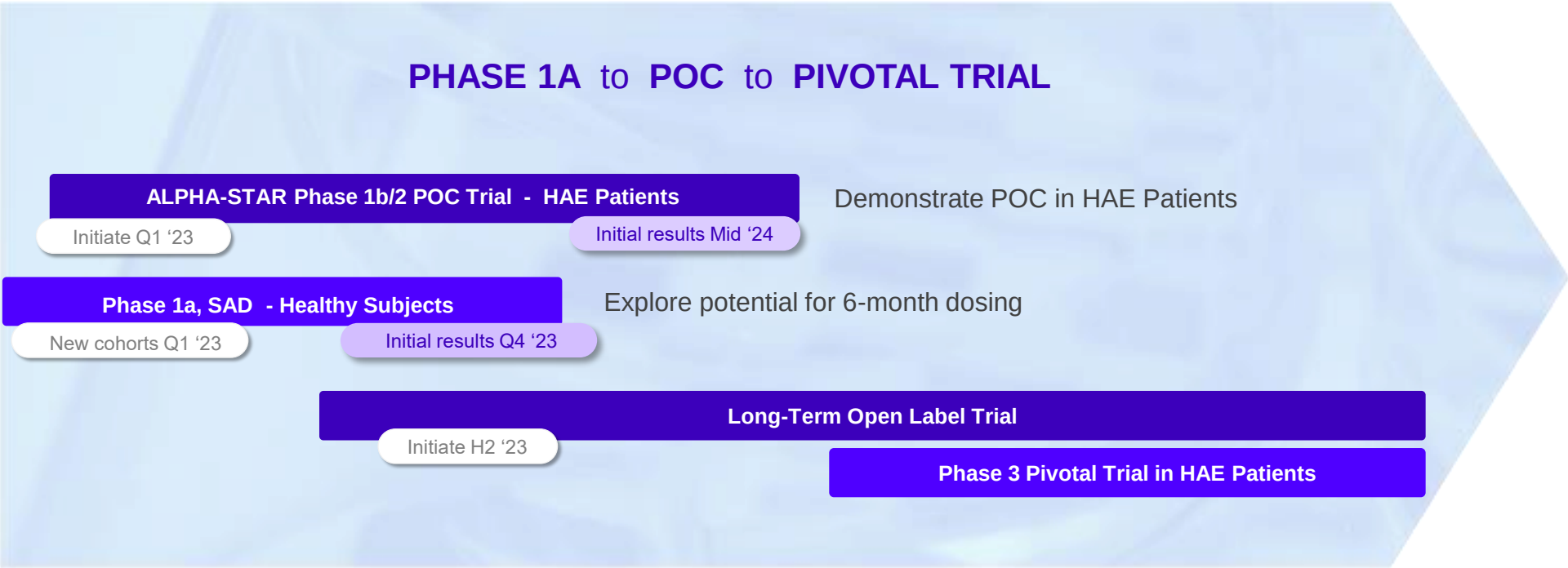
- Trial designed with feedback from patients and trialists
- Trial awareness and recruitment via partnerships with advocacy and clinical groups across patient, partner and caregiver communities
- LTOL trial may provide continued access to STAR-0215



- No placebo group
- Frequent remote contact and monitoring for support and engagement
- Personalized assistance for visits

- Global; multiple sites, focused on regions with efficient start-up processes
- Selection of countries optimized for trial's eligibility criteria

Overview of the Expected Clinical Development Plan



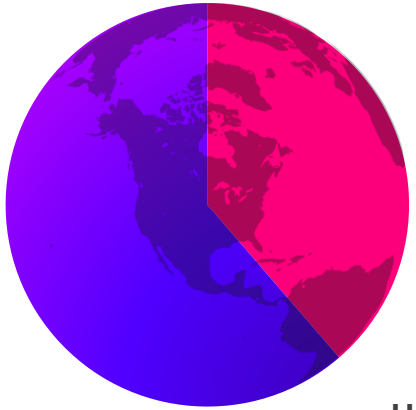
HAE Market Insights

Global HAE Treatment Market is Substantial and Growing

The HAE market is expected to nearly double by 2027[1,2], driven by:

- Patients being diagnosed earlier[3]
- More patients taking preventative treatments[4]
- Geographic expansion for currently available therapies[5]

