

EMPOWERING PATIENTS THROUGH KINOME INNOVATION

Corporate Overview

November 2023



Cautionary Note Regarding Forward-Looking Statements

Any statements contained in this presentation that do not describe historical facts may constitute forward-looking statements as that term is defined in the Private Securities Litigation Reform Act of 1995. These statements may be identified by words such as “anticipate,” “believe,” “expect,” “intend,” “may,” “plan,” “potential,” “will,” and similar expressions, and are based on Aclaris’ current beliefs and expectations. These forward-looking statements include expectations regarding the development of Aclaris’ drug candidates, including the timing of its clinical trials, availability of data from those trials, and regulatory filings, identification of novel development candidates through Aclaris’ KINect discovery engine, and its belief that its existing cash, cash equivalents and marketable securities will be sufficient to fund its operations through the end of 2025. These statements involve risks and uncertainties that could cause actual results to differ materially from those reflected in such statements. Risks and uncertainties that may cause actual results to differ materially include uncertainties inherent in the conduct of clinical trials, Aclaris’ reliance on third parties over which it may not always have full control, Aclaris’ ability to enter into strategic partnerships on commercially reasonable terms, the uncertainty regarding the macroeconomic environment and other risks and uncertainties that are described in the Risk Factors section of Aclaris’ Annual Report on Form 10-K for the year ended December 31, 2022, and other filings Aclaris makes with the U.S. Securities and Exchange Commission from time to time. These documents are available under the “SEC Filings” page of the “Investors” section of Aclaris’ website at www.aclaristx.com. Any forward-looking statements speak only as of the date of this presentation and are based on information available to Aclaris as of the date of this presentation, and Aclaris assumes no obligation to, and does not intend to, update any forward-looking statements, whether as a result of new information, future events or otherwise.

This presentation also contains estimates and other statistical data made by independent parties and by us relating to market size and other data about our industry. These data involve a number of assumptions and limitations, and you are cautioned not to give undue weight to such 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.

Biotechnology Company Focused on the Kinome

People + Platform + Pipeline

Leadership

Scientific Discovery led by World Class Kinase Expertise

- Kinome experts skilled at developing novel kinase targeted medicines

Proven Operational and Clinical Development Leadership Team in Place

KINect® Platform

Proprietary Kinase Discovery Engine

- Versatile discovery platform
- Fully integrated discovery and development team
- Advancing small molecule drug candidates designed to parallel or exceed efficacy of high-value biologics

Innovative Pipeline (investigational drug candidates)

Zunsemetinib (ATI-450) - MK2i

- Oral anti-TNF α , anti-IL17, anti-IL1, anti-IL6

ATI-1777 - Topical “Soft” JAK1/3i

- Tissue specific therapy

ATI-2138 - ITK/JAK3i

- Oral dual inhibitor of T cell and cytokine receptors

Development of Small Molecule Therapeutics for Immuno-inflammatory Diseases

Note: KINect® is the registered trademark of Aclaris Therapeutics, Inc.

The Kinase Opportunity

Unlocking the Potential of the Kinome

Medically Important and Productive Target Class

Oncology

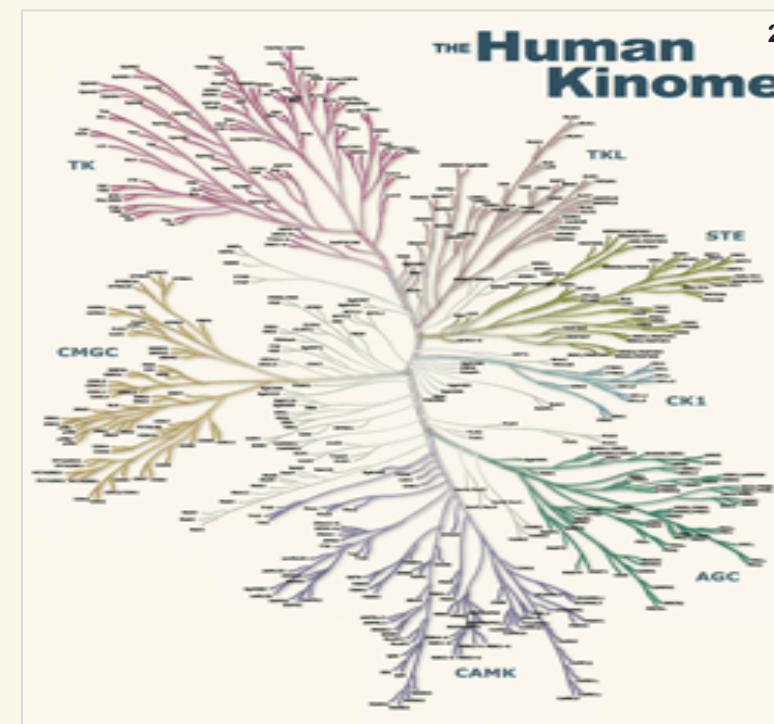


Non-Oncology



Global kinase inhibitors market valued at >\$57B in 2021
Estimated to reach >\$95B by 2030¹

Most Members of the Kinome Remain Unexplored



518 Members
>90% of the Human Kinome remains undrugged³

Creating New Medicines Targeting Previously Inaccessible Kinome Targets

Note: All trademarks are the property of their respective owners.

1. Spherical Insights. Accessed October 24, 2023. <https://www.sphericalinsights.com/reports/kinase-inhibitors-market> 2. Manning G, et al. Science. 2002;298(5600):1912-1934; 3. Oprea TI, et al. Nat Rev Drug Discov. 2018;17(5):317-332.

Precision Immunology with the KINect Platform

Demonstrated Success in Reversible and Covalent MOA

MK2 Inhibitors

- Zunsemetinib (ATI-450), ATI-2231: Oral anti-TNF, anti-IL17, anti-IL1, and anti-IL6
- Novel approach for a difficult to target kinase
- Broad potential in several immuno-inflammatory diseases

Unique kinase complex inhibitor

Tissue Restricted JAK Inhibitors

- ATI-1777: Skin specific (Soft) topical JAK1/3
- Goal: Comparable clinical efficacy with improved safety profile

Tailoring physico-chemical and potency properties

Covalent ITK Inhibitors

- ATI-2138: ITK/JAK3 Oral T cell kinase inhibitor for autoimmune diseases

Covalent inhibition for difficult-to-target kinase

Small Molecule Therapeutics Targeting Multi-billion Dollar Immunology and Inflammation Markets

Drug Development Pipeline

Drug Candidate / Program	Target	Route of Administration	Indication	Development Phase	Topline Data Expected
Immuno-Inflammatory Diseases					
Zunsemetinib (ATI-450)	MK2 inhibitor	Oral	Rheumatoid arthritis (moderate to severe)	Phase 2b	Nov. 2023
			Psoriatic arthritis (moderate to severe)	Phase 2a	1H 2024
ATI-1777	“Soft” JAK 1/3 inhibitor	Topical	Atopic dermatitis (mild to severe)	Phase 2b	~YE 2023
ATI-2138	ITK/JAK3 inhibitor	Oral	T cell-mediated autoimmune diseases	Phase 2 Ready	-
Oncology					
ATI-2231	MK2 inhibitor	Oral	Metastatic breast cancer	Phase 1a	*
			Pancreatic cancer		

* This is an investigator-initiated Phase 1a trial in patients with advanced solid tumor malignancies sponsored by Washington University.

