Carna Biosciences, Inc.

February 10, 2025

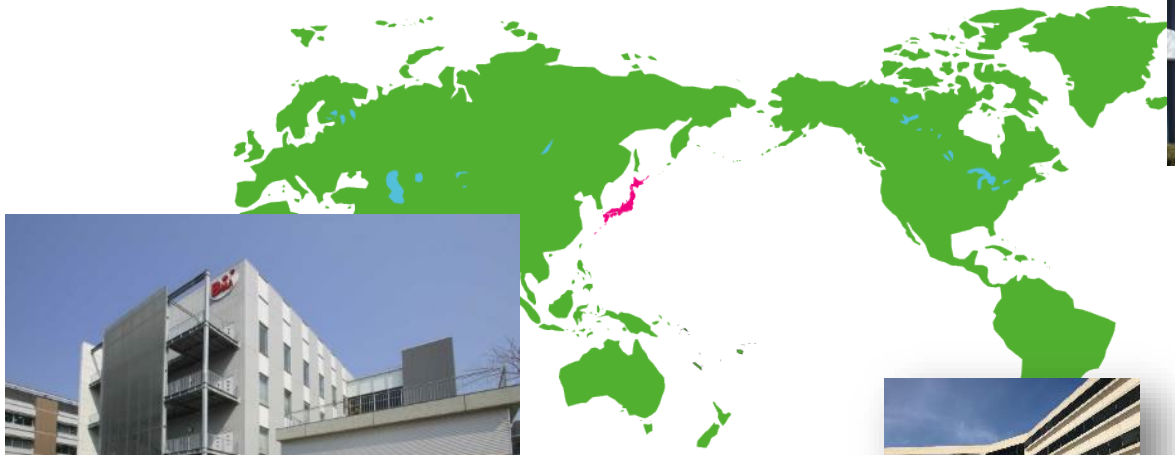
Stock Code: 4572

AGENDA

Company Overview

Company Overview

- Founded in April 2003 (spin-out company from N.V. Organon [MSD])
- Initial Public Offering (JASDAQ 4572) in March 2008
- 83 people
- Offices:
  - Carna Biosciences, Inc. - Kobe, Japan;
  - CarnaBio USA, Inc. - Natick, MA
  - Clinical Development Office – South San Francisco, CA



Carna Biosciences, Inc.
(Kobe, Japan)

CarnaBio USA
(Natick, MA)

Clinical Development Office
(SSF, CA)

(As of January 31, 2025)

Our Mission

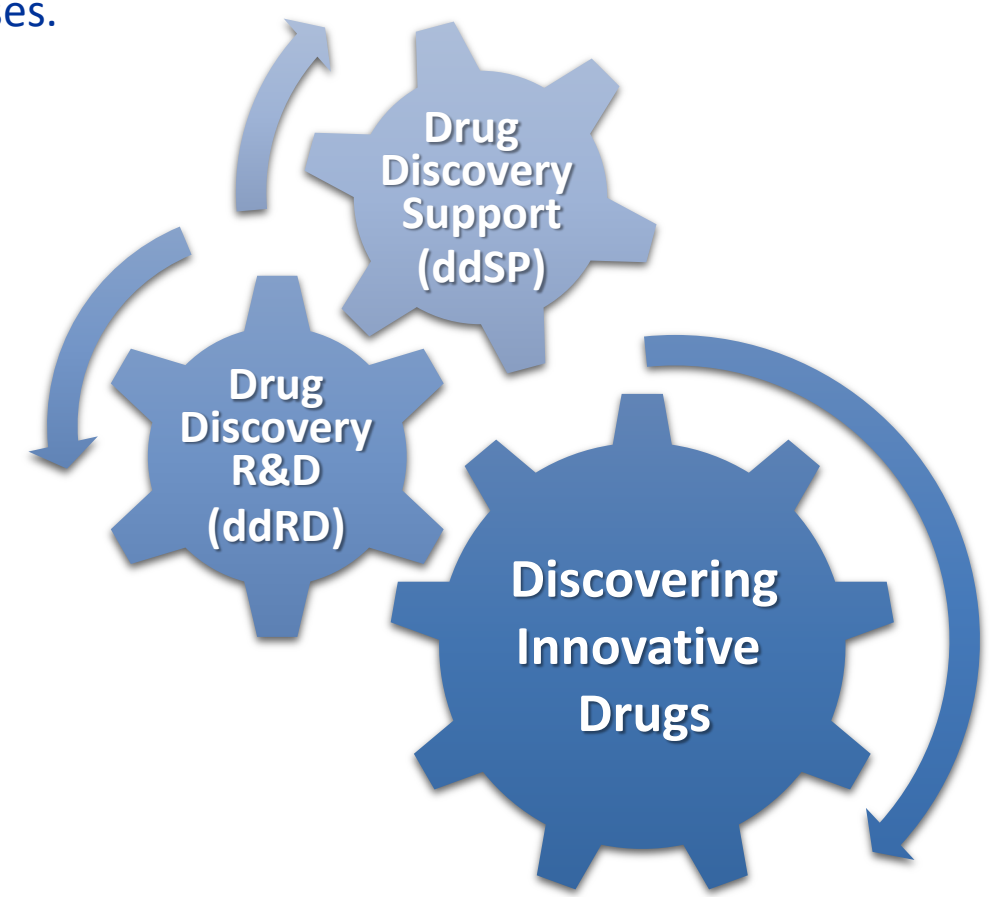
Discover and develop significant medical values that will provide therapeutic solutions for improving human health

Carna's powerful drug discovery engine invents a drug from scratch and drives our pipeline expansion

Continuously deliver innovative therapies for patients to treat serious unmet medical needs

Business Model to Drive Growth

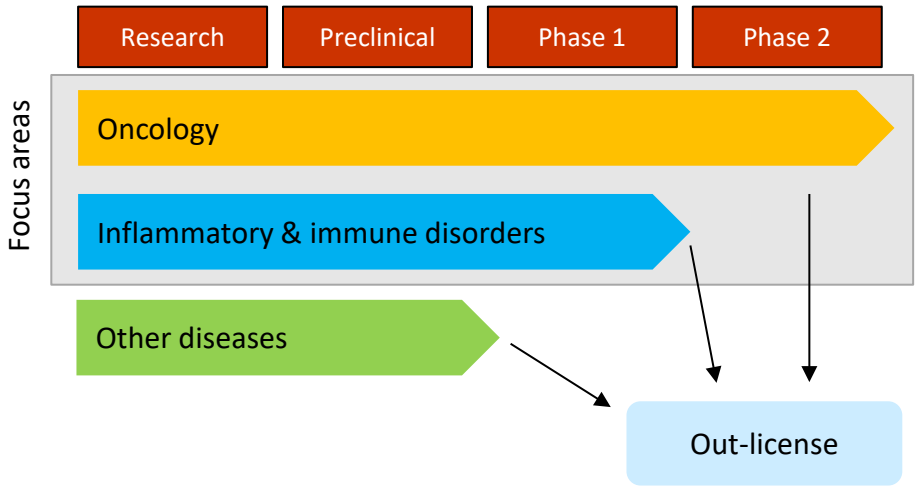
- Drug Discovery Support (ddSP) business provides pharmaceutical companies with the new tools to drive their kinase research. The stable income from the support business helps the drug discovery business to invest in R&D.
- Our small but powerful team with talented professionals at the Drug Discovery Research & Development (ddRD) business are focused on the research and development of innovative therapies targeting oncology and autoimmune diseases.



Business Model of Drug Discovery R&D (ddRD) Business

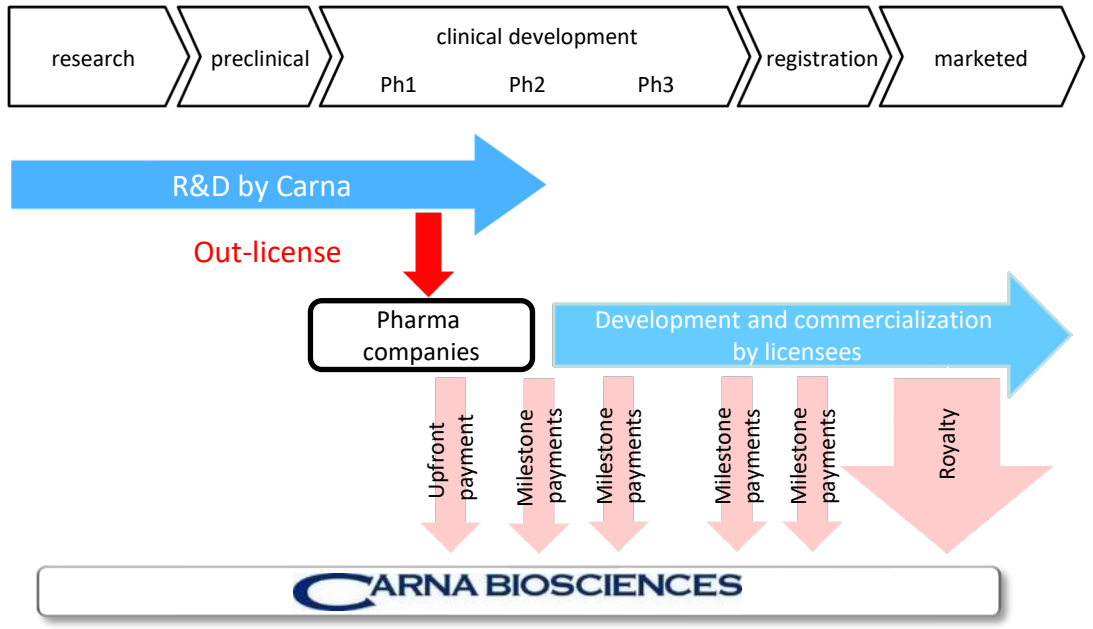
<R&D focus areas>

- ddRD business conducts research and development of innovative small molecule drugs including kinase inhibitors, focusing on oncology and inflammatory and immune disorders.
- We develop our oncology drug pipelines up to Phase 2 to maximize the potential values.
- For non-oncology pipelines, we basically license out at early stage before entering Phase 2 study to mitigate the development risk.



<Earnings model>

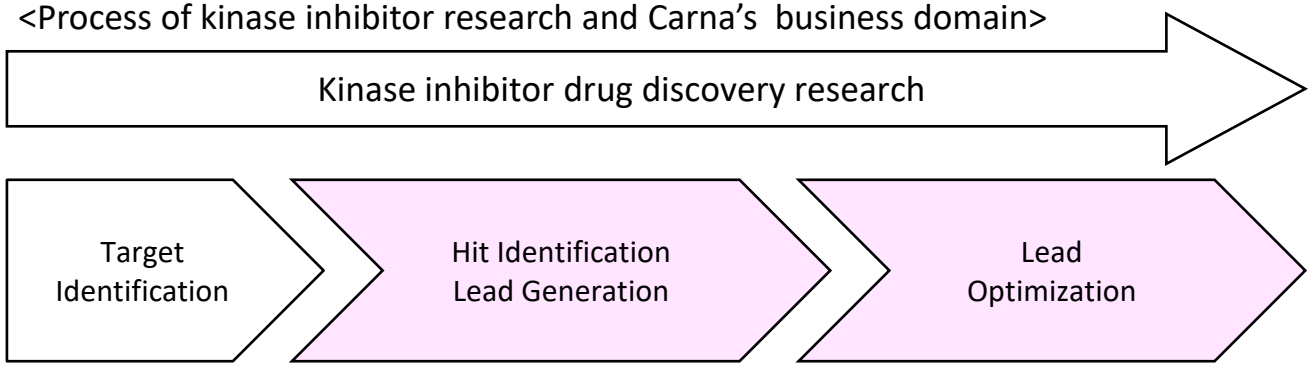
- We license our drug pipelines to pharma companies to generate revenue through upfront payments, milestone payments, and royalties on the resulting product sales.
- We intend to build long-term value by developing our own drug pipelines up to Phase 2 clinical trial on a fully burdened cost or in collaborations with development partners.



Business Model of Drug Discovery Support (ddSP) Business

- ddSP business develops and offers research tools for drug discovery, leveraging our proprietary kinase research technology, to generate stable cash flow. We apply the cash flows from ddSP business to ddRD business for the development of our own drug pipelines and the continued discovery of promising drug candidates in the future.

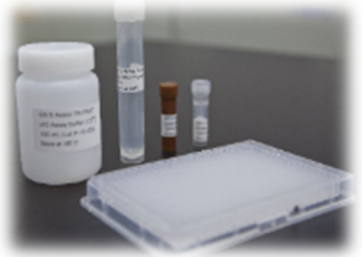
<Process of kinase inhibitor research and Carna's business domain>



Kinase proteins	Kinase proteins
Kinase Assay development Kinase Assay kits	Kinase Profiling service
Kinase Profiling service	Kinase Cell-based assay service
Kinase Screening service	X-Ray crystallography
Kinase Cell-based assay service	

Carna's products and services

Kinase proteins



Kinase Assay kits

Kinase Profiling and screening service

Drug Discovery R&D (ddRD) Business

Extensive Expertise in Drug Discovery

- Highly experienced team with strong scientific background

Carna has published many research papers in high-impact journals, showing our extensive drug discovery expertise.

Updates on Pipelines in Clinical Development

1. docirbrutinib (AS-1763)
2. sofnobrutinib (AS-0871)
3. monzosertib (AS-0141)

International Nonproprietary Name (INN) : docirbrutinib, Code name : AS-1763
International Nonproprietary Name (INN) : sofnobrutinib, Code name : AS-0871
International Nonproprietary Name (INN) : monzosertib, Code name : AS-0141

Pipelines in Clinical Development

Compound	Target	Indication	Status
docirbrutinib (AS-1763)	BTK	Blood Cancer	• Phase 1b clinical trial is ongoing in the U.S. • Dose expansion part was initiated in October to accelerate the development timeline. • Dose escalation part was completed in December. • Encouraging preliminary data was presented at ASH 2024 in December. Multi-center clinical study Study Lead ：Prof. Nitin Jain, MD, Department of Leukemia, University of Texas MD Anderson Cancer Center.
sofnobrutinib (AS-0871)	BTK	Immune-inflammatory diseases	• Completed Phase 1 clinical trial in healthy volunteers in the Netherlands, in which a favorable safety and tolerability profile as well as a promising PK/PD profile were confirmed. • Performed a preclinical study (EFD study) to establish a best-in-class status; potential advantages of sofnobrutinib over other BTK inhibitors. • Seeking a strategic partner for further development.
monzosertib (AS-0141)	CDC7/ ASK	Cancer	• Phase 1 clinical trial in cancer patients is ongoing in Japan. • Solid tumor : Completed dose escalation part Initiated patient recruitment in dose expansion part in January 2025. • Blood caner : Dose escalation part is ongoing. Clinical trial sites - National Cancer Center Hospital and National Cancer Center Hospital East - The Cancer Institute Hospital of JFCR

EFD study : Embryo-Fetal Development toxicity study

Docirbrutinib (AS-1763): Highlights

Key Highlights

Orally available small molecule inhibitor of Bruton's Tyrosine Kinase (BTK) targeting B-cell malignancies

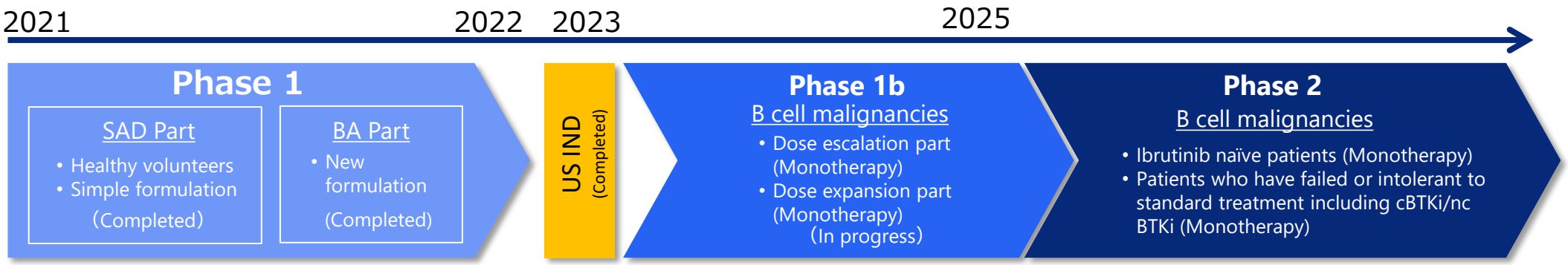
- ✓ Indication : CLL/SLL and B-cell NHL
- ✓ Non-covalent BTK inhibitor
- ✓ Docirbrutinib has a potential to be effective for patients who have developed resistance to the existing BTK inhibitors.