2021 HAE Market[1]

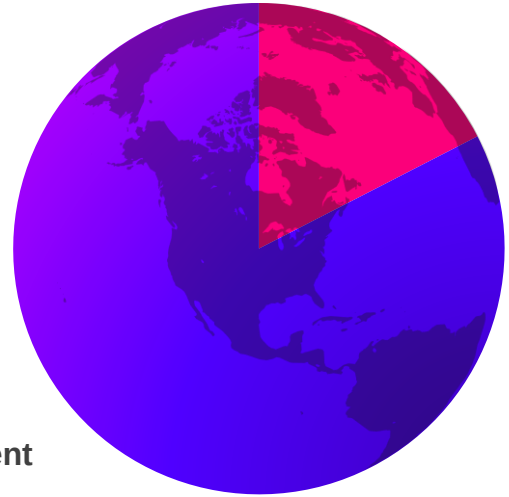


$2.3B

HAE Treatment

- Preventative
- On-Demand

2027 Estimated HAE Market[1,2]



$4.5B

1. Company-reported sales (Takeda, CSL Behring, Pharming, BioCryst)
2. Analyst consensus forecasts compiled by Clarivate's Cortellis, Astria company research and analysis.
3. Zanichelli A. Clin Transl Allergy. 2018: doi: 10.1186/s13601-018-0229-4
4. Astria company research and analysis
5. Company-reported expectations (Takeda, CSL Behring, BioCryst)

Approved and Late-Stage Preventative HAE Treatments

Approved Therapies

Product	Mechanism of Action	Administration	Mean Attack Reduction*	% of Attack- Free Patients
CINRYZE	Plasma derived C1-INH	2x/week	52%	18% (12 weeks)[1]
HAEGARDA	Plasma derived C1-INH	2x/week	88%	40% (16 weeks)[2]
TAKHZYRO *(lanadelumab)*	Plasma kallikrein inhibitor	1-2x/month	73-87%	31-44% (26 weeks)[3]
ORLADEYO *(berotralstat)*	Plasma kallikrein inhibitor	1x/day	30-44%	2-8% (24 weeks)[4]

Late-Stage Development Programs

Program	Mechanism of Action	Administration	Development Phase	Efficacy
garadacimab	Factor XIIa inhibitor	1x/month	3	TBD[5]
donidalorsen	Prekallikrein inhibitor	1x/1-2 months	3	TBD[6]

There remains a need for an effective, infrequent treatment that can help normalize the lives of people with HAE

*Efficacy quoted as reduction in mean attack rate vs placebo; data from respective products' Prescribing Information[1,2,3,7].

1. CINRYZE Prescribing Information, 2021.
2. HAEGARDA Prescribing Information, 2020.
3. TAKHZYRO Prescribing Information, 2018.
4. Center for Drug Evaluation and Research. NDA/BLA Multidisciplinary Review and Evaluation NDA 214094. Washington DC: CDER (US); 2020.
5. CSL Behring, 2022 Aug 17, Press release. https://www.cslbehring.com/newsroom/2022/positive-top-line-phase-3-results-for-garadacimab
6. IONIS 2021 Nov 18, Press Release. https://ir.ionispharma.com/news-releases/news-release-details/ionis-initiates-phase-3-clinical-program-donidalorsen-patients
7. ORLADEYO Prescribing Information 2020.

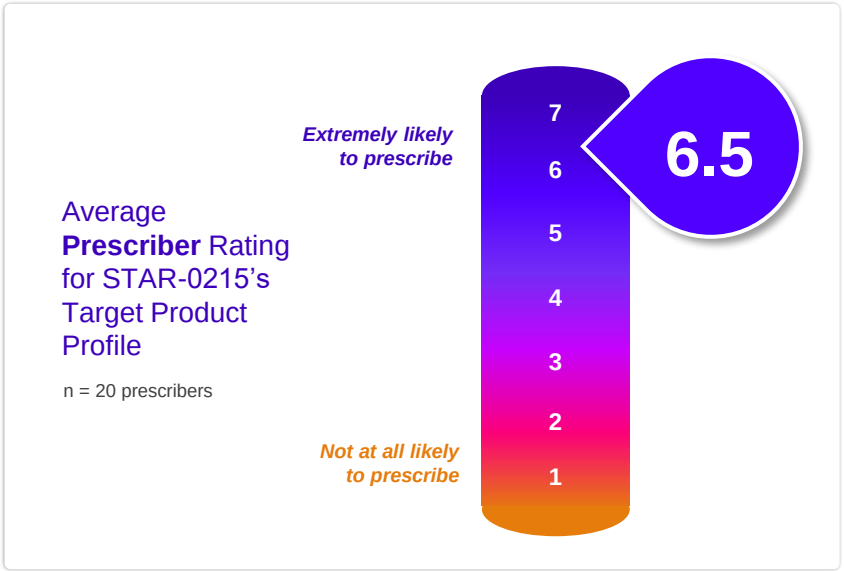
Interviewed HAE Treatment Providers Were Highly Motivated to Prescribe a Product With STAR-0215's Target Profile

Prescribers Viewed STAR-0215's Target Profile as the Potential Next Generation of HAE Treatment