Zunsemetinib (ATI-450): MK2 Inhibitor

(Investigational Drug Candidate)

Evolution in Understanding of a Well-Known Path

The Path From p38 α to MK2

p38 α was initially targeted for suppressing TNF α and other pro-inflammatory cytokines



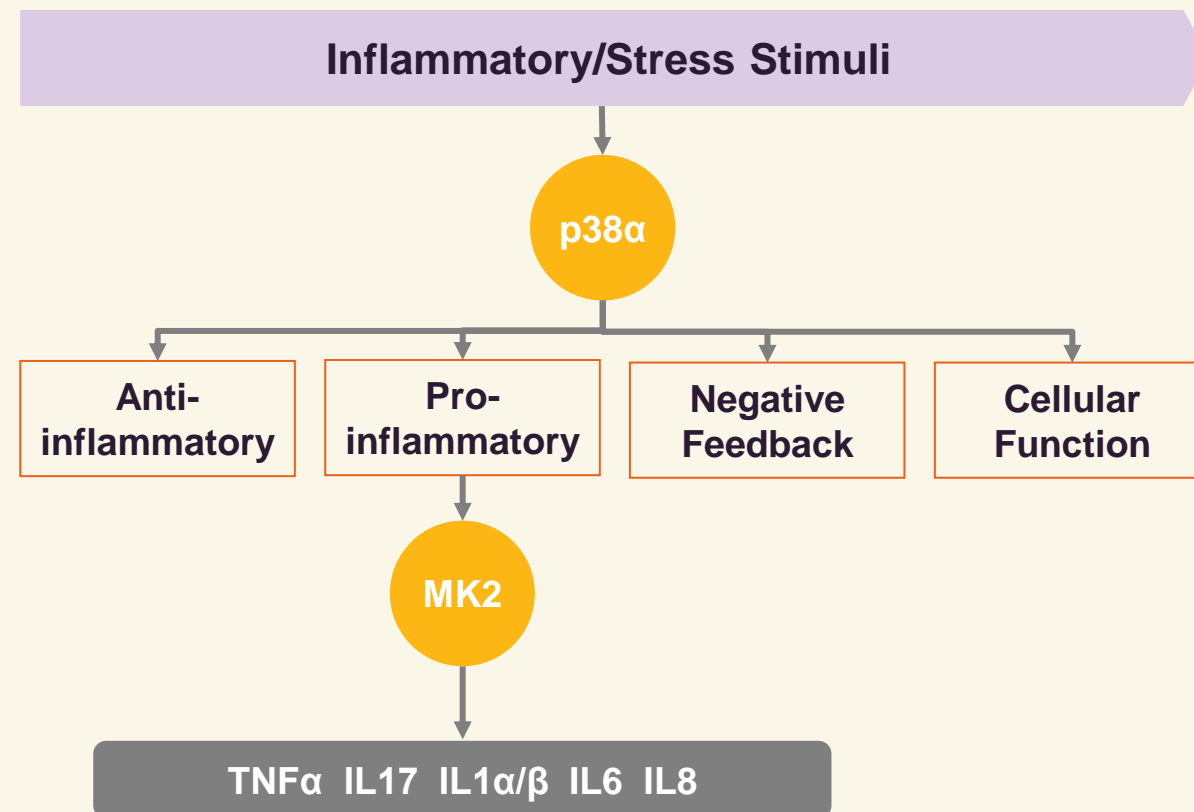
Global p38 α inhibitors have exhibited toxicity and/or lack of sustained efficacy “tachyphylaxis” in RA and IBD



p38 α phosphorylates over 60 substrates — yet MK2 drives the pro-inflammatory node of this pathway

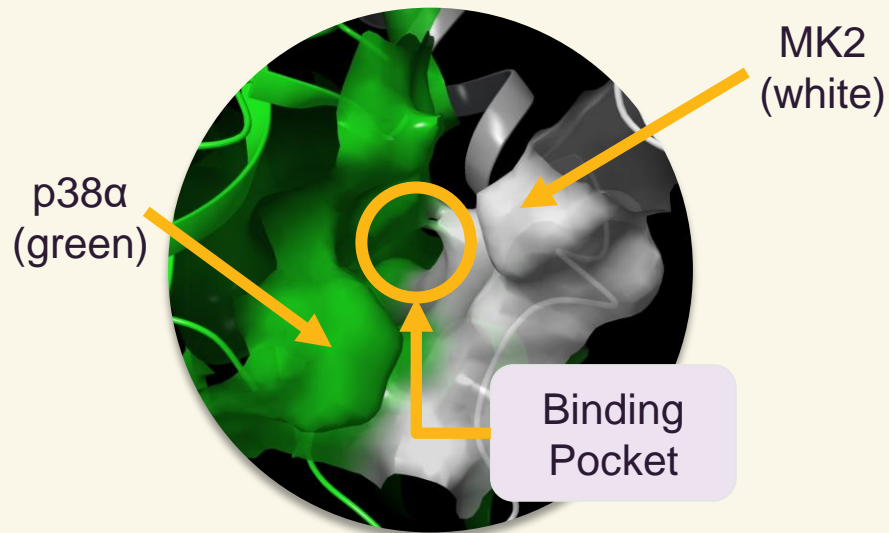


MK2 has been a high priority therapeutic target since 1999 but has proven very difficult to drug

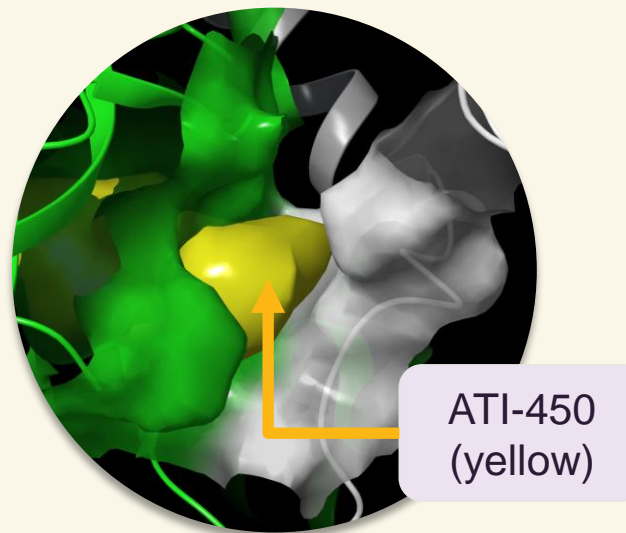


Note: Wang C, et al. J Exp Med. 2018;215(5):1315-1325; Cheung P, et al. EMBO J. 2003;22(21):5793-5805; Muniyappa H, et al. Cell Signal. 2008;20(4):675-683; Ma W, et al. J Biol Chem. 2001;276(17):13664-13674.