Status

Phase 1b study is ongoing in the U.S.

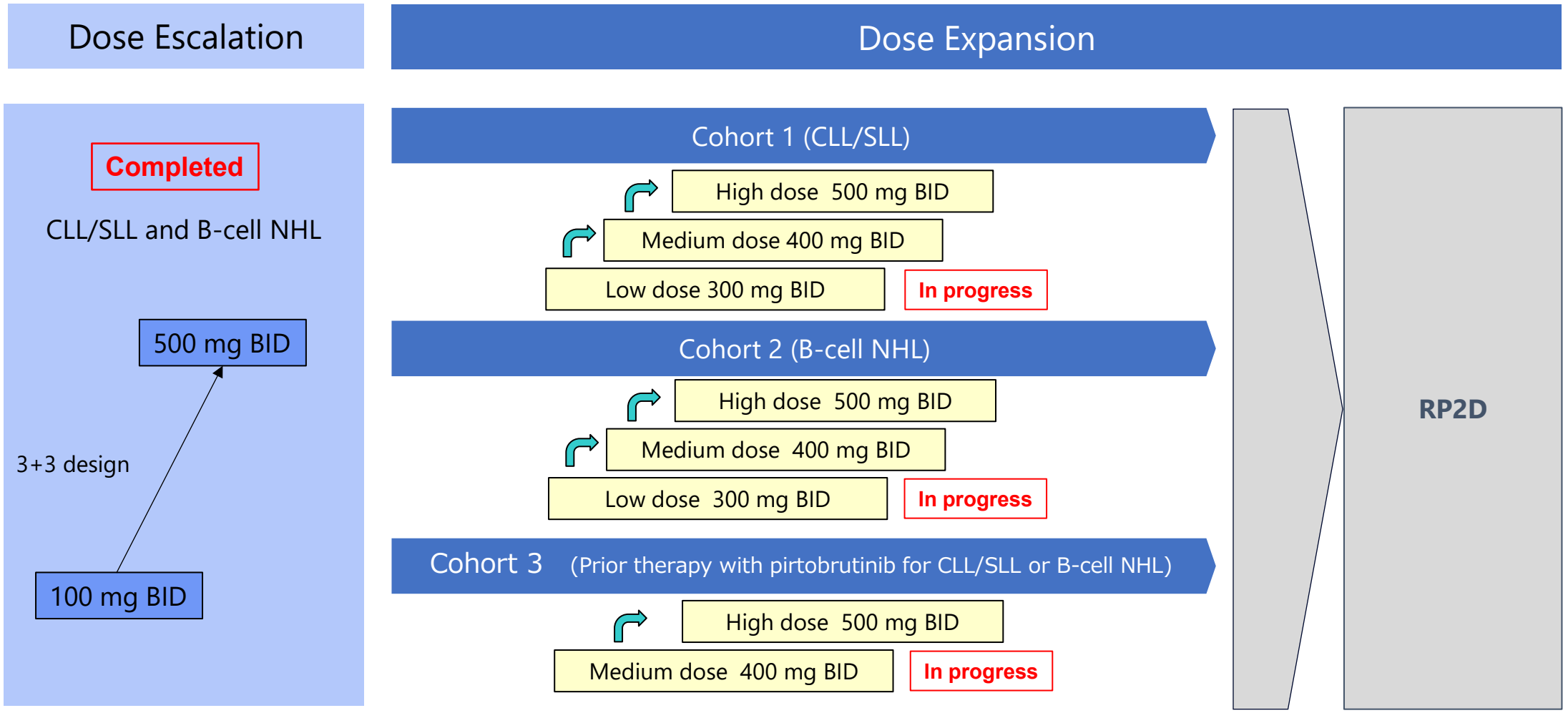
Multi-center clinical study
Study Lead : Prof. Nitin Jain, MD, Department of Leukemia, University of Texas MD Anderson Cancer Center

- ✓ Dose escalation part was completed in December 2024.
- ✓ Dose expansion part was initiated to accelerate the development timeline in October 2024.



IND application : Investigational New Drug application SAD: Single Ascending Dose BA: Bioavailability
B-cell malignancies: Chronic Lymphocytic Leukemia (CLL), Small Lymphocytic Lymphoma (SLL), and B-cell non-Hodgkin Lymphoma (B-cell NHL), etc.
cBTKi: covalent BTK inhibitor ncBTKi: non-covalent BTK inhibitor

Docirbrutinib (AS-1763): Phase 1b Trial Design



RP2D: Recommended phase 2
BID: Twice a day

Patients with CLL/SLL or B-cell NHL who have failed or intolerant to at least two lines of systemic therapy. Prior therapy with a covalent BTKi is permitted.

Docirbrutinib Ph 1b study: Clinical sites

Clinical sites（As of January 2025）

- UC Irvine Health
- Mount Sinai Comprehensive Cancer Center
- Moffitt Cancer Center
- Northwestern Memorial Hospital
- University of Maryland Medical Center-Greenebaum Comprehensive Cancer Center
- University of Massachusetts Memorial Medical Center
- Clinical Research Alliance, Inc.
- University of Texas MD Anderson Cancer Center
- The Medical College of Wisconsin

✓ **Phase 1b study is ongoing at nine top clinical sites in the US.**
✓ **Planning to activate additional clinical sites to accelerate the development timeline.**

Docirbrutinib (AS-1763) : Sponsorship to CLL Society

CLL Society

CLL Society is the world's leading authority for chronic lymphocytic leukemia and small lymphocytic lymphoma cancer patients.

Mission

CLL Society is an inclusive, patient-centric, physician-curated nonprofit organization that addresses the unmet needs of the chronic lymphocytic leukemia and small lymphocytic lymphoma (CLL / SLL) community through patient education, advocacy, support, and research.

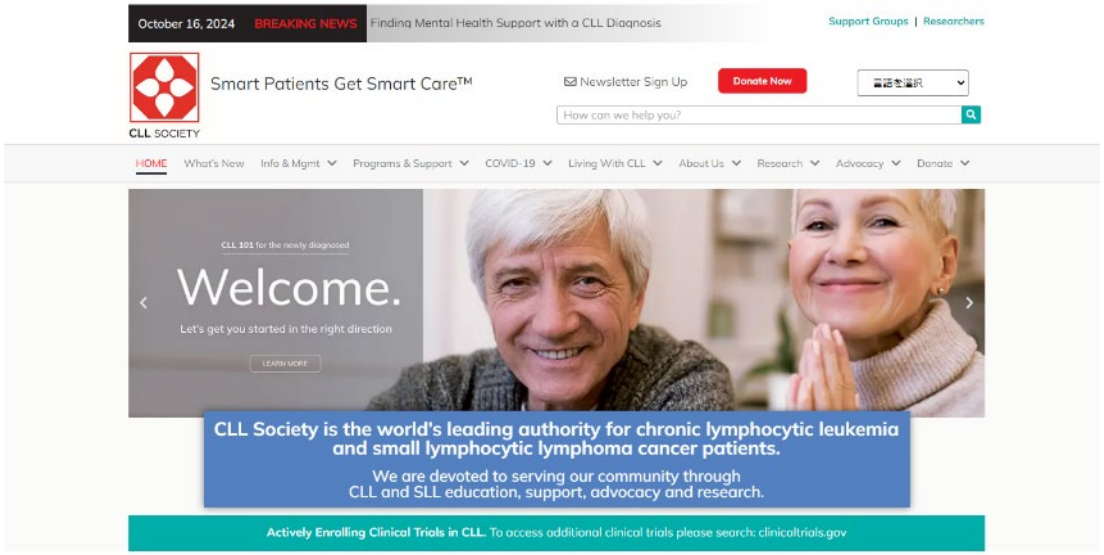
Vision

We envision a world in which the entire CLL / SLL community can equitably access quality education, support, and care, to lead healthier and richer lives.

－Cited from the website of CLL Society－

Carna offered sponsorship at the request of CLL Society.

https://cllsociety.org/



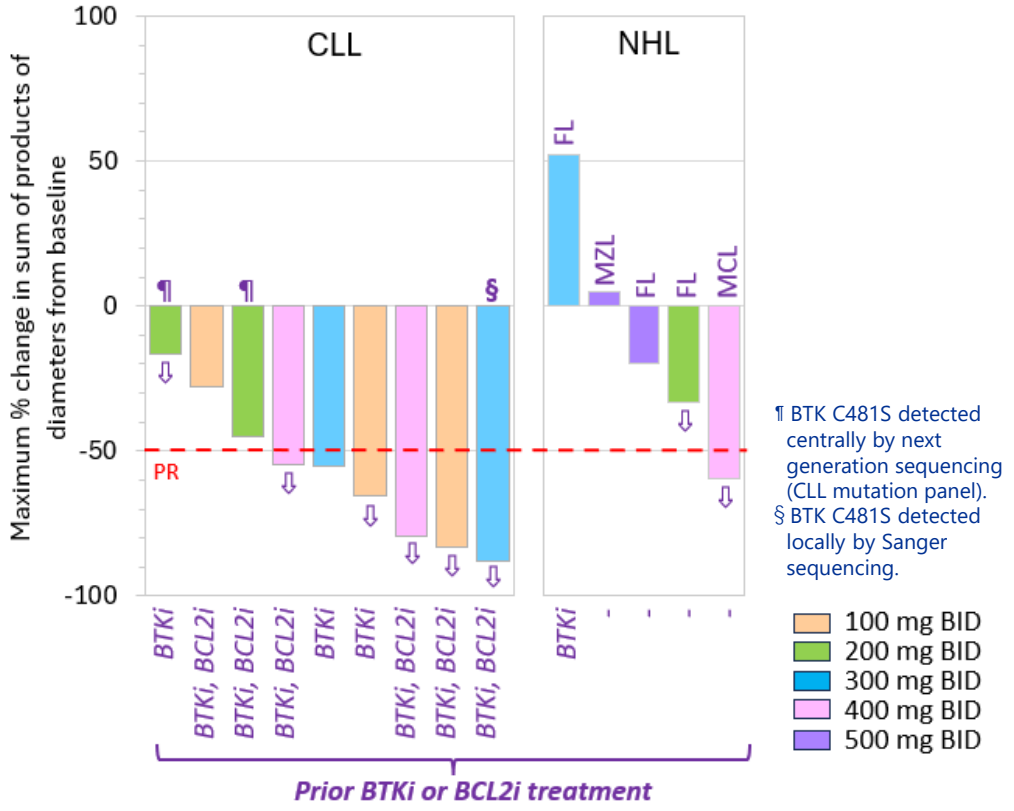
A clinical trial ad for docirbrutinib is on CLL Society's website to promote patient enrollment.

Docirbrutinib Ph 1b study: Tumor response

Preliminary Phase 1b data (1)

Data from ASH2024 poster presentation
The 66th American Society of Hematology Annual Meeting & Exposition, December 7-10, 2024

Tumor response (lymph node size)



CLL: Chronic Lymphocytic Leukemia, NHL: non-Hodgkin Lymphoma, FL: Follicular Lymphoma, MCL: Mantle cell lymphoma, MZL: Marginal zone lymphoma, BTKi: BTK inhibitor, BCL2i: BCL2 inhibitor, BID: Twice a day

Efficacy of docirbrutinib

CLL: All patients experienced lymph node size reduction. 6 out of 9 evaluable patients (67%) with CLL achieved PR or PR-L with 50% reduction in lymph node size. The exposures at ≥300 mg BID exceeded the IC_{90} throughout the dosing interval, and all 4 CLL patients (100%) receiving ≥300 mg BID achieved PR or PR-L.

NHL: 3 out of 5 patients with NHL experienced lymph node size reduction. One MCL patient experienced PR with over 50% reduction in lymph node size.

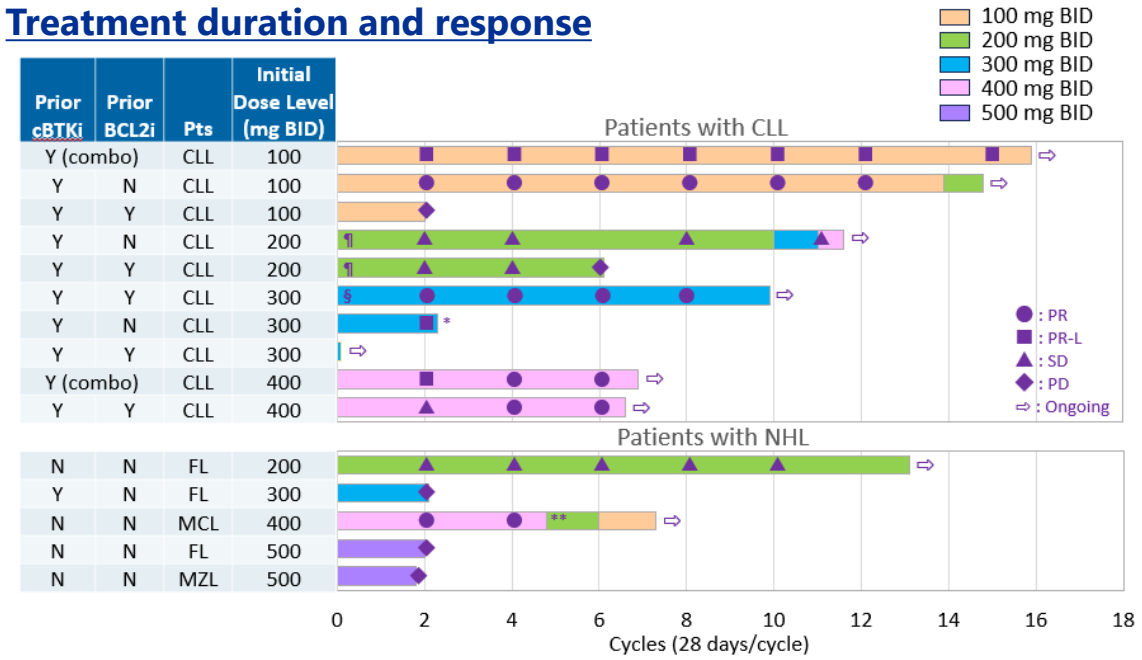
These preliminary data indicate clinical responses in patients with B-cell malignancies.