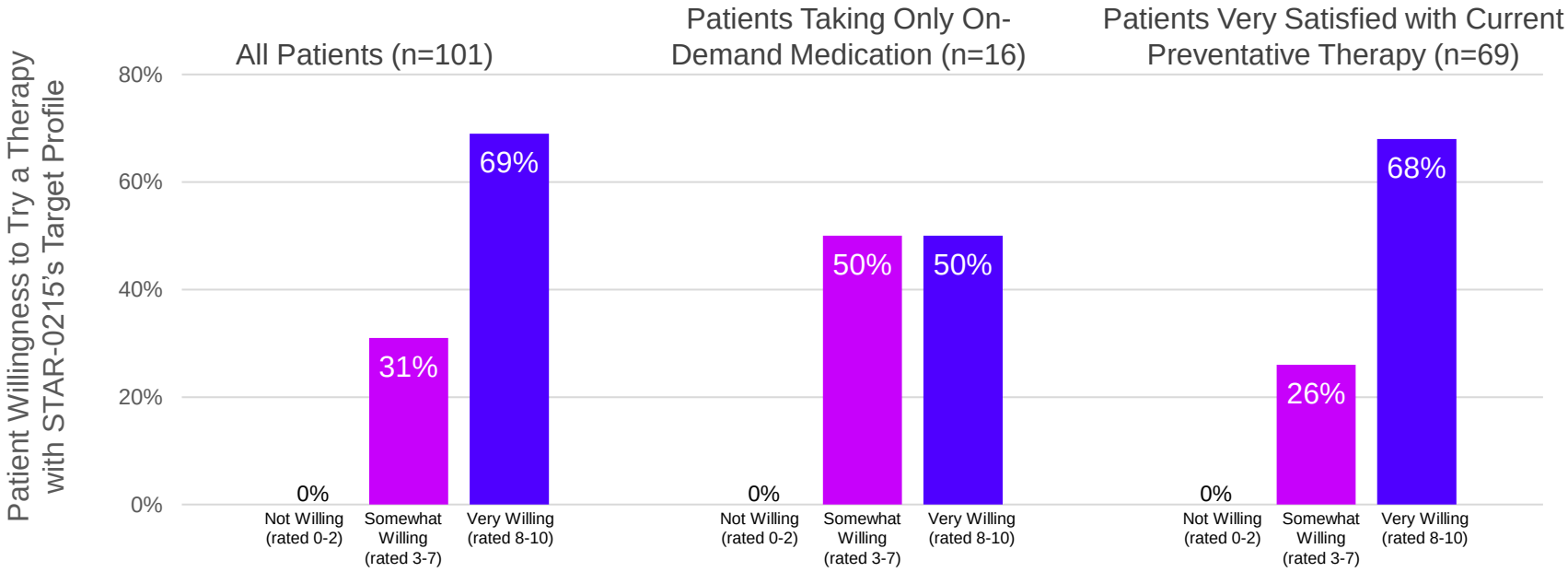
Blinded Product Profile

- A monoclonal antibody inhibitor of plasma kallikrein that helps prevent HAE attacks by suppressing the pathway that generates bradykinin and causes excessive swelling
- Efficacy on par with current subcutaneous therapies
- Dosing once every 3 months or longer

> *"[if this were available], this would be my first choice. I've looked through all the products [in development], this is the first one which is really exciting. This is a generation leap; anybody who is on medication now either daily, every three days, or every two or four weeks, why wouldn't they want to do this?"*
>
> *— HAE Prescriber 16*



All Surveyed HAE Patients Were Willing to Try a Product with STAR-0215's Target Profile



Willingness rated on a scale where "0" indicates "Not at all willing," and "10" indicates "Extremely willing."

Satisfaction with current treatment rated on a scale where "0" indicates "Not at all satisfied," and "10" indicates "Extremely satisfied." Ratings of 8-10 grouped as "Very Satisfied."

Astria proprietary blinded quantitative market research study (2022) with 101 HAE patients recruited by HAEA patient organization. Patients were screened for those currently taking preventative HAE therapy or having at least 1 attack every 3 months. Patients were shown a blinded profile of STAR-0215 with attributes shown on previous slide.

Early Proof of Concept for STAR-0215 for HAE and Expected Upcoming Milestones

STAR-0215 has shown early proof of concept for its target profile: long-acting preventative therapy for HAE, best-in-class PK profile, and dosing once every 3 months or less frequently

- Full results from 3-month data set to be presented at a scientific conference in Q1 2023

Progress to HAE patients

- Initiate Phase 1b/2 ALPHA-STAR trial Q1 2023
- Initial proof of concept results in HAE patients in mid-2024

STAR-0215 could potentially be dosed less frequently

Evaluate potential for 6-month dosing

- Initiate additional cohorts in Phase 1a healthy subject trial Q1 2023
- Initial results in Q4 2023

Astria's HAE patient market research indicates high interest in a preventative therapy like STAR-0215


astria
THERAPEUTICS