Novel Mechanism: Locking MK2 in an Inactive State



Crystal structure of the p38α/MK2 complex



Zunsemetinib (yellow) docked in the pocket

- In the nucleus, inactive MK2 and p38α dock in a high affinity complex that generates a binding pocket formed by juxtaposed walls of both proteins
- Zunsemetinib binds to both walls of the pocket, stabilizing the complex and preventing MK2 activation

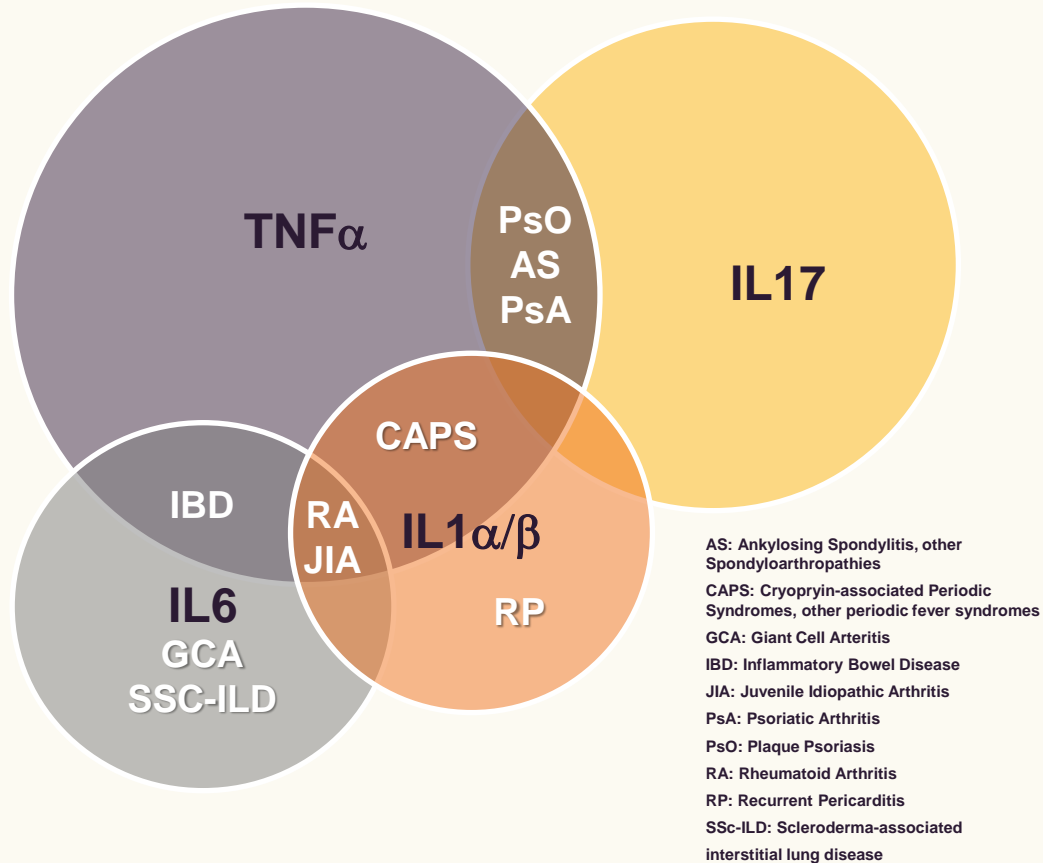
Zunsemetinib locks MK2 in a catalytically inactive state – a unique MOA

Note: Wang C, et al. J Exp Med. 2018;215(5):1315-1325.

Zunsemetinib: Investigational Small Molecule, Oral MK2 Inhibitor

Designed to Block the Targets of Broadly-Used Biologics

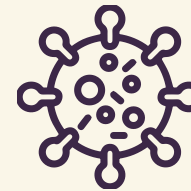
Inhibiting MK2 blocks $\text{TNF}\alpha$, IL17 , $\text{IL1}\alpha/\beta$ and IL6^1 , the targets of commercially successful biologics



MK2 drives pro-inflammatory cytokine expression



By inhibiting multiple cytokines, zunsemetinib may be a potential treatment for multiple diseases



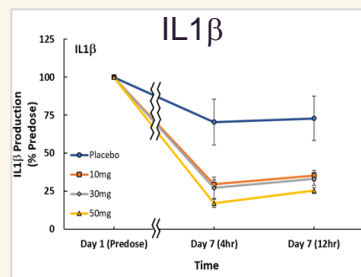
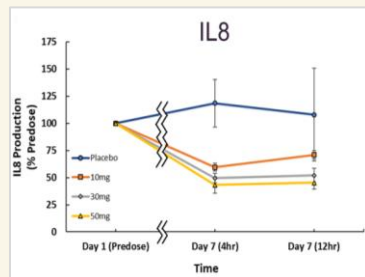
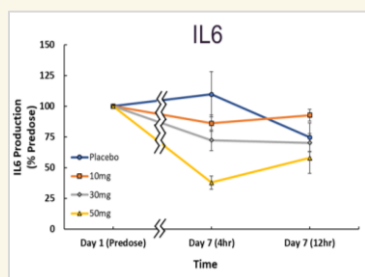
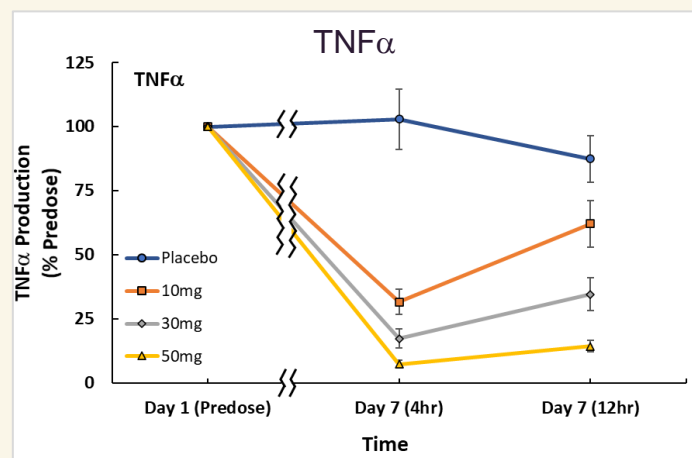
Potential alternative to injectable, anti-cytokine biologics and JAK inhibitors for immuno-inflammatory diseases