Docirbrutinib Ph 1b study: Efficacy and safety

Preliminary Phase 1b data (2)

Data from ASH2024 poster presentation

Treatment duration and response



Prior cBTKi	Prior BCL2i	Pts	Initial Dose Level (mg BID)
Y (combo)		CLL	100
Y	N	CLL	100
Y	Y	CLL	100
Y	N	CLL	200
Y	Y	CLL	200
Y	Y	CLL	300
Y	N	CLL	300
Y	Y	CLL	300
Y (combo)		CLL	400
Y	Y	CLL	400
N	N	FL	200
Y	N	FL	300
N	N	MCL	400
N	N	FL	500
N	N	MZL	500

¶ BTK C481S detected centrally by next generation sequencing (CLL mutation panel).
§ BTK C481S detected locally by Sanger sequencing.

*Discontinued due to consent withdrawal
**Dose reduction due to asymptomatic live enzyme elevations (G3)

- The bar charts indicate the duration of treatment.
- The color of the bar charts indicates does levels. The change in the color indicates that the dose level was changed during the treatment.
- Arrows indicate that the treatment is ongoing.
- PR (Partial Response) indicates that the size of lymph nodes has decreased ≥50% and other parameters for PR, e.g. reduction in the number of lymphocytes, have been met.
- PR-L (PR-Lymphocytosis) indicates that the size of lymph nodes has decreased ≥50% but the reduction in the number of lymphocytes has not met the criteria for PR.
- SD (Stable Disease) indicates that the disease remains stable.
- PD (Progression Disease) indicates that the diseases has progressed.

CLL: Chronic Lymphocytic Leukemia, NHL: non-Hodgkin Lymphoma, FL: Follicular Lymphoma
MCL: Mantle cell lymphoma, MZL: Marginal zone lymphoma, BTKi: BTK inhibitor, BCL2i: BCL2 inhibitor, BID: Twice a day

Safety profile of docirbrutinib

- No dose-limiting toxicities were observed. No treatment discontinuation due to AEs and no drug-related atrial fibrillation or hypertension were reported at doses of 100-500 mg BID.
- Asymptomatic ALT/AST elevations (G3) were reported in one patient (7%) as the only drug-related ≥G3 AEs other than neutrophil count decrease, indicating a favorable safety profile of docirbrutinib.

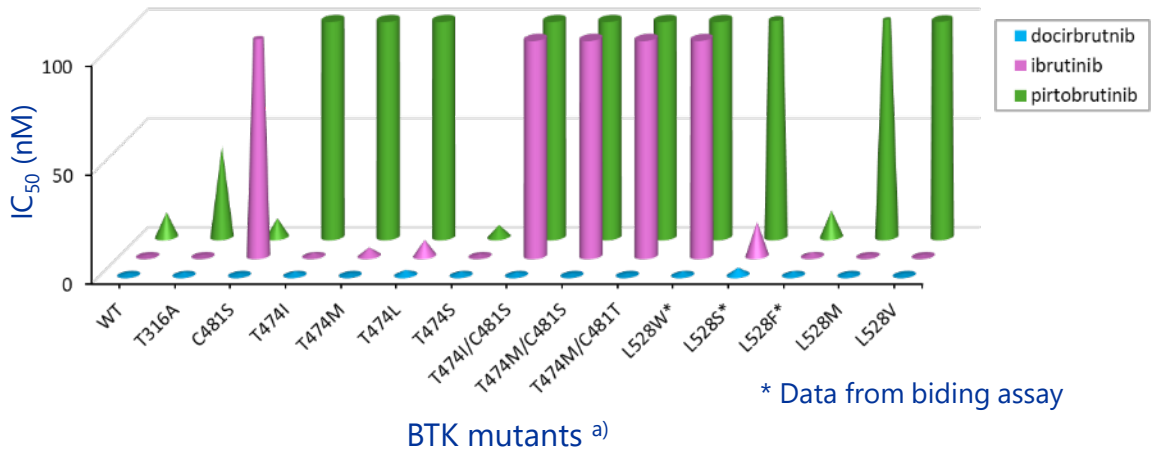
These preliminary data indicate a favorable safety profile and clinical responses in heavily pretreated patients with B-cell malignancies.

Docirbrutinib: Potential to address various BTK mutations

Data from ASH2024 poster presentation

Preclinical study

Inhibitory potency of BTK inhibitors against BTK mutants



* Data from biding assay

BTK mutants [a)]

[a)] Patients are reported to develop resistance during the treatment with covalent BTK inhibitors including ibrutinib due to substitution of cysteine residue at 481 position with serine (C481S mutation) in BTK, which reduces the efficacy of covalent BTK inhibitors. In addition, the emergence of other types of mutations, such as T474x and L528x, has been reported during the treatment with pirtobrutinib.

In vitro study using recombinant BTK mutant proteins

The bar charts show the comparison of the inhibitory potency of BTK inhibitors against various BTK mutants. A shorter bar indicates stronger potency.

- Ibrutinib and pirtobrutinib showed weak inhibitory potency against many resistant BTK mutants.
- Docirbrutinib showed strong inhibitory potency against all resistant BTK mutants.

Docirbrutinib is expected to be effective against patients who have developed resistance to the existing BTK inhibitors.

Drug resistance: the reduction in effectiveness of a drug during targeted therapies due to alterations of drug targets including the mutation of the target proteins.

Safety profile of docirbrutinib

Preliminary data from Phase 1b study

Data from ASH2024 poster presentation

Treatment-Emergent Adverse Event (TEAE)	All Doses and Pts (n=15)			
	Any		Treatment-related	
	Any Grades n (%)	Grade ≥3 n (%)	Any Grades n (%)	Grade ≥3 n (%)
≥15%				
Dizziness	9 (60%)	0	2 (13%)	0
Headache	6 (40%)	0	1 (7%)	0
Nausea	5 (33%)	0	2 (13%)	0
Neutrophil count decreased	5 (33%)	2 (13%)	4 (27%)	2 (13%)
Blood creatinine increased	4 (27%)	0	0	0
Fatigue	4 (27%)	0	1 (7%)	0
Abdominal pain	3 (20%)	0	0	0
Anemia	3 (20%)	0	1 (7%)	0
Constipation	3 (20%)	0	1 (7%)	0
Cough	3 (20%)	0	0	0
Fever	3 (20%)	0	0	0
Myalgia	3 (20%)	0	0	0
TEAEs of Special Interest				
Bruising[a]	2 (13%)	0	1 (7%)	0
Hemorrhage[b]	1 (7%)	0	1 (7%)	0

[a] Contusion (G1), [b] Epistaxis (G1).

The preliminary data from the Phase 1b study indicates impressive safety profile of docirbrutinib.

BTK Inhibitors in clinical development

Selected BTK inhibitors in clinical development

Compound	Type	Company (Originator)	Development Phase
pirtobrutinib (LOXO-305)	Non-covalent BTK inhibitor	Lilly (Loxo)	Approved/P3
nemtabrutinib (ARQ 531)	Non-covalent BTK inhibitor	Merck (ArQule)	P3
NX-5948	BTK degrader	Nurix	P1
BGB-16673	BTK degrader	BeiGene	P1
docirbrutinib (AS-1763)	Non-covalent BTK inhibitor	Carna	P1

Carna plans to accelerate the enrollment in the dose expansion part of the Phase 1b study and accumulate the clinical data to demonstrate:

Best-in-Class BTKi

- ✓ Safer profile compared with other BTKi
- ✓ Effective against resistant mutants

Adverse Events Were the Most Common Reason for Ibrutinib Discontinuation

Discontinuation of ibrutinib treatment is commonly due to intolerance

The discontinuation rate of ibrutinib treatment was 41% in the US, and the majority reasons of discontinuation was AEs.

Reasons for ibrutinib discontinuation	Ibrutinib in front-line	Ibrutinib in relapse
Toxicity	63.1%	50.2%
CLL Progression	15.8%	20.9%
Others	21.1%	28.9%

Data cited from Mato AR, et al., Haematologica. 2018;103(5):874-879

Docirbrutinib (AS-1763) in Phase 1b :

No discontinuation due to adverse events so far

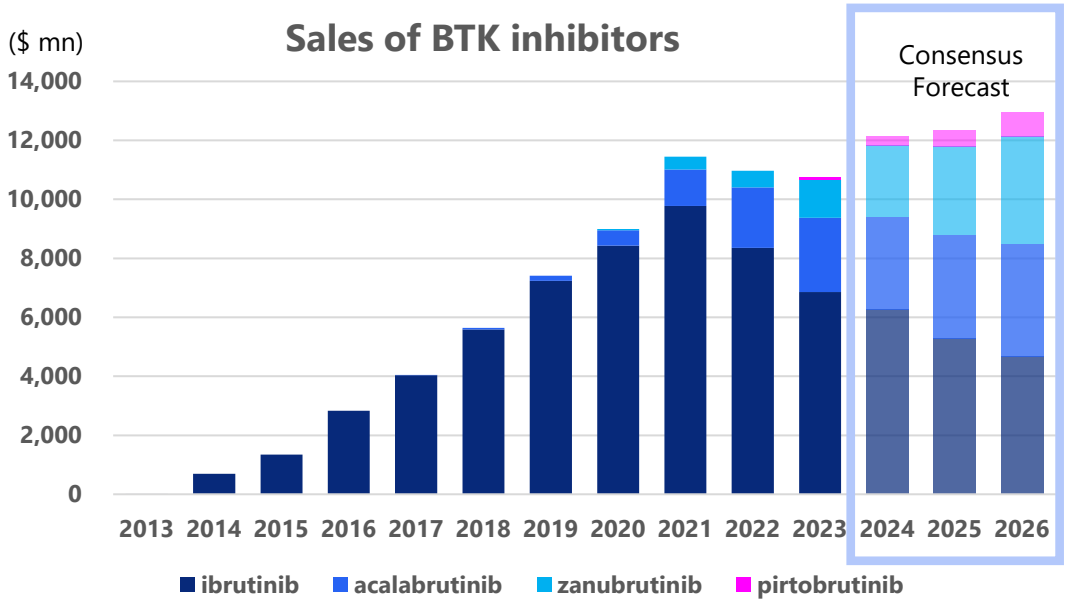
Docirbrutinib demonstrates safer profiles,

suggesting better option for effective therapy

BTK inhibitors form a large market

Sales of the currently approved BTK inhibitors, ibrutinib, acalabrutinib, zanubrutinib, and pirtobrutinib, exceed $10 bn.

- Acalabrutinib, zanubrutinib, and pirtobrutinib are taking a market share from ibrutinib as safer BTK inhibitors.
- Acquired resistance against ibrutinib, acalabrutinib, zanubrutinib, and pirtobrutinib present a need for new therapeutic options



Source: Clarivate

Product Positioning of docirbrutinib

Offer a new therapeutic option to:

- *patients who discontinued the existing BTK inhibitors due to adverse events as a safer BTK inhibitor*
- *patients who have developed resistance to the existing BTK inhibitors as a pan-mutant BTK inhibitor*

Sofnobrutinib (AS-0871) : Highlights

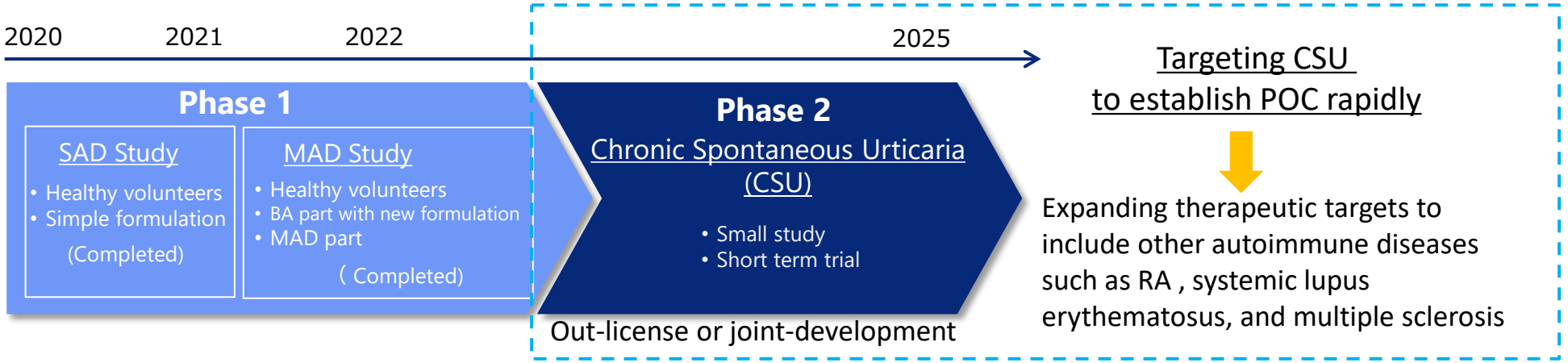
Mechanism/ Indication	Sofnobrutinib is an **orally available** Bruton's Tyrosine Kinase (BTK) inhibitor to treat autoimmune diseases by inhibiting activation of immune cells such as B cells, macrophages, and mast cells.
Clinical trials	Completed Phase 1 clinical trial in healthy volunteers in the Netherlands. A favorable safety and tolerability profile as well as a promising PK/PD profile were confirmed and these results support to advance sofnobrutinib into Phase 2 clinical development.
Status	✓ Performed a preclinical study to establish a best-in-class status; potential advantages of sofnobrutinib over other BTK inhibitors. ✓ Seeking a strategic partner for further development.

Sofnobrutinib (AS-0871) : Non-covalent BTK Inhibitor

Sofnobrutinib : Targeting Immune-inflammatory diseases

- Small molecule BTK inhibitor
- Non-covalent/reversible
- High kinase selectivity
- Orally available

- Demonstrated significant efficacies in arthritis models
- Showed efficacy in systemic lupus erythematosus model
- Phase 1 Clinical Trial was completed
- Find a partner to conduct further development
- Performed a preclinical study to establish a best-in-class status



SAD: Single Ascending Dose
MAD: Multiple Ascending Dose
BA: Bioavailability
POC: Proof of Concept

Sofnobrutinib (AS-0871) : Potential best-in-class

Embryo-Fetal Development (EFD) toxicity study was performed to prove potential advantages of sofnobrutinib over other BTK inhibitors.

Sofnobrutinib showed "No Teratogenic Effect“ in the EFD study, suggesting it is suitable for the treatment of dermatologic diseases including CSU.

As most BTK inhibitors approved are teratogenic, their use should be limited especially for women.
Sofnobrutinib is confirmed to be non-teratogenic in the EFD toxicity study, providing a treatment option for a wider range of patients.

Sofnobrutinib is the only BTK inhibitor having a non-covalent inhibitory mechanism of action with no teratogenic effect.

Sofnobrutinib (AS-0871) : CSU is a skin disease with unmet medical needs

Chronic Spontaneous Urticaria (CSU) is a distressing skin disorder that is characterized by itching and hives lasting for more than 4 weeks with unknown causes. The symptoms can last months or years, affecting QoL of patients.

Challenges of CSU

- A significant number of patients having uncontrolled CSU by existing drugs.
- High socio-economic costs for patients with high disease activity*
- Large number of patients; approximately 1% of the global population is affected*

High unmet medical needs with potential large market

＊Br J Dermatol 2021;184:226-36.

Competitors

Compound	Company	Development Phase
Remibrutinib (LOU064)	Novartis	P3

The Phase III trials met the primary endpoints and showed rapid symptom control in CSU, supporting the potential of BTK inhibitors as a new treatment option for those uncontrolled by first-line H1-antihistamines.*

＊https://www.novartis.com/news

Opportunity

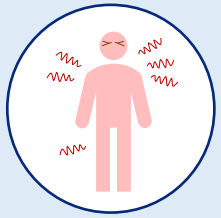
- Approval of new treatment options may trigger the expansion of CSU market.
- We plan to pursue the clinical implications of sofnobrutinib (non-covalent BTK inhibitor) to provide clinical benefits by minimizing potential adverse events associated with covalent BTK inhibitors including remibrutinib.