Global immunology market valued at >\$97B in 2021²

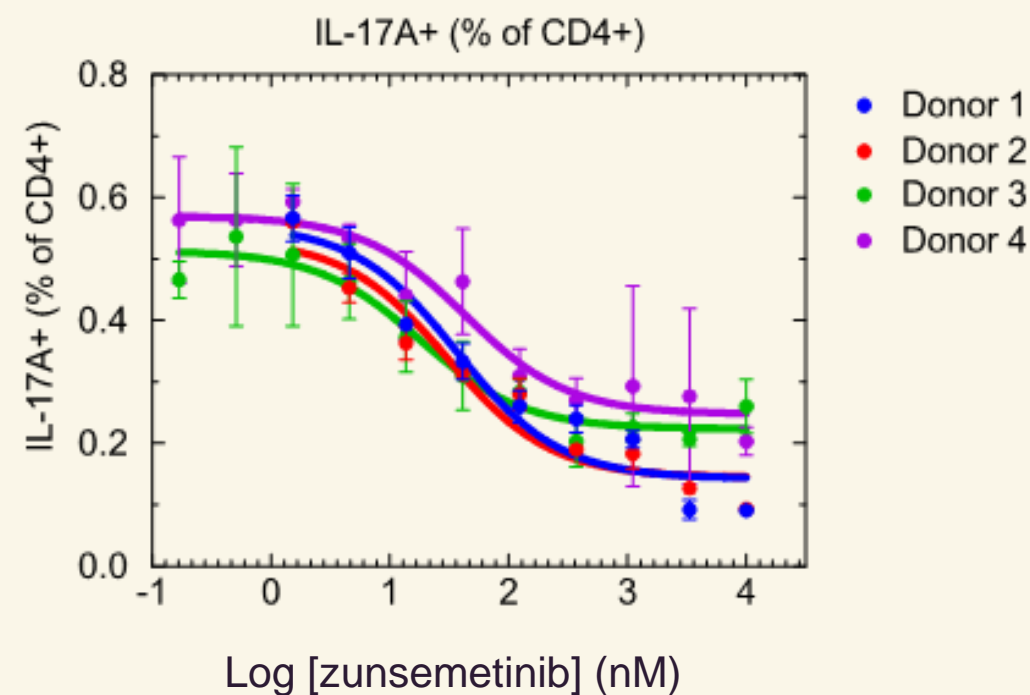
1. Data on file; 2. Fortune Business Insights. Accessed January 4, 2023. <https://www.fortunebusinessinsights.com/industry-reports/immunology-market-100657>;

Zunsemetinib Demonstrated Strong Inhibition Across Key Cytokines

Zunsemetinib dosed orally BID for 7 days in healthy subjects at doses of 10, 30 or 50 mg in Phase 1



hPBMC treated with antiCD3/28 for 72 hr in-vitro



Note: Data on file

Zunsemetinib Phase 2a Trial in Rheumatoid Arthritis

Summary of Clinical Data

Potent and Durable Clinical Efficacy with 50mg

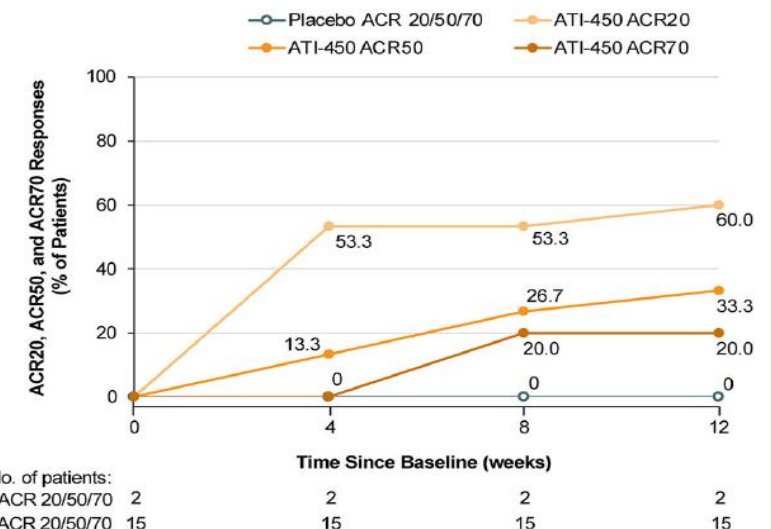
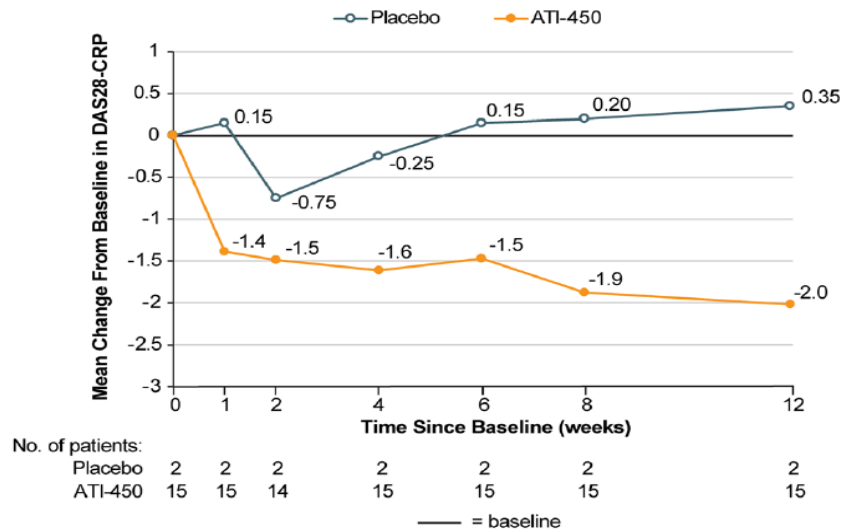
Main Objectives of POC Study were addressed

Potent and durable clinical efficacy with 50mg BID

Zunsemetinib was generally well tolerated over a 12-week period

- DAS-28-CRP reduction persisted
- ACR effect comparable to effective mechanisms
- hsCRP reduction maintained

Summary of Efficacy Endpoints



Phase 2 Clinical Development: Zunsemetinib

Hidradenitis Suppurativa 12-week Phase 2a randomized trial

Final trial size: 95 subjects

Dose arms: Randomized 1:1 to
zunsemetinib 50 mg BID
and placebo

Entry criteria:
Moderate-severe HS

Topline Data Announced:
March 2023

Rheumatoid Arthritis 12-week Phase 2b randomized trial

Final trial size: 251 subjects
(enrollment complete)