Chronic Spontaneous Urticaria (CSU)

CSU is a debilitating disease of chronic itch, hives and angioedema, lasting six weeks or more.

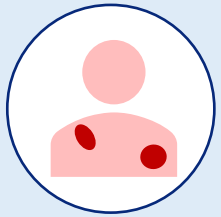
Symptoms

There is no specific external trigger for CSU, but the autoimmune system may play a role

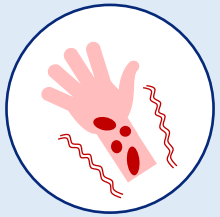


Spontaneously present & re-occur

Lack of Energy
Depression/Anxiety
Chronic (Lasting for at least six weeks)



Red swollen hives



Itch

Number of Patients

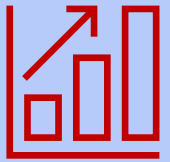
2.8 million

diagnosed prevalent cases in major seven markets

- ✓ Approximately 1% of the population worldwide is affected.

- ✓ Approximately 50% of CSU patients don't respond to H1-antihistamine.
- ✓ Curative treatment is not available.
- ✓ High socio-economic costs for patients with high disease activity.

Market Size



$2,844 million

in 2020 in seven major markets

- ✓ The market size of CSU in major seven countries is expected to reach $8,043 mn by 2030

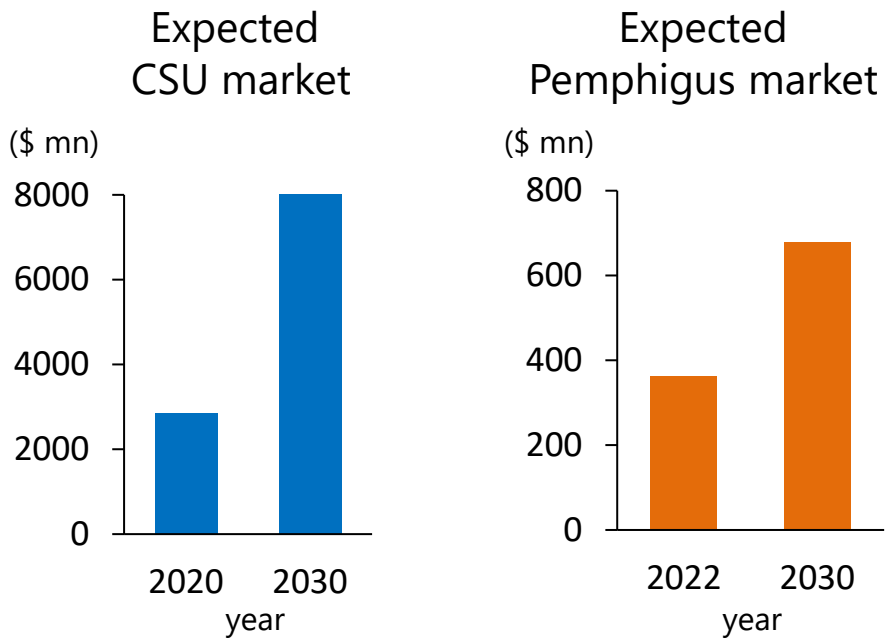
https://www.delveinsight.com/
Source : Clarivate

Potential Market Size for Sofnobrutinib (AS-0871)

Initial focus

Diseases	Number of patients
CSU	• Diagnosed prevalent cases : 2.8 mn* • WW population affected: 76 mn
Pemphigus	• Diagnosed prevalent cases : 40,000*

*in major 7 markets



Other potential therapeutic area

Diseases	Number of patients	Market size in value
Systemic lupus erythematosus (SLE)	Global SLE prevalence is estimated to be 15.87 to 108.92 per 100,000 people	expected to reach $3,517 mn by 2030
Multiple sclerosis (MS)	In 2016, an estimated 2.2 million people worldwide had MS, corresponding to a prevalence of 30.1 cases per 100,000 population	expected to reach $34 bn by 2031
Rheumatoid arthritis (RA)	18 million people worldwide were living with RA	expected to reach $70 bn by 2030

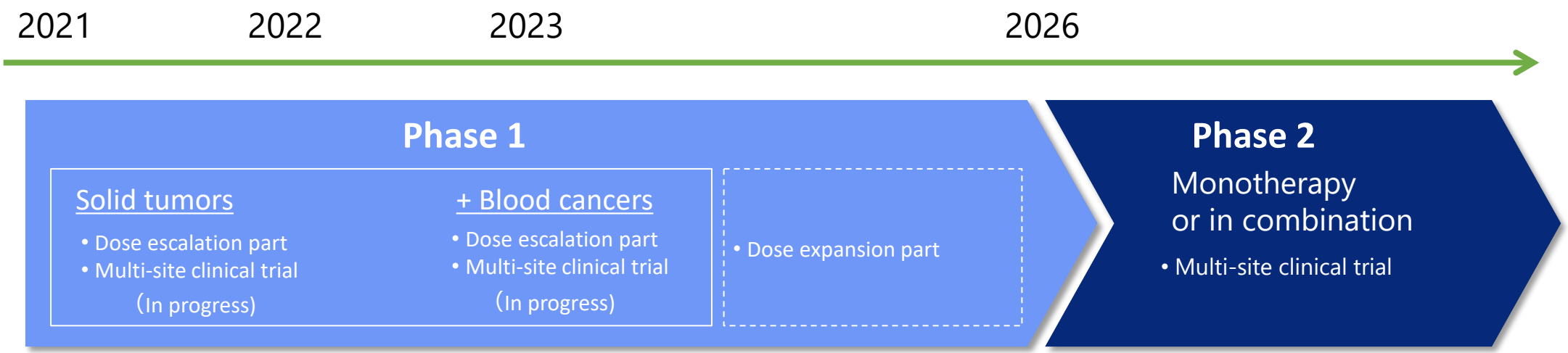
https://www.delveinsight.com/
https://www.databridgemarketresearch.com/
https://ard.bmj.com/
https://straitsresearch.com/
https://www.skyquestt.com/
https://www.who.int/
Ann Rheum Dis 2023;82:351–356
Lancet Neurol 2019 ; 18: 269–85
Source : Clarivate

Monzosertib (AS-0141) : CDC7 Inhibitor

Highlights	Monzosertib is an orally available CDC7 kinase inhibitor targeting cancer
Clinical trials in progress	Conducting Phase 1 study in Japan targeting solid tumors and blood cancers ✓ Solid tumor : Completed dose escalation part. Initiated patient recruitment in dose expansion part in January 2025. ✓ Blood cancer : Dose escalation part is ongoing. Clinical trial sites - National Cancer Center Hospital and National Cancer Center Hospital East - The Cancer Institute Hospital of JFCR will be activated in dose expansion part.

Monzosertib (AS-0141) : CDC7 Inhibitor

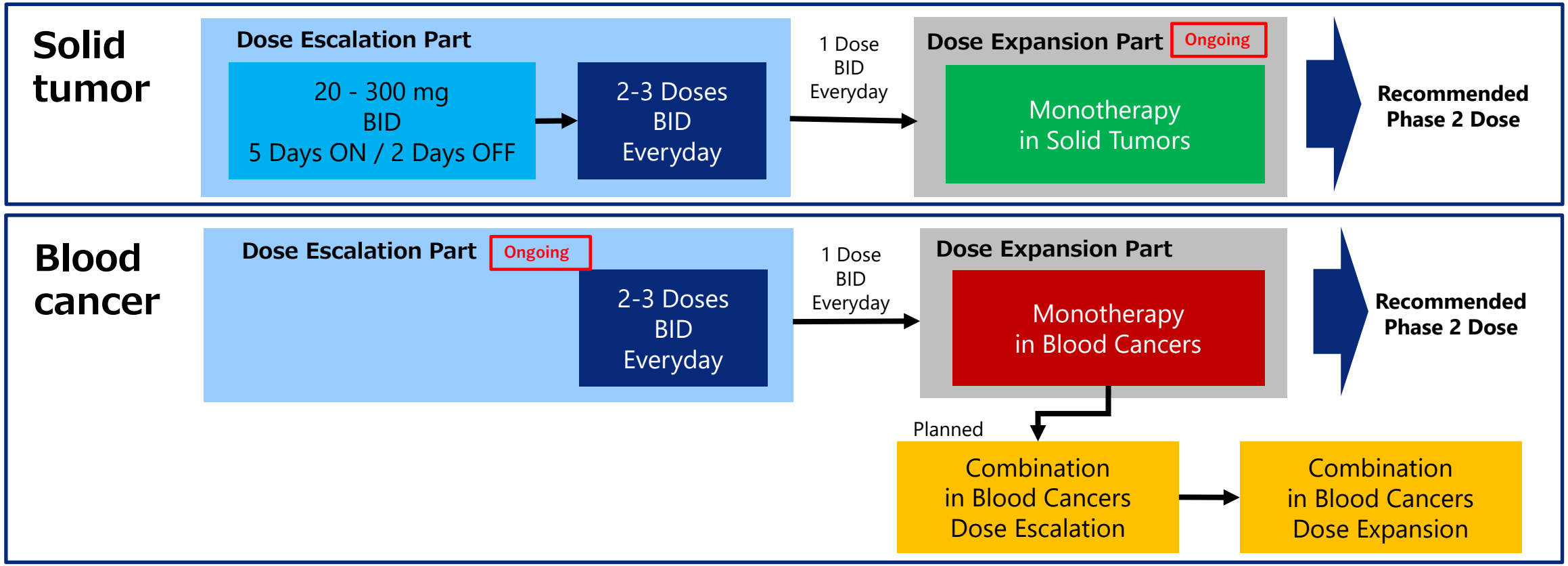
Monzosertib : Targeting Cancer	
● Small molecule CDC7 inhibitor ● High kinase selectivity ● Potential First-in-class drug ● Orally available	● Potent anti-proliferative activity against various cancer cell lines ● Demonstrated strong anti-tumor activity in several human tumor xenograft models ● Conducting Phase 1 study in Japan targeting solid tumors and blood cancers Solid tumor : Initiated patient recruitment in dose expansion part in January 2025. Blood cancer : Dose escalation part is ongoing.



Monzosertib (AS-0141) : Phase 1 Clinical Trial

Phase 1 study targeting cancer patients

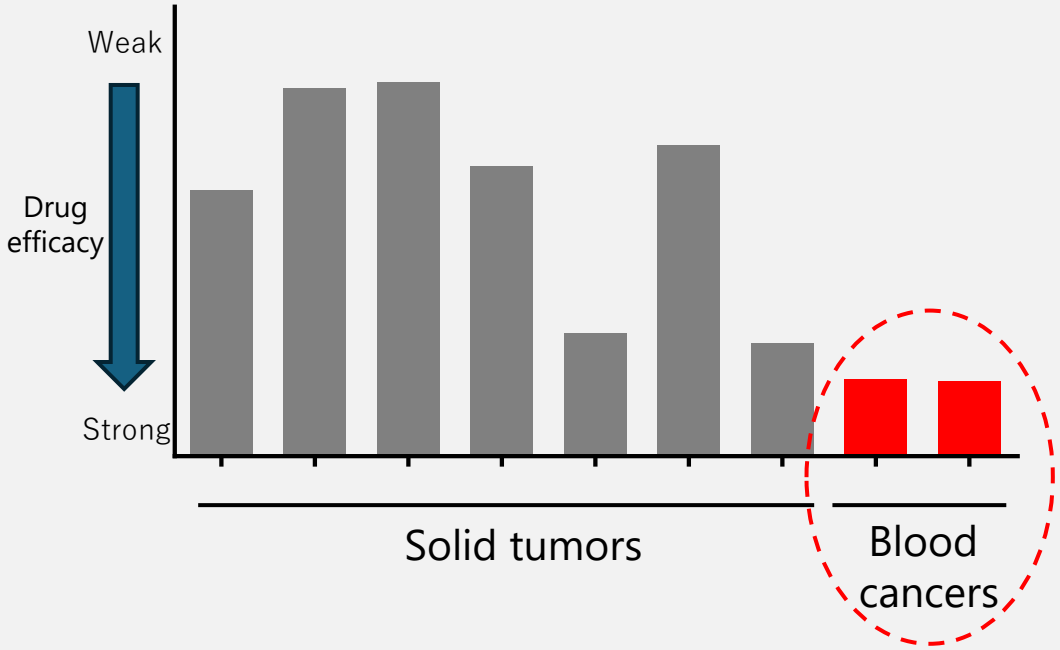
- The Phase 1 study in patients with advanced, metastatic, relapsed or refractory malignancies. The protocol has been changed to include patients with blood cancers.
- The study consists of two parts, a dose escalation and an expansion.
- The primary objective is to assess safety, tolerability, maximum tolerated dose (MTD), preliminary anti-tumor activity, and PK / PD as well as to determine RP2D.
- Pharmacodynamic effect of monzosertib was confirmed at 40 mg BID and above.



Monzosertib (AS-0141): Dose escalation part targeting blood cancer is ongoing

Non-clinical study

Antiproliferative effects of monzosertib on 35 human cancer cell lines
(Each bar are presented as mean of different cell lines (N = 1 – 7)



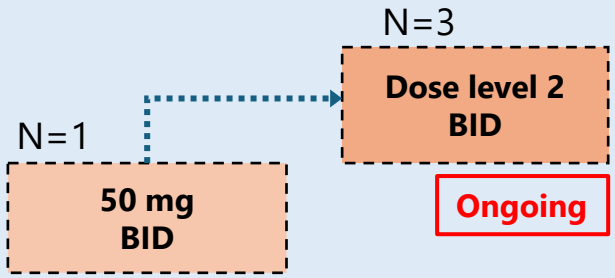
✓ Monzosertib demonstrated robust tumor growth inhibition in a human AML xenograft mouse model.

Phase 1 study

Patient Population: advanced, relapsed, refractory or distant metastasis malignant tumors

Initiated dose escalation part targeting blood cancer patients in 2024.

✓ Safety and tolerability were confirmed in a patient dosed 50 mg BID, and dosing at dose level 2 has started.

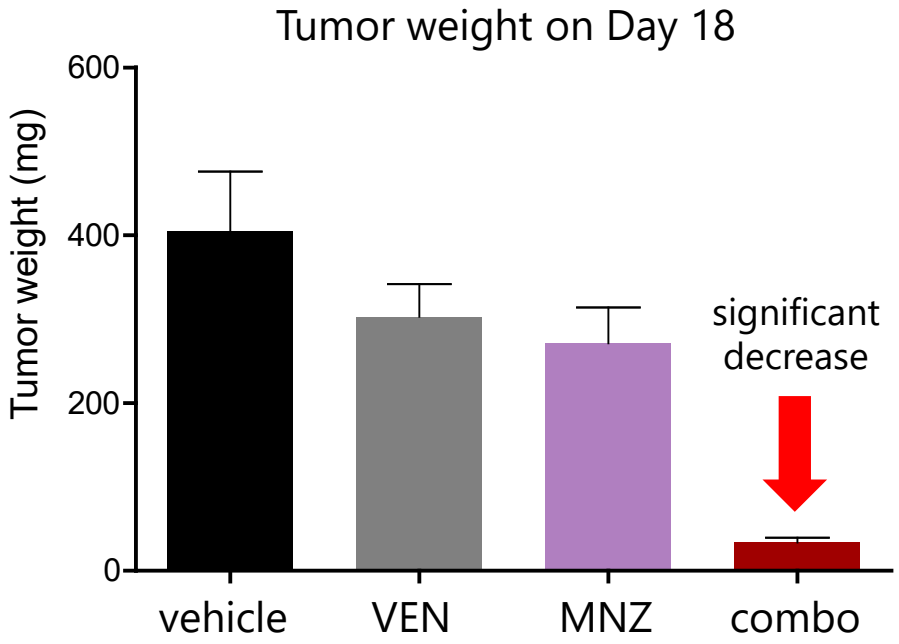


Monzosertib: Synergistic effect with BCL2 inhibitor

Synergistic effect of monzosertib with BCL2 inhibitor venetoclax was assessed using a MV-4-11 human AML mouse model.

AACR2024 Poster Presentation
AACR2024：American Association for Cancer Research Annual Meeting 2024

In vivo antitumor efficacy in MV-4-11 xenograft model mice



VEN: venetoclax (10 mg/kg, QD)
MNZ: monzosertib (60mg/kg, BID)
5 days/week, dosed orally

- In combination with venetoclax, monzosertib demonstrated robust tumor growth inhibition in a MV-4-11 human AML xenograft model.

Monzosertib (AS-0141): Phase 1 Dose Escalation Part targeting solid tumor

As of Oct. 31, 2024

Phase 1 dose escalation part targeting solid tumor

Switched to a continuous dosing schedule (without drug holiday) allowing persistent inhibition of CDC7 to maximize efficacy

- 100 mg BID (twice a day) was well-tolerated and safe and MTD was determined to be this dose level.
- Dose expansion part was initiated at 80 mg BID , one dose level lower than MTD
- 6 of 10 efficacy-evaluable patients achieved SD
- One patient receiving 50 mg BID (every dat) achieved long SD（>6 months).

Doses	Regimen	n	DLT
50 mg BID	every day	3	0
80 mg BID	every day	4	0
100 mg BID	every day	3	0

Completed dose escalation part, and dose expansion part is ongoing.

MTD: Maximum Tolerated Dose

DLT: Dose Limiting Toxicity

Updates on Licensed Pipelines

1. **DGKα Inhibitor** (Gilead Sciences, Inc.)
2. **Joint Research with Sumitomo Pharma**

Out-licensed Programs

Program/ Partner	Compound (Target)	Status	Upfront payment	Total milestone payments expected	Royalty	Region	Contract date	Milestones received
DGKα inhibitor Gilead Sciences (Out-license)	GS-9911 (Immuno-oncology)	Phase 1	$20M	$450M	Undisclosed	Worldwide	Jun. 2019	Received milestones twice, totaling $15M
Joint Research with Sumitomo Pharma	Kinase inhibitor (Psychiatric and neurological disorders)	Late discovery	JPY80M (including research milestone)	JPY10.6B	Undisclosed	Worldwide	Mar. 2018	

DGKα Inhibitor

Partner

Gilead Sciences, Inc.
Out-licensed in June 2019 (worldwide rights)

Deal size	• Upfront payment $20 million • Maximum of $450 million potential milestone payments upon achievement of certain development and commercial milestones
Royalties	• Royalties on future net sales

1. **Investigational DGKα inhibitor: GS-9911**
2. **Indication: Cancer (immunotherapy)**
   - At JP Morgan Annual Healthcare Conference held in January 2024, Gilead introduced DGKα as next generation target in oncology and presented GS-9911 as the DGKα inhibitor in Phase 1 trials.
3. **The Phase 1 study in patients with solid tumors is ongoing.**

   In December 2024, Carna received a progress report on the development of GS-9911 from Gilead and confirmed the progress is on track.

   Refer Gilead's website for details of the study.
   https://www.gileadclinicaltrials.com/study?nctid=NCT06082960

Joint Research with Sumitomo Pharma

Partner	Sumitomo Pharma Co., Ltd. Joint Research Agreement in March 2018 (worldwide rights)
Deal size	• Upfront payment + Research milestone JPY80 million • Maximum of JPY10.6 billion potential milestone payments upon achievement of certain development and commercial milestones
Royalties	• Royalties on future net sales

1. **Joint research to discover novel kinase inhibitors to treat psychiatric and neurological disorders.**
2. **The term of the joint research was extended in December 2021.**
3. **Joint research is ongoing to identify preclinical candidates.**

Drug Discovery Support (ddSP) Business

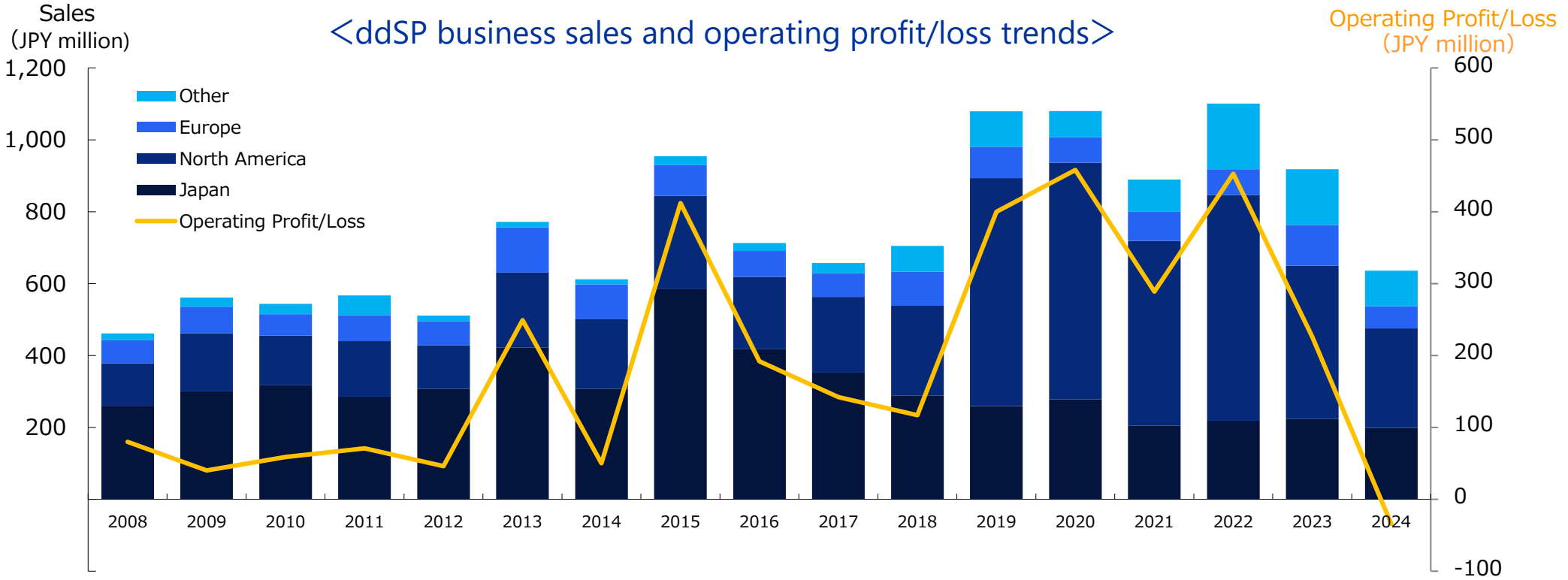
Drug Discovery Support Business : Strengths

Carna's kinase proteins and services have grown as one of the world's top brands.

- ✓ **Established the direct sales channels in Japan and the U.S.**
- ✓ **Our products and services are distributed through our exclusive agent in Europe.**
- ✓ **In China, SUBC*, one of the leading research tool provider in China distributes our kinase proteins (exclusive for us in kinase related products).**
- ✓ **While sales of proteins and profiling services were robust in Japan, overseas sales remained weak in 2024.**
  - **Accompanied with our major customers' projects progress or termination, the needs of kinase protein declined.**
  - **The economic recession and the possibility of restraint of trade with Chinese biotech companies by the U.S. government had negative impacts on Chinese market and the start of production of kinase protein by some Chinese CROs also caused the continuous reduction in demand in China.**

***Shanghai Universal Biotech Co.(SUBC)**
SUBC is one of the leading reagents suppliers in China, headquartered in Shanghai, has 36 branches with over 700 employees. Top sales company in immune-related reagents in China.

<ddSP business sales and operating profit/loss trends>



Kinase Proteins

- World-class product lineup：over 500 products including mutants
- Built a mass-production system：provide custom made kinase proteins of several dozen mg.
- High quality：highly active, high purity and stable quality（less variations among batches）

Biotinylated Protein Kinases

- Established our own technology of manufacturing biotinylated protein kinases: biotinylated protein kinases are suitable for the drug discovery research of next generation kinase inhibitors.
- Biotinylated protein kinases of over 200 kinds are available and product lineup is expanding.

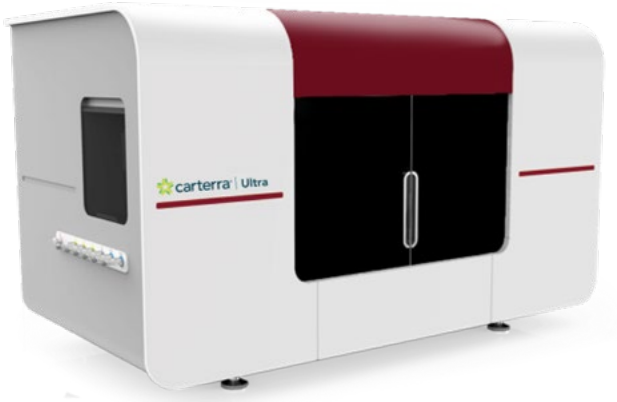
Profiling Services

- Data accuracy is the most important factor in kinase inhibitor selectivity profiling.
- Our customers, including both domestic and international pharmaceutical companies, highly evaluate Carna's profiling services for its data accuracy.

Our customers, the world's major pharmaceutical companies and promising bio-ventures, who use our kinase proteins and profiling services, launched many molecular target drugs. Some of the approved drugs became blockbusters.

Biotinylated Protein Kinases

- The demand for high throughput screening systems for small molecule compounds which bind to kinase proteins is increasing.
- Carterra (U.S) developed new innovative high throughput systems, LSA^{XT} and Ultra, which enabled small molecule screening and characterization in addition to antibody.
- Carna and Carterra collaborated to preliminary develop the assay with these new screening systems in combination with Carna's single site biotinylated kinase proteins and Carterra's HT-SPR LSA^{XT} or Ultra.
- This collaboration successfully proved these new systems screen about hundreds kinases and compound binding event just in 3 days.



Our biotinylated kinase protein sales is expected to be expand with the permeation of Carterra LSA^{XT} and Ultra.

Profiling Services

- Conventionally, capillary electrophoresis has been known as highly reliable method for measuring kinase protein activity without using radioisotopes.
- Perkin Elmer (renamed Revvity in 2023)'s EZ Reader which equipped electrophoresis system on microchip with 12 capillaries has been a de facto standard for measuring kinase activity, was discontinued including supply of consumables and the support at the end of 2024. This boosts high demand for a substitute system with the same data quality.
- We have been providing high quality profiling services with EZ Reader.
- To continue offering profiling services, we challenged and succeeded in developing our original substitute system. The new system consists of combination with Sciex BioPhase8800 of 8 capillary electrophoresis, and the robot arm with stacker which we originally installed by combining stand alone machines.

Carna launched new reliable profiling services with this original system in May 2024 and aims to acquire even more customers.

Market environment for Drug Discovery Support Business

Market environment

- The demand for kinase inhibitor drug discovery research services is strong in North America and China. More stable in Japan.

Competitors・Our advantage

- Major competitors:
  Thermo Fisher Scientific (US), Eurofins（EU）
  SignalChem (Sino Biological, China), Reaction Biology (US)
- Carna is the only drug discovery support service provider specialized in kinase inhibitor drug discovery.
- Carna's proprietary manufacturing technologies contribute to establish the uniqueness and predominance of biotinylated kinases with an abundant product lineup and quality in the global market.
- Precise assays, appropriate product development and finely attentive technical support by scientists with drug discovery experiences and knowledges.

Business Plan

Growth Strategy

➢ Advance clinical trials of our innovative pipelines to maximize corporate value

	Started internal drug discovery activity	Demonstrated strong capabilities in drug discovery	Maximize the value of pipelines	Continue delivering profits
	2010-2015	2016-2020	2021-2025 (Plan)	2026-2030 (Plan)
PLAN	• Established in-house research capability • Established pipeline	• Out-licensed multiple programs • Initiated clinical trials	• Advance clinical trials of docirbrutinib (AS-1763), sofnobrutinib (AS-0871) and monzosertib (AS-0141) • Earn revenue from new license deals • Receive milestone payments from the out-licensed programs and deliver profits • Initiate pre-clinical and clinical studies of new pipelines	• Receive milestone payments and royalty income from the out-licensed programs and expand profits • Earn revenue from new license deals • Initiate pre-clinical and clinical studies of new pipelines
ACTUAL	✓ Out-licensed : J&J (2015)	✓ Out-licensed : Sierra Oncology (2016) ✓ Joint research : Sumitomo Pharma (2018) ✓ Out-licensed : Gilead (2019) ✓ Out-licensed : BioNova (2020) ✓ Initiated clinical trials of sofnobrutinib (2020)	✓ Out-licensed : Fresh Tracks Therapeutics (2022) ✓ 1st Milestone : BioNova (2022) ✓ 1st Milestone : Gilead (2021) ✓ 2nd Milestone : Gilead (2023) ✓ Initiated clinical trials of docirbrutinib (2021) ✓ Initiated clinical trials of monzosertib (2021)	

<ddRD>

✓ Advance clinical trials of docirbrutinib (AS-1763) and monzosertib(AS-0141)

✓ Create next wave of pipeline

✓ Receive milestone payments and royalty income from out-licensed programs

<ddSP>

- Expand sales of in-house developed products and services in North America and Asia
- Secure sustainable sales growth by launching new products and services and reaching out to new customers
- Generate cash to invest in ddRD

ddRD: Drug Discovery R&D business
ddSP: Drug Discovery Support Business

Business Plan

(JPY million)	FY2024 Actual	**FY2025 Plan**	**Outlook for 2026 – 2029**
Total Sales	636	**722**	
ddSP business	636	**722**	Maintain stable sales
ddRD business	—	—	Revenue from milestone payments and upfront payments
Total Operating Loss	(2,076)	**(2,133)**	
ddSP business	(34)	**83**	Maintain stable profit while investing in product developments
ddRD business	(2,041)	**(2,216)**	Continue to invest in R&D and deliver profits depending on the size of milestone payments and upfront payments
Ordinary Loss	(2,080)	**(2,137)**	
Net Loss	(2,178)	**(2,147)**	

(JPY million)	FY2024 Actual	**FY2025 Plan**	**Outlook for 2026 – 2029**
R&D Cost	1,886	**2,059**	Continue to invest in R&D for the future growth. The R&D cost may vary from JPY 1 bn to 2.5 bn, depending on the size of clinical studies.
Capex	13	**7**	Invest in equipment for R&D and IT system (JPY20 mn to 100 mn)

- Business plan for FY2025 dose not include potential milestone payments or upfront payments as the timing or the amounts are difficult to predict.
- Numerical targets for 2026-2029 are not disclosed for the same reason.

ddRD: Drug Discovery R&D business
ddSP: Drug Discovery Support Business

Key Milestones for 2025

Business		Key Milestones		
		Milestones for 2024	Achievement in 2024	Milestones for 2025
ddRD	Docirbrutinib (AS-1763)	☐ Present interim clinical data from ongoing Ph1b study	☑ Present interim clinical data from ongoing Ph1b study ・Presented the preliminary data of Ph1b study at EHA2024 in June 2024 and ASH in December 2024	☐ Promote Ph1b dose expansion part and present interim clinical data from the study
	Sofnobrutinib (AS-0871)	☐ Promote partnering activity to find a strategic partner	☑ Promote partnering activity to find a strategic partner	☐ Out-license or initiate Ph2 by joint-development
	Monzosertib (AS-0141)	☐ Enroll patients with blood cancers ☐ Initiate Ph1 dose expansion part	☑ Enroll patients with blood cancers ☐ Initiate Ph1 dose expansion part Solid tumor : Initiated patient recruitment in January 2025	☐ Promote Ph1 study and choose cancer types for the clinical development
ddSP		☐ Expand sales of in-house developed products and services in North America and Asia ☐ Increase line-up of protein kinase products ☐ Expand sales of cell-based assay	☐ Expand sales of in-house developed products and services in North America and Asia ☑ Increase line-up of protein kinase products ☐ Expand sales of cell-based assay	☐ Expand sales of in-house developed products and services in North America, Europe and Asia ☐ Increase line-up of protein kinase products ☐ Expand sales of cell-based assay

EHA : European Hematology Association
ASH : American Society of Hematology
ddRD: Drug Discovery R&D business
ddSP: Drug Discovery Support Business

☑ Achieved
☐ Plan or to be achieved

Balance Sheet

- In order to advance clinical trials, we aim to maintain adequate cash position by generating cash from Drug Discovery Support(ddSP) business and licensing, as well as by raising funds from capital markets.