Dose arms: Randomized 1:1:1
to zunsemetinib 50 mg BID, 20
mg BID and placebo

Entry criteria: Moderate-severe
RA on methotrexate

Expected Topline Data:
November 2023

Psoriatic Arthritis 12-week Phase 2a randomized trial

Expected trial size: 70 subjects

Dose arms: Randomizing 1:1 to
zunsemetinib 50 mg BID
and placebo

Entry criteria: Moderate-severe
PsA unresponsive to ≥ 1 non-
biologic DMARD

Expected Topline Data:
1H 2024

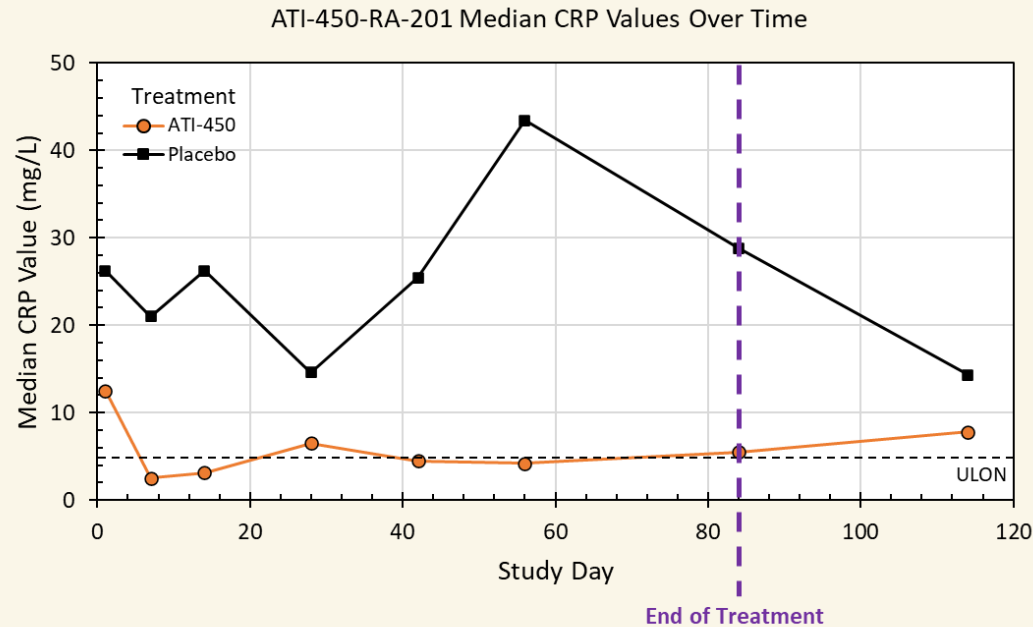
Hidradenitis Suppurativa Phase 2a Preliminary Topline Data Summary

Preliminary topline data announced in March 2023

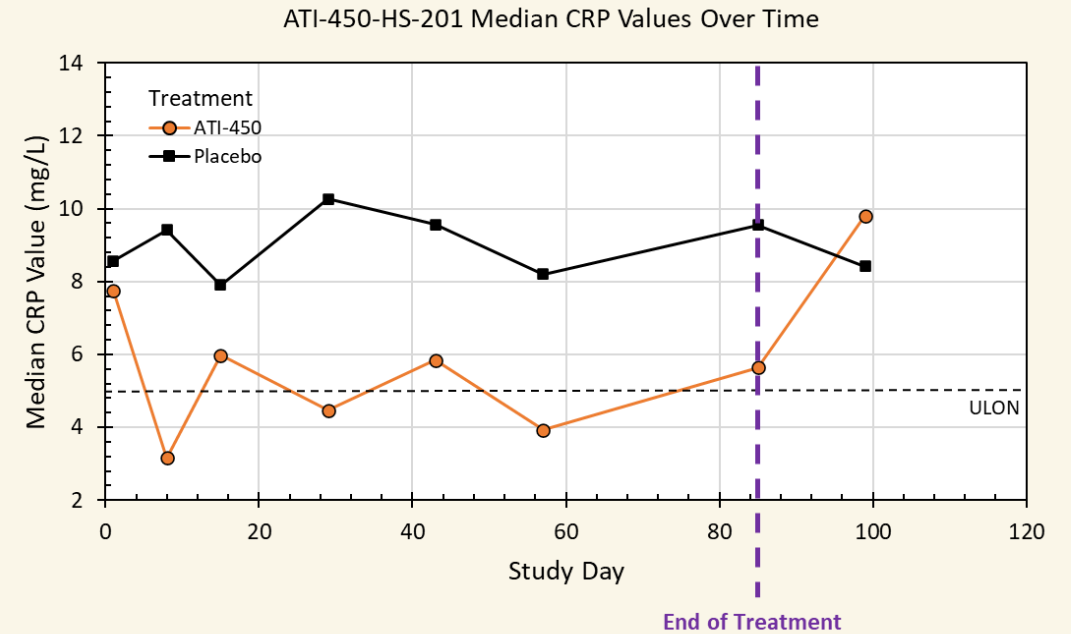
- Zunsemetinib in HS did not meet any primary or secondary efficacy endpoints
- PD profile of zunsemetinib in trial demonstrated activity generally consistent to that observed in prior studies of zunsemetinib
 - ✓ In a subset of patients, ex vivo stimulated cytokines demonstrated knock-down consistent with prior RA trial at both Day 1 and Day 85 demonstrating no tachyphylaxis
 - ✓ Although endogenous cytokines in HS patients were, as expected, not significantly elevated relative to healthy donors, zunsemetinib reduced levels to near those of healthy donors
- Safety profile of zunsemetinib bolstered
 - ✓ No serious adverse events, no serious or opportunistic infections, no end organ toxicity
 - ✓ Discontinuations due to adverse events were largely associated with lack of clinical efficacy
- CPK elevations were relatively balanced (15 patients on zunsemetinib vs. 11 on placebo)
 - ✓ CPK elevations were either minor or generally transient in nature and resolved on continued treatment
 - ✓ None were accompanied by any related signs or symptoms (i.e.: muscle weakness, cardiac)

Zunsemetinib Treatment Resulted in a Sustained Inhibition of CRP in both RA-201 and HS-201 Studies

RA Phase 2a Study



HS Phase 2a Study



Sustained inhibition of plasma CRP in HS patients was observed with zunsemetinib treatment similar to that observed in the RA-201 Phase 2a study

ATI-1777 (Topical “Soft” JAK Inhibitor)

(Investigational Drug Candidate)



Aiming to Develop an Effective and Safe Therapy for Atopic Dermatitis

Atopic dermatitis (AD) is a chronic, pruritic inflammatory skin condition¹

- The U.S. prevalence of AD is reported to be 11.3–12.7% in children and 6.9–7.6% in adults²
- Market projected to be \$8-12 billion at peak (moderate to severe AD)³
- Systemic and topical JAK inhibition has demonstrated promising results in AD clinical trials⁴

Goal

- Comparable efficacy to other topical JAKis but a “soft” drug to minimize the potential for systemic toxicities
- JAK1/3 selective to minimize JAK2 mediated hematopoietic effects
- Patients with mild to severe AD
- Deliver in a patient-friendly formulation