(JPY million)	As of Dec. 31, 2023	As of Dec. 31, 2024	Change
Current assets	4,191	2,737	-1,453
Cash and deposits	2,889	2,108	-780
Non-current Assets	158	34	-124
Total assets	4,349	2,772	-1,577
Current liabilities	375	222	-152
Non-current liabilities	96	73	-22
Total liabilities	472	296	-175
Total net assets	3,877	2,475	-1,402
Total liabilities and net assets	4,349	2,772	-1,577

Financing

Raised additional capital through the 3rd party allotment of common shares in May and in October.

- **Allotee　Athos Asia Event Driven Master Fund**

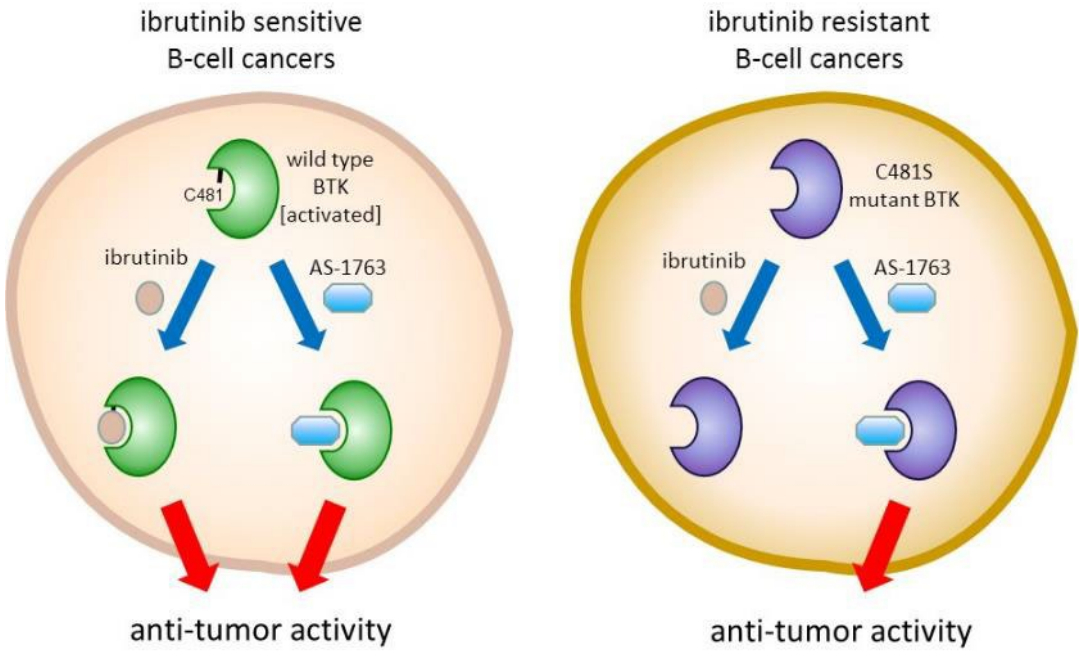
Settlement date	May 31st, 2024	October 11th, 2024
Net proceeds (JPN million)	362	378
Use of proceeds	Investment in development of docirbrutinib (AS-1763) and monzosertib (AS-0141)	

Financing

Additional financing may be considered as necessary in order to accelerate the clinical trials of docirbrutinib (AS-1763), our most important asset.

Appendix 1

Docirbrutinib (AS-1763): Potent Inhibitor of C481S mutant BTK



Journal of Medicinal Chemistry
pubs.acs.org/jmc
Drug Annotation

Discovery of AS-1763: A Potent, Selective, Noncovalent, and Orally Available Inhibitor of Bruton's Tyrosine Kinase

Wataru Kawahata,* Tokiko Asami, Takao Kiyoi, Takayuki Irie, Shigeki Kashimoto, Hatsuo Furuichi, and Masaaki Sawa

Cite This: *J. Med. Chem.* 2021, 64, 14129–14141 Read Online

- **IC_{50} values of docirbrutinib against wild-type and C481S-mutant BTK**

	IC_{50} (nM)	
	BTK[A]	BTK^{C481S}
docirbrutinib	0.85	0.99

J Med Chem. 2021 Oct 14;64(19):14129-14141.

Docirbrutinib (AS-1763): Strong Cellular Activity and High Kinase Selectivity

ARNA BIOSCIENCES

In vitro pharmacological activities of docirbrutinib

	IC_{50} (nM)	
	docirbrutinib	Ibrutinib
Autophosphorylation BTK (Ramos)	1.4	1.1
CD69 activation (Human whole blood)	11	8.1
Cancer cell growth OCI-Ly10 cells	1.8	0.75
Cancer cell growth OCI-Ly10 [BTK C481S] cells	20	1030
Normal cell growth HEL299 cells	6370	6870

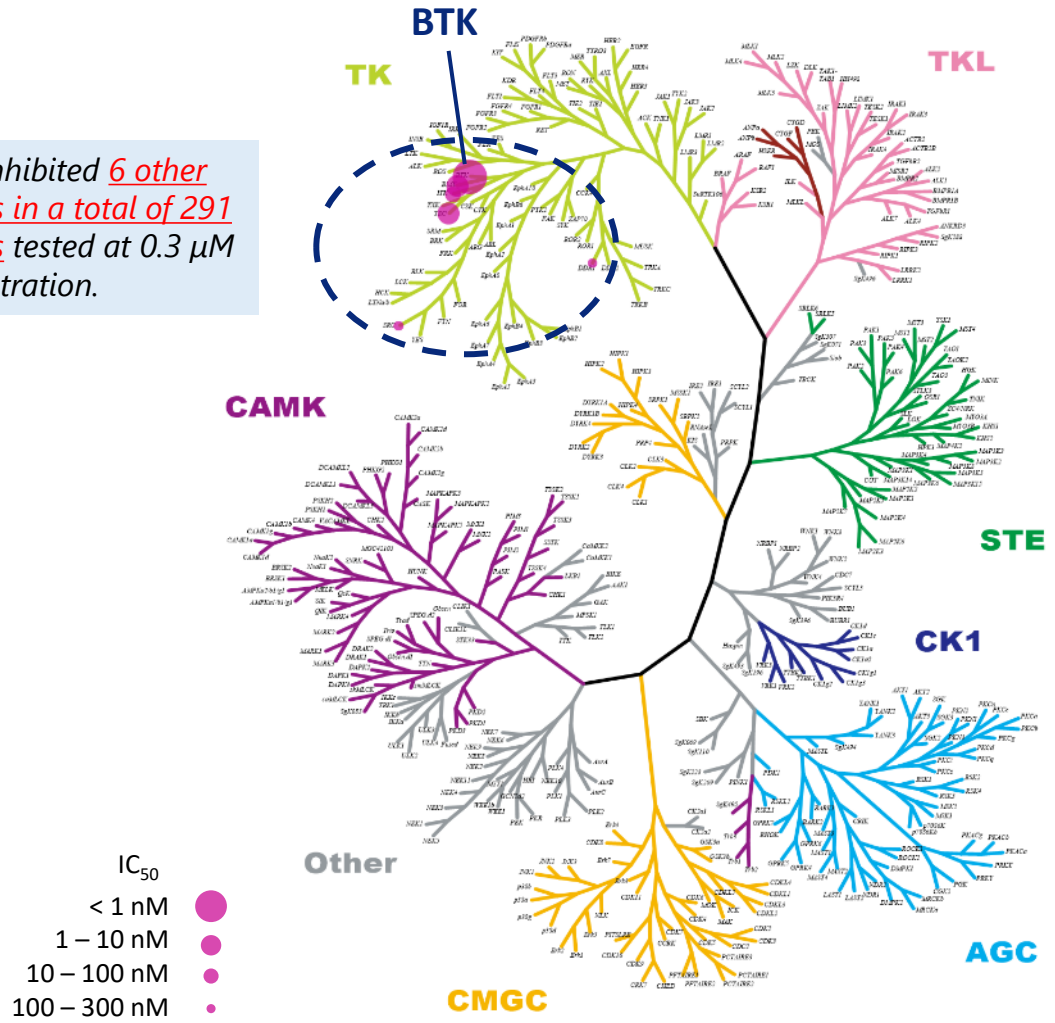
50-fold Stronger activity

Ramos: human Burkitt lymphoma cell line
OCI-Ly10: human B-cell non-Hodgkin lymphoma cell line
OCI-Ly10 [BTK C481S]: BTK[C481S] knock-in OCI-Ly10 cells
HEL299: human embryo lung cell line

J Med Chem. 2021 Oct 14;64(19):14129-14141.

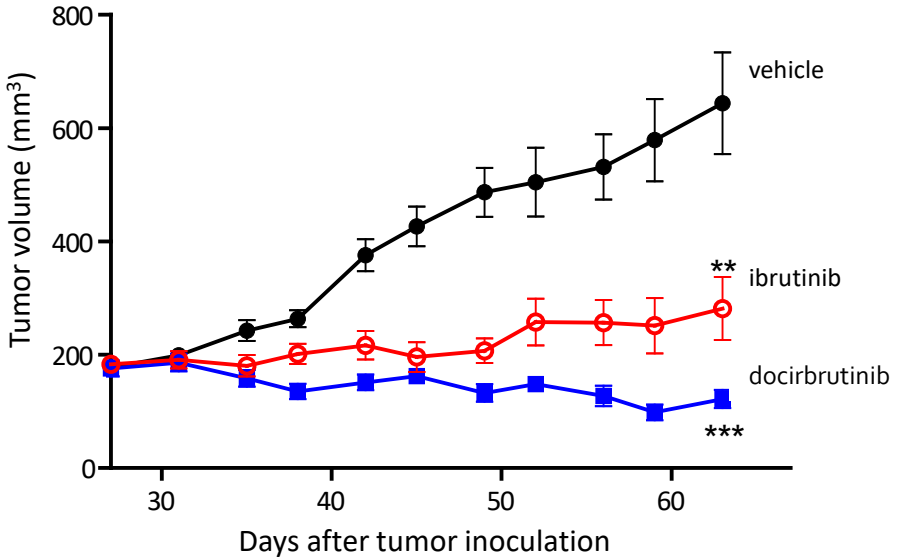
Kinase selectivity profiling

Only inhibited 6 other kinases in a total of 291 kinases tested at 0.3 μM concentration.



Docirbrutinib (AS-1763) : In Vivo Antitumor Effect against BTK^{C481S} Mutant

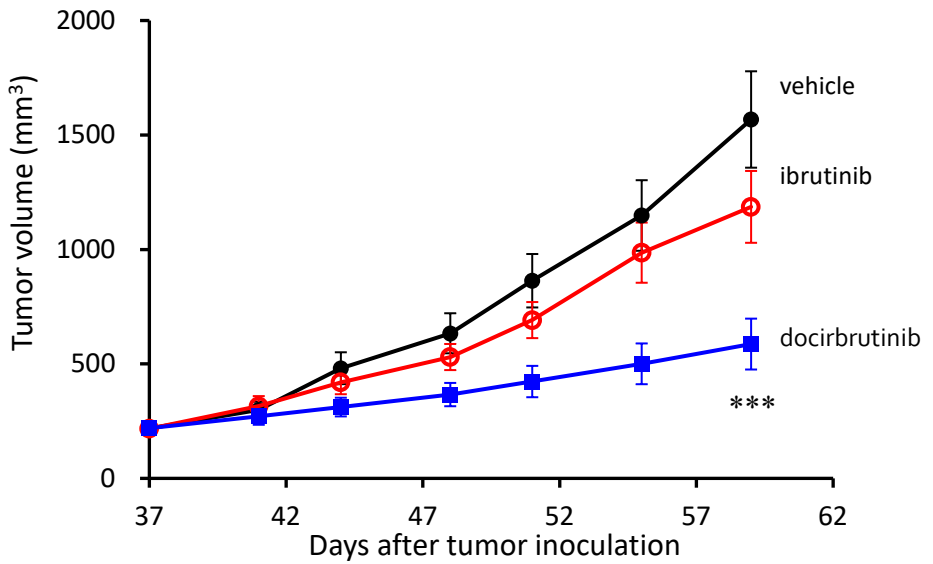
- **In vivo antitumor effects of docirbrutinib on human B-cell non-Hodgkin lymphoma cell line, OCI-LY10 tumor xenograft mouse model (n=8-10)**



Ibrutinib: 25 mg/kg QD
Docirbrutinib : 60 mg/kg BID

**: p<0.01
***: p<0.001

- **In vivo antitumor effects of docirbrutinib on ibrutinib-resistant BTKC481S knock-in OCI-LY10 tumor xenograft mouse model (n=11)**



Ibrutinib: 25 mg/kg QD
Docirbrutinib : 60 mg/kg BID

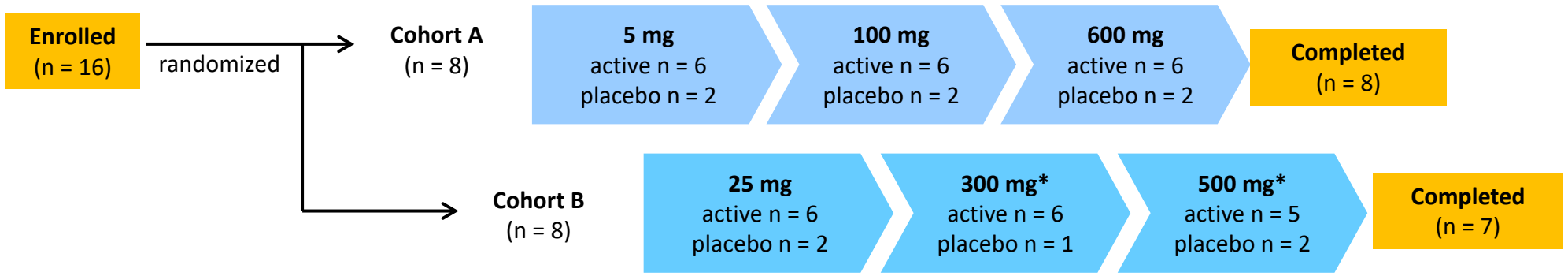
***: p<0.001

J Med Chem. 2021 Oct 14;64(19):14129-14141.