ATI-1777

(investigational compound)

- First-in-human Phase 2a trial in subjects with moderate to severe AD completed
- Phase 2a - 4-week trial in subjects with moderate to severe AD completed with primary endpoint of % change from baseline in mEASI
- Phase 2b – 4-week dose ranging trial underway in subjects with mild to severe AD, including children down to 12 years

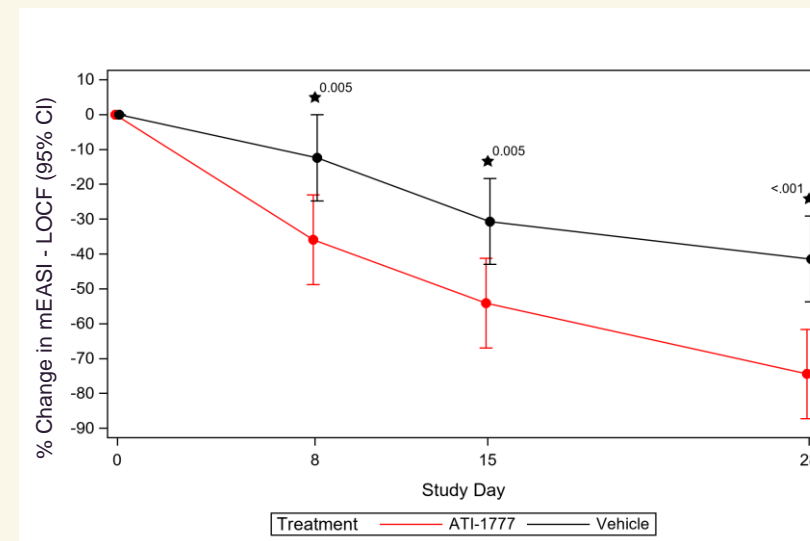
1. Medscape. Accessed January 7, 2023. <https://emedicine.medscape.com/article/1049085-overview>. 2. Silverberg J. Dermatol Clin. 2017;Jul;35(3):283-289; 3. Auster M, et al. Something Big Is Getting Bigger [research note]. Credit Suisse Equity Research; 2019; 4. Shreberk-Hassidim R, et al. J Am Acad Dermatol. 2017;Apr;76(4):745-753.

Positive Data Demonstrated in ATI-1777 Phase 2a Study in Atopic Dermatitis

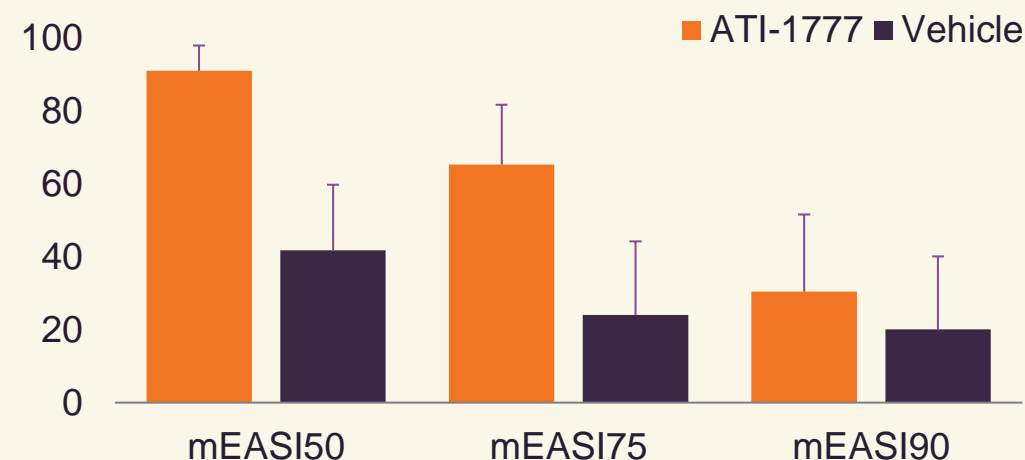
Phase 2a Trial Highlights

- ATI-1777 achieved statistically significant result in the primary efficacy endpoint at week 4
- Positive trends were observed in secondary endpoints including improvement of itch, percent of mEASI-50 responders, IGA responder analysis and reduction in BSA impacted by disease
- ATI-1777 was generally well tolerated

Primary Efficacy Endpoint:
% Change in mEASI – LOCF (FAS)



Secondary Efficacy Endpoint:
mEASI50/75/90 at Day 28 (FAS)

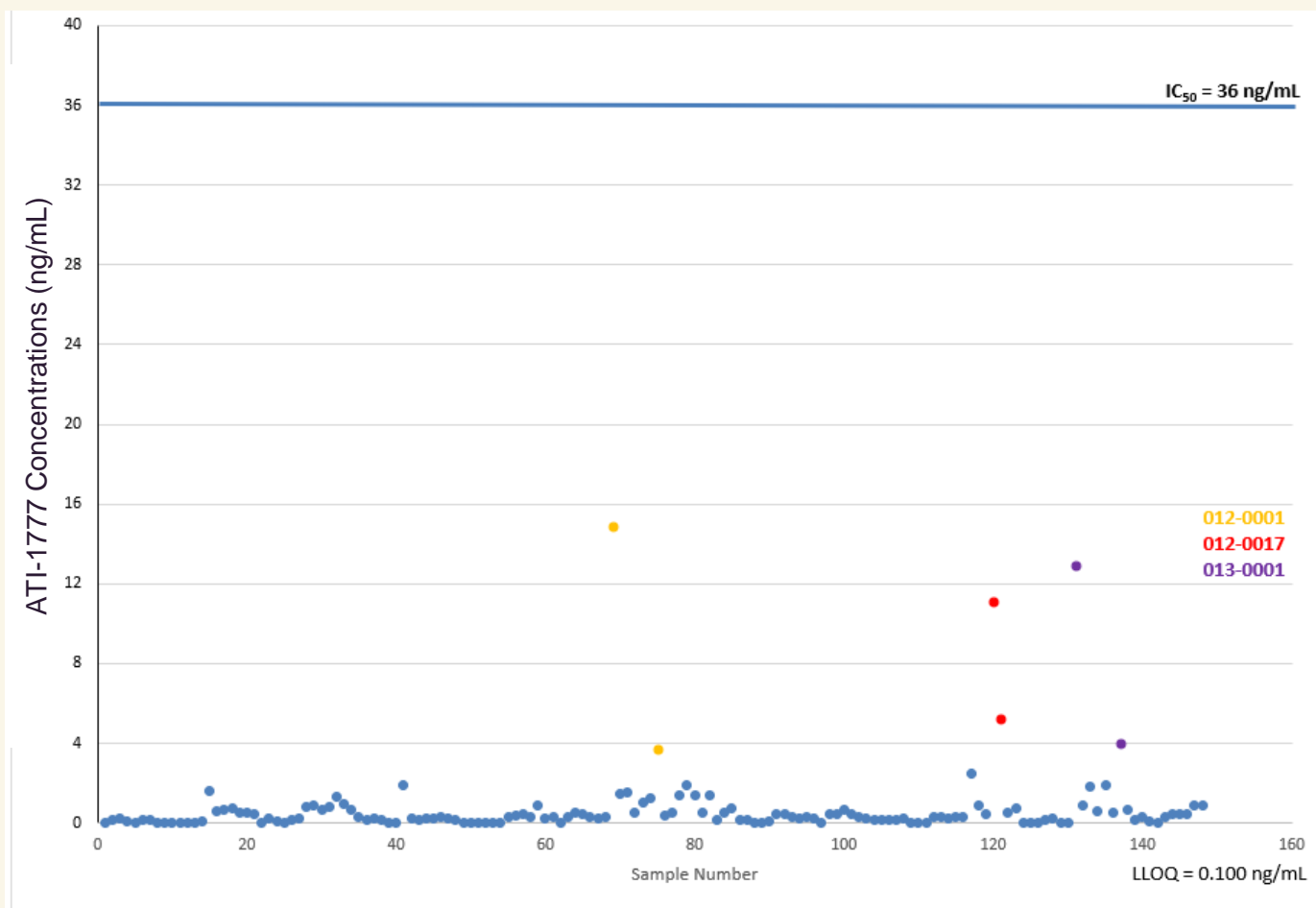


Note: (FAS): Full Analysis Set

Trial details: 50 patients with AD were randomized and 48 were treated. Two patients in the ATI-1777 group and 7 patients in the vehicle group discontinued treatment early. Overall, 95.8% of patients had moderate AD. Baseline mEASI was 8.63 (ATI-1777) and 7.68 (placebo).

Low Plasma Levels of ATI-1777 Following Topical Application

PK Plasma Concentrations of ATI-1777 in Subjects



Note: Data on file

- >86% of samples tested following ATI-1777 administration exhibited blood levels below the detectable level
- Average concentration in subjects receiving ATI-1777 solution was never >5% the IC_{50}
- Only 3 subjects (6 out of 148 total samples) with concentrations > 1/10th the IC_{50}

ATI-1777 Status

Positive Proof of Concept First in Human Study

- Moderate to Severe Atopic Dermatitis
 - ✓ Traditionally the domain of systemic therapy
- Rapid and continuing improvement over 4 weeks
- PK supports lack of systemic drug penetration
- Generally, well tolerated

Potential Positioning in Mild to Severe Atopic Dermatitis

- Monotherapy
- Combination therapy with biologics to potentially drive improved efficacy¹

Licensing Agreement with Pediatrix Therapeutics for Greater China

Phase 2b Data Upcoming in Mild to Severe Atopic Dermatitis (~Year End 2023)

1. Reich, Teixeira, Bruin-Weller, Bieber, Lancet 397, Issue 10290, P2169-2181, June 5, 2021
Note: Data on file

ATI-2138 (ITK/JAK3 Inhibitor)

(Investigational Drug Candidate)



ATI-2138: Combined IL-2-Inducible Tyrosine Kinase (ITK) & JAK3 Inhibitor for Autoimmune Disease

- ATI-2138 is an oral compound which interrupts T cell receptor (TCR) signaling by inhibiting ITK and JAK3 signaling of common γ chain cytokines in lymphocytes (including IL-2 & IL-15)
- ATI-2138 potently and selectively inhibits ITK and JAK3 (with some activity at TXK)
- ATI-2138 has demonstrated the prevention of inflammation in animal models of colitis and arthritis
- Safety, pharmacology and toxicology studies have been completed and support further development
- Phase 1 SAD and MAD studies in healthy volunteers have been completed
 - ✓ ATI-2138 was generally well tolerated and no serious adverse events were reported
 - ✓ PK was dose proportional with adequate exposure to block ITK and JAK3 in PD biomarker assays
- Aclaris is evaluating ATI-2138 for the potential treatment of a number of T cell-mediated autoimmune diseases
- A Phase 2a ulcerative colitis trial is in protocol development and operational preparations are under way

The unique pharmacological profile of ATI-2138 provides opportunity for differentiation

ATI-2138 Multiple Ascending Dose: Preliminary Data Summary

Safety

- ATI-2138 was generally well tolerated at all doses tested in the trial.
- No serious adverse events were reported.
- The most common adverse events in subjects treated with ATI-2138, and the only events occurring in more than 1 subject, were headache (2 subjects on 5 mg BID, 1 on 40 mg BID, all mild, resolved) and diarrhea (2 subjects on 5 mg BID— both single episodes, both mild).

Pharmacokinetics

- ATI-2138 was rapidly absorbed and cleared from the human body.
- Multiple doses ranging from 10 to 80 mg daily over two weeks in healthy volunteers showed linear PK and dose-dependent increases in exposure.
- At 30 mg daily, ATI-2138 plasma concentration reached the targeted level established using preclinical data.