Docirbrutinib (AS-1763): FIH Phase 1 Clinical Trial in Healthy Volunteers

Study Design

Step 1 Single Ascending Dose (SAD) Part	Step 2 Relative Bioavailability (BA) Part
• Double-blind, placebo-controlled, randomized FIH study • Simple formulation (solution) • 6 dose levels (8 subjects/cohort A, 8 subjects/cohort B) • 6 active / 2 placebo for each dose level • Safety and tolerability • Pharmacokinetics and pharmacodynamics (PD; CD69 upregulation on naïve B cells)	• Open label study • Another cohort of 8 subjects • The subjects were dosed with a single dose of docirbrutinib 100-mg tablet, and relative bioavailability with simple formulation was evaluated



*One subject was withdrawn from the study on Day 1 of 300-mg period before the intake of treatment medication (placebo) by physician's decision. This subject showed AEs (Grade 2 lymphocytosis and Grade 2 neutropenia) which were considered treatment-emergent but not trial medication-related. No replacement was done at 300-mg and the following 500-mg periods.

Docirbrutinib (AS-1763): SAD Part

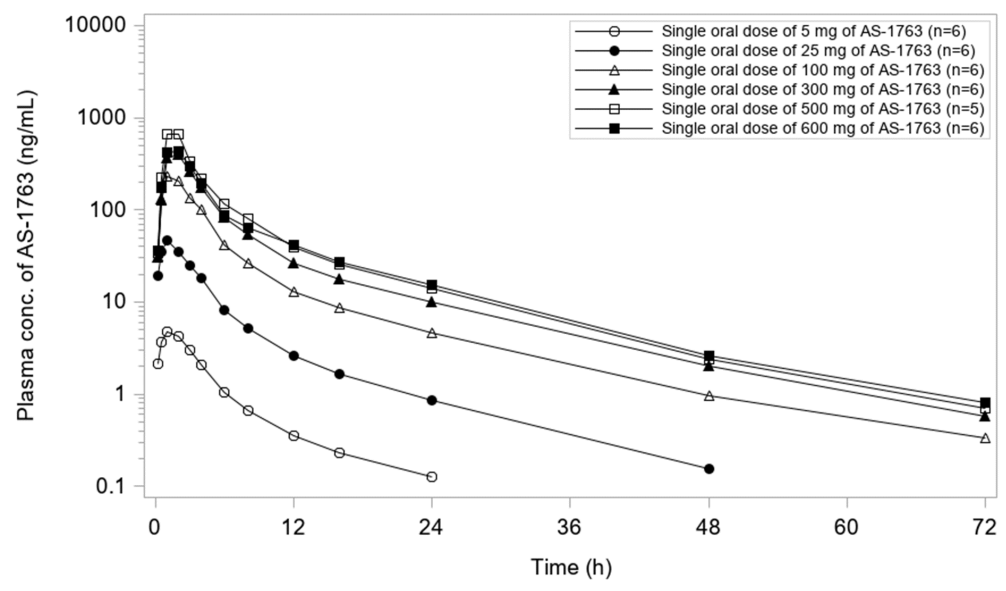
Safety and tolerability

- Docirbrutinib was well-tolerated after single dose administration up to the maximum dose level (600 mg).
- No serious adverse events (AEs) were reported during the trial.
- Two Grade 2 AEs were reported in one subject, which were considered not related to trial medication.
- Other AEs reported were of mild intensity and showed no apparent dose-relationship in frequency.
- No clinically relevant changes from baseline were observed in all other safety parameters assessed (clinical laboratory, 12-lead safety ECGs, vital signs, or physical examinations).

Pharmacokinetics

- After a single-dose oral administration, plasma concentration of docirbrutinib rapidly reached the maximum and then declined in a biphasic manner across the dose range (median tmax between 0.5 and 1.5 hours; mean t1/2 between 8.4 and 12.1 hours).
- Mean docirbrutinib exposures generally increased with dose up to 500 mg.

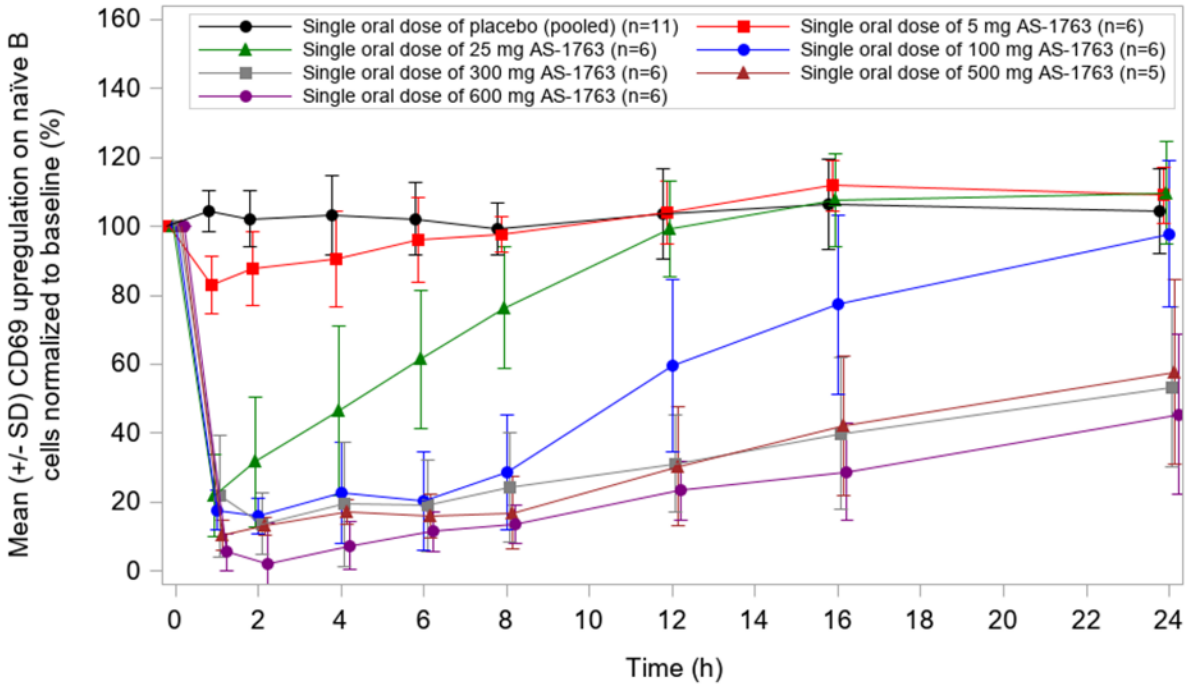
< Plasma concentration of a single oral dose of docirbrutinib >



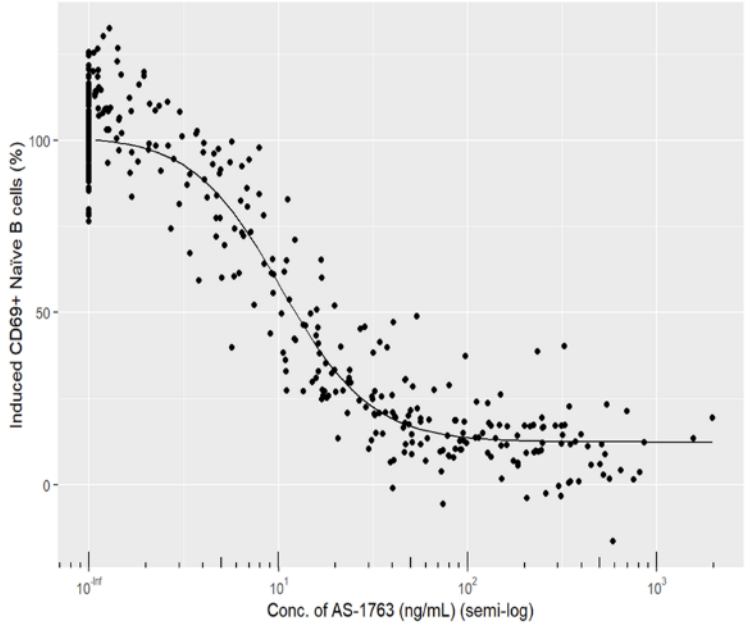
Pharmacodynamics of docirbrutinib (AS-1763)

- Inhibition of B cell CD69 upregulation was observed for 5 mg onwards.
- Maximum inhibition (arbitrarily defined as ≥80%) was observed at 1-2 hours post-dose from 100 mg to 600 mg, and the duration of inhibition was dose-dependent with values of 2, 6, 8 and 8 hours for 100, 300, 500, and 600 mg, respectively.
- Based on a PK/PD correlation analysis, the IC50 value of docirbrutinib on CD69 upregulation was calculated to be 10.5 ng/mL.

< B cell CD69 upregulation after a single oral dose of docirbrutinib >



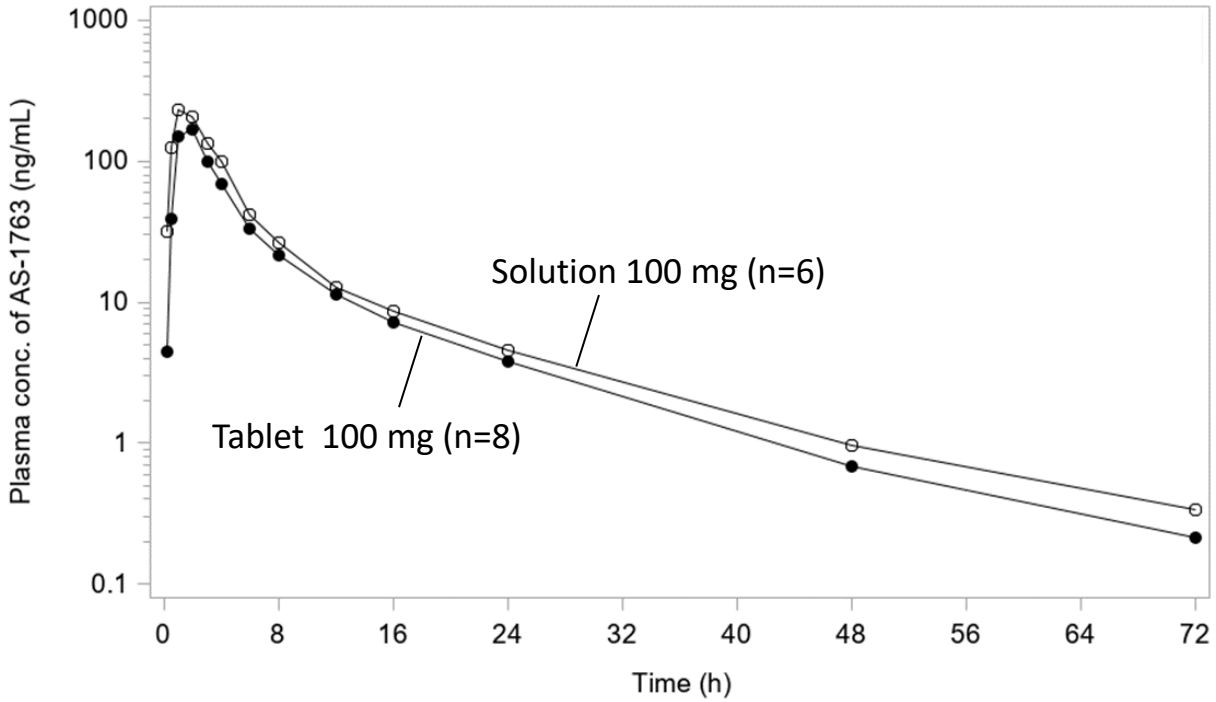
< PK/PD correlation analysis >



Docirbrutinib (AS-1763): BA Part

- In the BA part, 100 mg tablet and the solution showed almost similar PK profile while the exposure of 100 mg tablet was slightly lower than the that of the solution.
- The PK/PD data and favorable safety profile in healthy volunteers support a planned Phase 1b clinical study with docirbrutinib tablet twice daily dosing in relapsed/refractory CLL and B-cell NHL.

<PK of Tablet vs Solution after a Single oral dose docirbrutinib>



Docirbrutinib (AS-1763) : Ph I Clinical Trial in Healthy Volunteers

CARNA BIOSCIENCES

Objectives of the study

A single dose of docirbrutinib was administered orally to healthy volunteers to evaluate:

- plasma concentration of docirbrutinib
- safety assessments (clinical laboratory, ECGs, or vital signs, etc.)
- inhibitory potency on B cell activation

Result of the study

After a single-dose administration of 5 mg, 25 mg, 100 mg, 300 mg, 500 mg, and 600 mg of docirbrutinib :

- plasma concentrations of docirbrutinib were increased in a dose dependent manner.
- no clinically meaningful issues were reported in all safety assessments.
- dose-dependent inhibition in B-cell activation was observed.

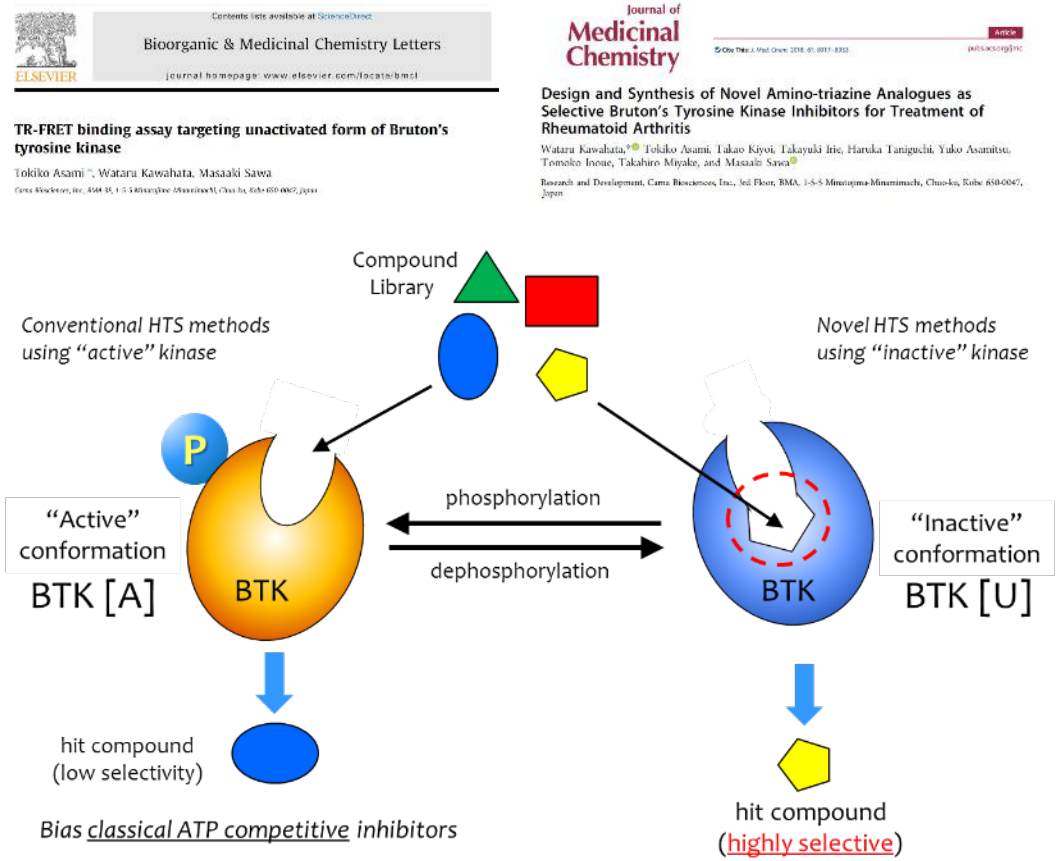
New tablet formulation for Phase 1b study

Relative oral bioavailability was evaluated after administering newly developed tablet formulation containing 100 mg of docirbrutinib to healthy volunteers.