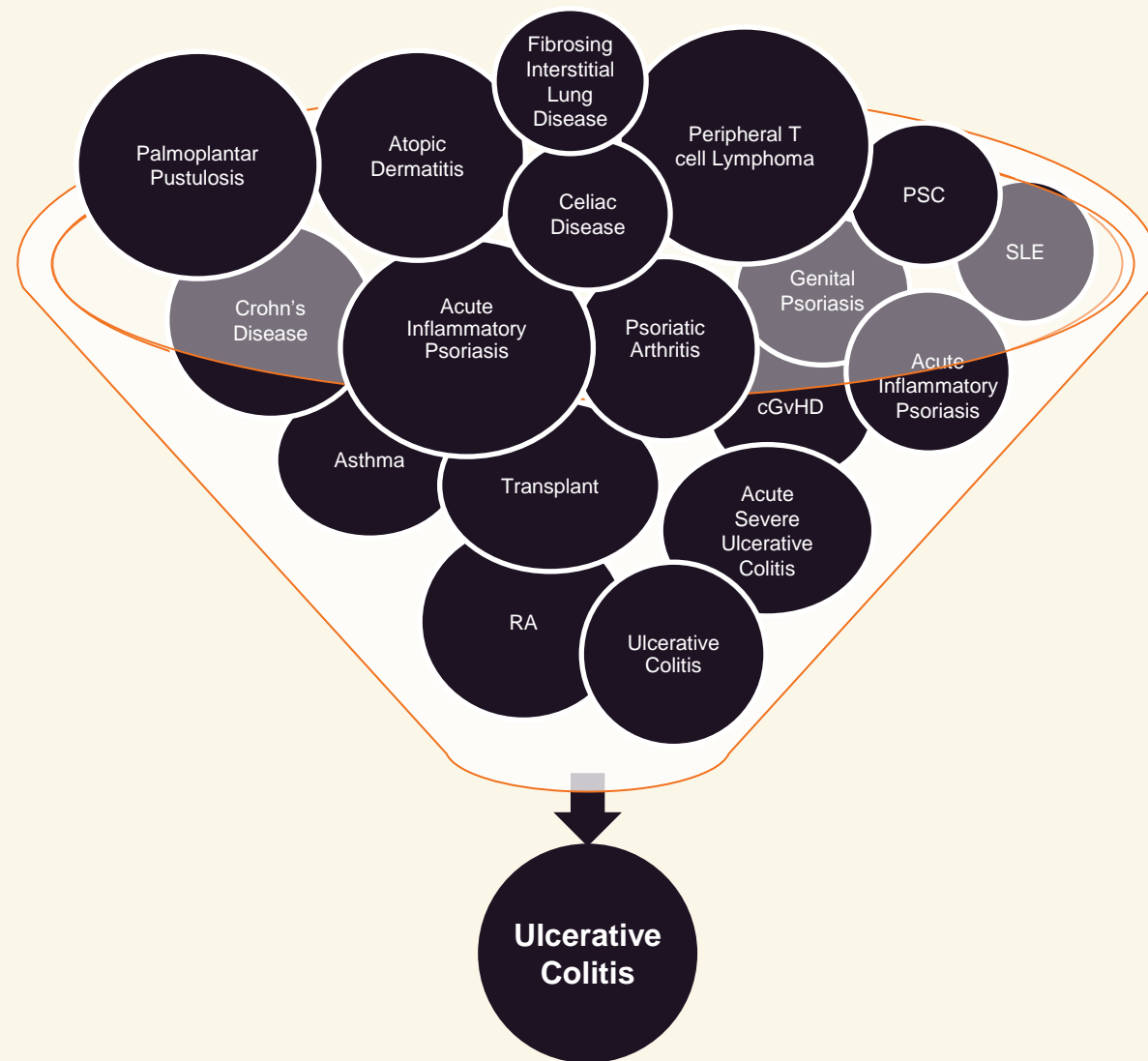
Pharmacodynamics

- Dose-dependent inhibition of both ITK and JAK3 exploratory PD biomarkers was observed.
- Near complete inhibition of the dual ITK and JAK3-stimulated IFN γ protein production was observed at 15 mg BID, with minimal incremental benefit at higher doses.

Wide Array of Disease Targets for ATI-2138

Ulcerative Colitis Selected as First Indication for Proof of Concept

- Genetic linkage of the ITK locus to a murine model of disease¹
- Elevated expression of ITK in colonic mucosa of UC patients¹
- Similar T cell signaling of pathway of cyclosporine, a successful treatment for US that bears significant toxicity risks
- Continued need for new treatment approaches in UC, with increasing incidence and prevalence expected in the future²



1. Gastroenterology 2021; 161:1270-87; 2. Lancet GI&Hep, 2020. 5(1)17-30.

Corporate Highlights



Empowering Patients Through Kinome Innovation



Executive Team

Proven track record of R&D, business development and scientific leadership in immuno-inflammatory diseases



KINect Technology Platform

Proprietary discovery engine enables targeted design of novel drug candidates



Pipeline

Multiple therapeutic programs ranging from discovery to clinical development



Intellectual Property

Global IP estate



Financial Strength

Ended Q3 2023 with \$187M of cash, cash equivalents and marketable securities and cash runway expected through end of 2025



Commitment to Patients

Focus on addressing the needs of patients with immuno-inflammatory diseases who lack satisfactory treatment options

Q3 2023 Financial Results Highlights

**Q3 2023 total revenue
of \$9.3M**

- Primarily consists of licensing revenue from out-licenses

**Q3 2023 net loss of
\$29.0M**

- Research and development expense increased by \$0.2M, driven by
 - Increase in ATI-2138 Phase 1 development expenses, including a Phase 1 MAD trial
 - Increase in personnel and stock-based compensation
 - Partially offset by a decrease in zunsemetinib costs associated with completion of HS trial
- General and administrative expense increased by \$1.3M, driven by
 - Increase in personnel and stock-based compensation

**Financial Strength –
Cash runway through
the end of 2025**

- As of September 30, 2023 cash, cash equivalents and marketable securities balance of \$187M

Experienced Leadership Team



Douglas Manion
Chief Executive
Officer

Over 25 years
Pharmaceutical
Industry Experience

Former EVP of
R&D at Arena
Pharmaceuticals

Former CEO of Kleo
Pharmaceuticals

Former R&D
leadership roles at
BMS, GSK and
DuPont
Pharmaceuticals



Joseph Monahan
Chief Scientific
Officer

Over 35 years
pharmaceutical
research experience

Lead Founder and
Former CSO of
Confluence Life
Sciences

Former Pfizer Leader
of Global Kinase Team

> 100 publications and
patents (>30 total on
kinases)



Matthew Rothman
General Counsel

Over a decade of legal
leadership experience

Former corporate
and securities group
associate at Dechert
LLP



Gail Cawkwell
Chief Medical
Officer

Pediatric
rheumatologist and
epidemiologist with
over 20 years of
pharmaceutical
development and
medical affairs
experience

Former SVP of
Medical Affairs and
Safety at Intercept
Pharmaceuticals

Former leadership
roles at Pfizer and
other pharmaceutical
companies



Kevin Balthaser
Chief Financial
Officer

Over 13 years of
financial leadership
including 10 years in
the pharmaceutical
industry

Former accounting and
finance roles at
Lannett Company, Inc.
and Pricewaterhouse
Coopers, LLP.

Certified Public
Accountant




James Loerop
Chief Business
Officer

Over 30 years of large
pharma and biotech
business development
experience

Former EVP of BD and
Strategic Planning at
Anika Therapeutics

Former Business
Development
leadership roles at
Alexion, GSK and
Stifel Laboratories

Drug Development Pipeline

Drug Candidate / Program	Target	Route of Administration	Indication	Partner	Development Phase
Immuno-Inflammatory Diseases					
Zunsemetinib (ATI-450)	MK2 inhibitor	Oral	Rheumatoid arthritis (moderate to severe)		Phase 2b
			Psoriatic arthritis (moderate to severe)		Phase 2a
ATI-1777	“Soft” JAK 1/3 inhibitor	Topical	Atopic dermatitis (mild to severe)	 1*	Phase 2b
ATI-2138	ITK/JAK3 inhibitor	Oral	T cell-mediated autoimmune diseases		Phase 2 Ready
Oncology					
ATI-2231	MK2 inhibitor	Oral	Metastatic breast cancer		Phase 1a ²
			Pancreatic cancer		

1 In November 2022, Aclaris Therapeutics and Pediatrix Therapeutics announced a License Agreement for ATI-1777 in Greater China.

2 This is an investigator-initiated Phase 1a trial in patients with advanced solid tumor malignancies sponsored by Washington University.

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