- the new tablet formulation demonstrated good oral bioavailability, supporting that the tablet formulation can be used for Phase 1b study.

Sofnobrutinib (AS-0871) : Excellent Kinase Selectivity

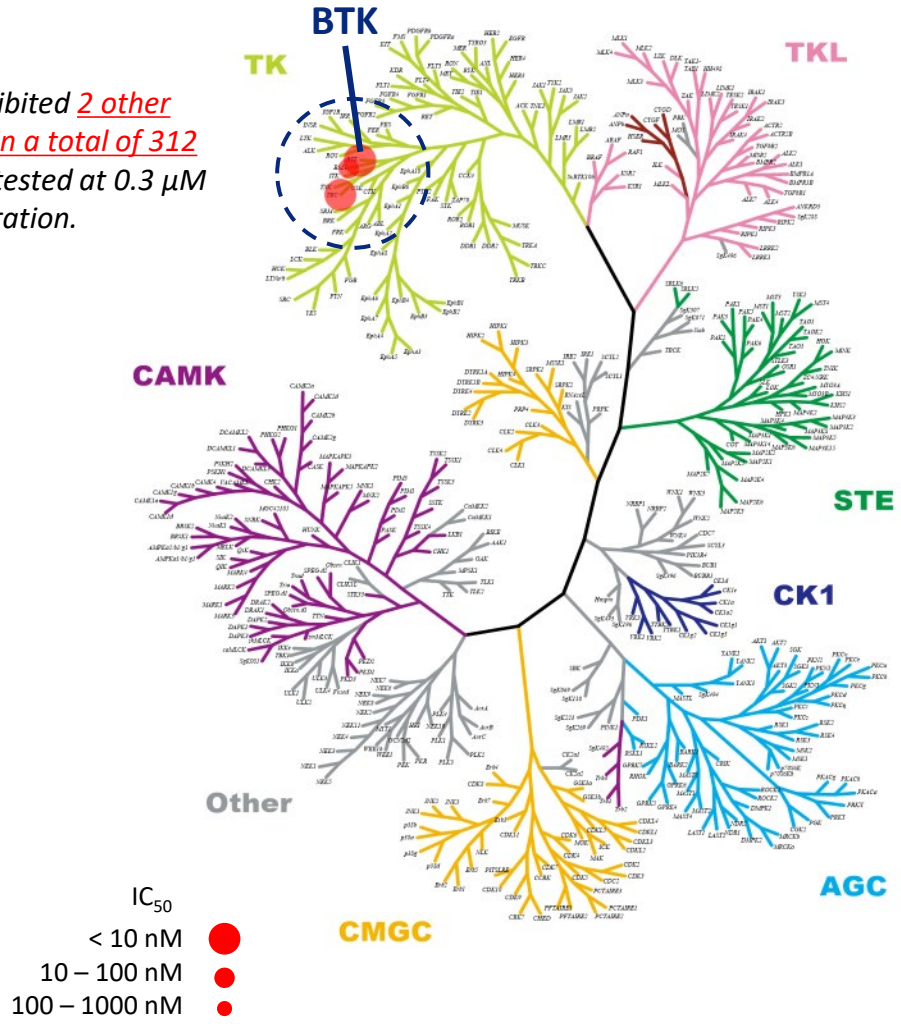
◆ Targeting Inactive Conformation of BTK



	BTK IC_{50} (nM)	
	BTK[A]	BTK[U]
sofnobrutinib	3.4	0.3

◆ Kinase Selectivity Profiling

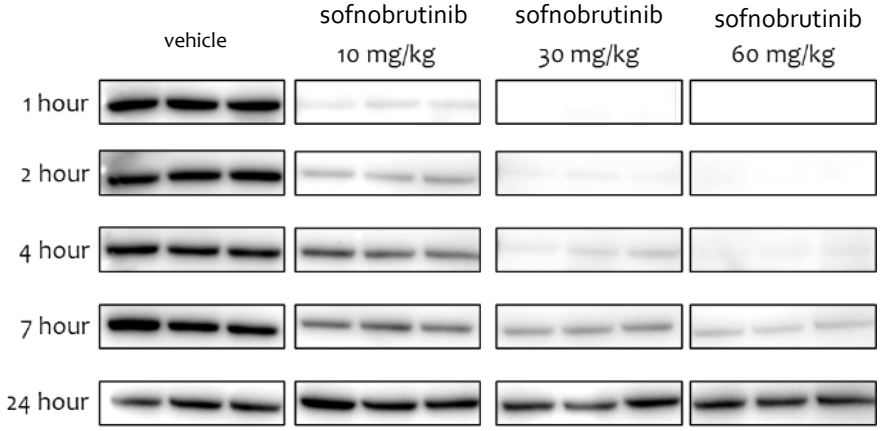
Only inhibited 2 other kinases in a total of 312 kinases tested at 0.3 μM concentration.

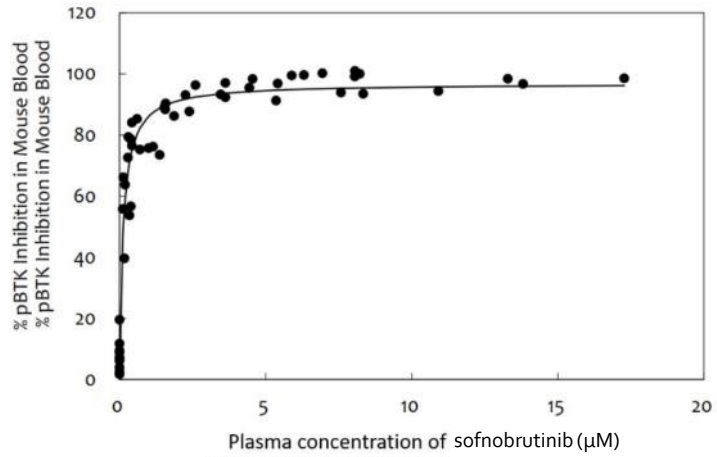


Sofnobrutinib (AS-0871) : In Vivo Therapeutic Efficacy

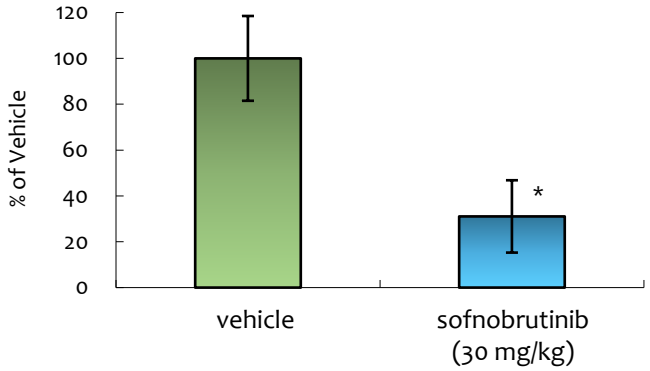
◆ PK/PD Study

Auto-phosphorylation status of BTK was measured following oral single administration of sofnobrutinib.

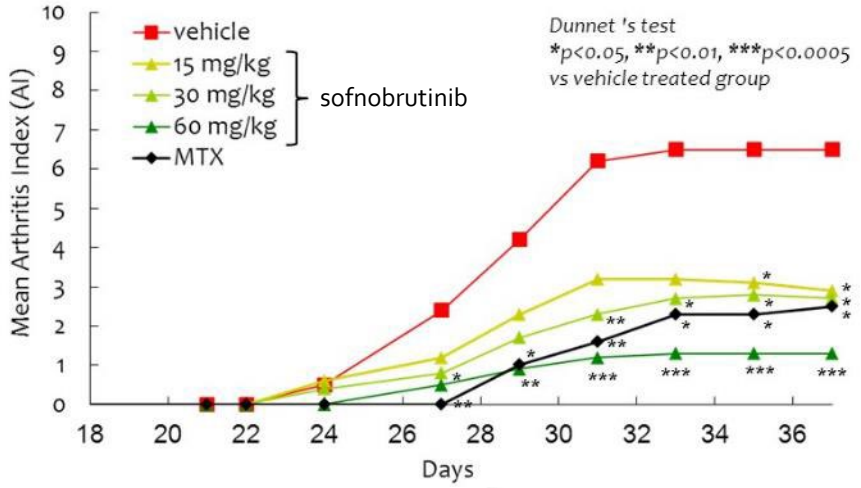




◆ Passive cutaneous anaphylaxis (PCA) mouse model (n=5)



◆ Collagen-induced arthritis (CIA) mouse model (n=10)



Sofnobrutinib (AS-0871): Phase 1 Clinical Trial in Progress

CARNA BIOSCIENCES

Phase 1 in the Netherlands
SAD study (Healthy volunteers)

Completed

- Safe and well-tolerated at all dose levels
- Favorable Pharmacokinetic (PK) Profile
- Promising Pharmacodynamic(PD) effects
- Conducted using simple formulation

Developed multiple new formulations

Phase 1 in the Netherlands
MAD study (Healthy volunteers)

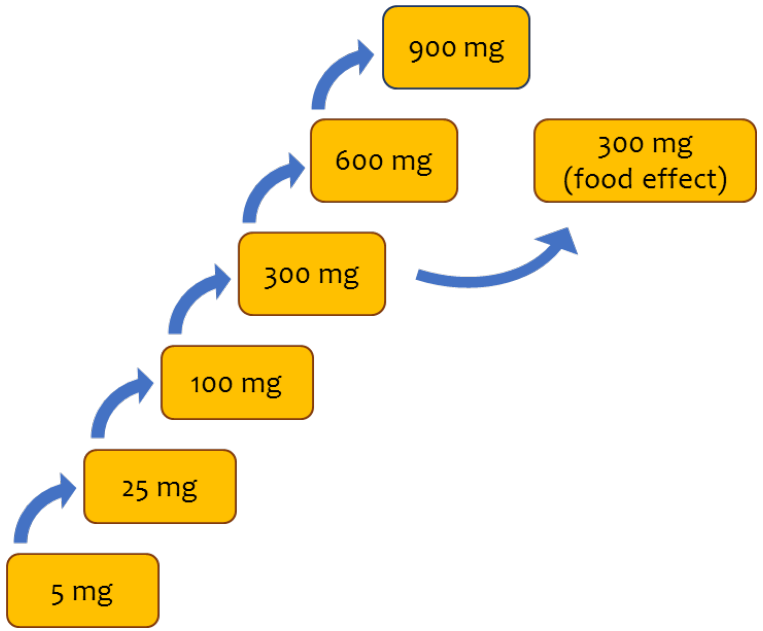
BA Part Evaluate the relative bioavailability of multiple new formulations to select the best formulation — Completed

MAD Part Evaluate the safety, tolerability, PK and PD in the 2-week multiple ascending dose of sofnobrutinib. — Completed

Sofnobrutinib (AS-0871) : FIH Study

SAD Part (Completed)

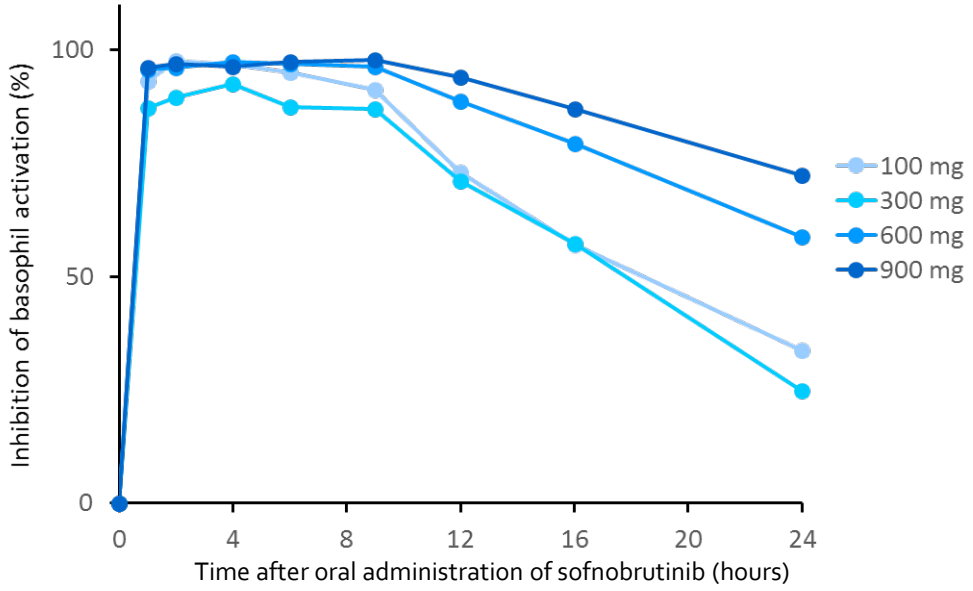
Step 1 Single Ascending Dose (SAD)	Step 2
• 6 dose levels (8 subjects/cohort) • Placebo controlled (6 active / 2 placebo) • Safety and tolerability • Pharmacokinetics and pharmacodynamics	• Food effect

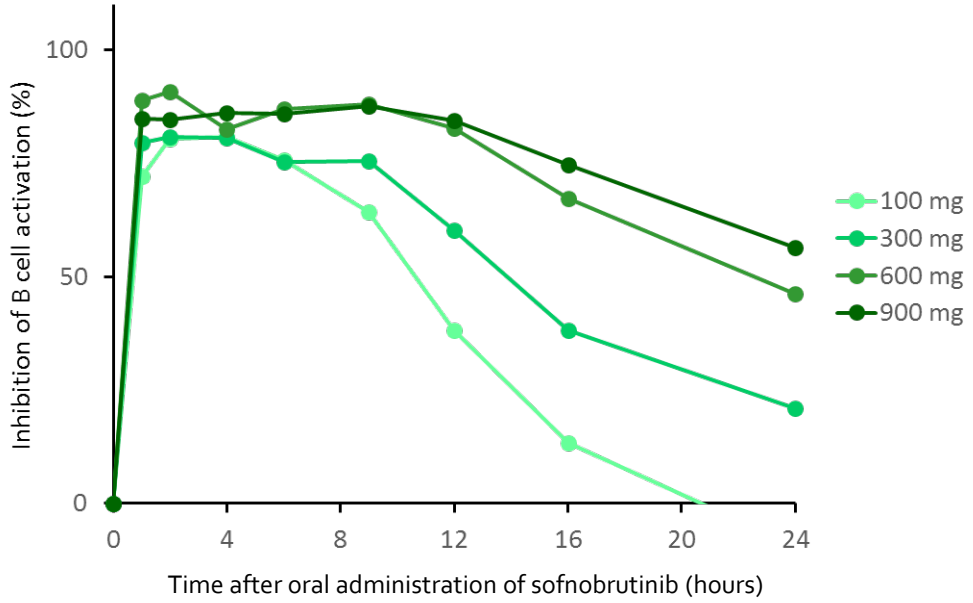


- Sofnobrutinib is well-tolerated without any safety concerns.
- Favorable pharmacokinetic profile.
- Blood samples to assess PD effects were analyzed for evaluation of the B-cell and basophil responses. Administration of sofnobrutinib at 100mg or above resulted in strong inhibition of B-cell and basophil activation.
- Switching to a new formulation in the MAD study.

Pharmacodynamics of sofnobrutinib (AS-0871)

- Pharmacodynamic study demonstrated that subjects who received sofnobrutinib showed dose proportional inhibitions in basophil and B-cell activations, and significant and sustained inhibitory effects were observed at 100 mg and above.
- Oral administration of sofnobrutinib achieved therapeutic plasma levels needed to inhibit B cells and basophils activation, suggesting that sofnobrutinib has a potential to become a new treatment option for inflammatory diseases.

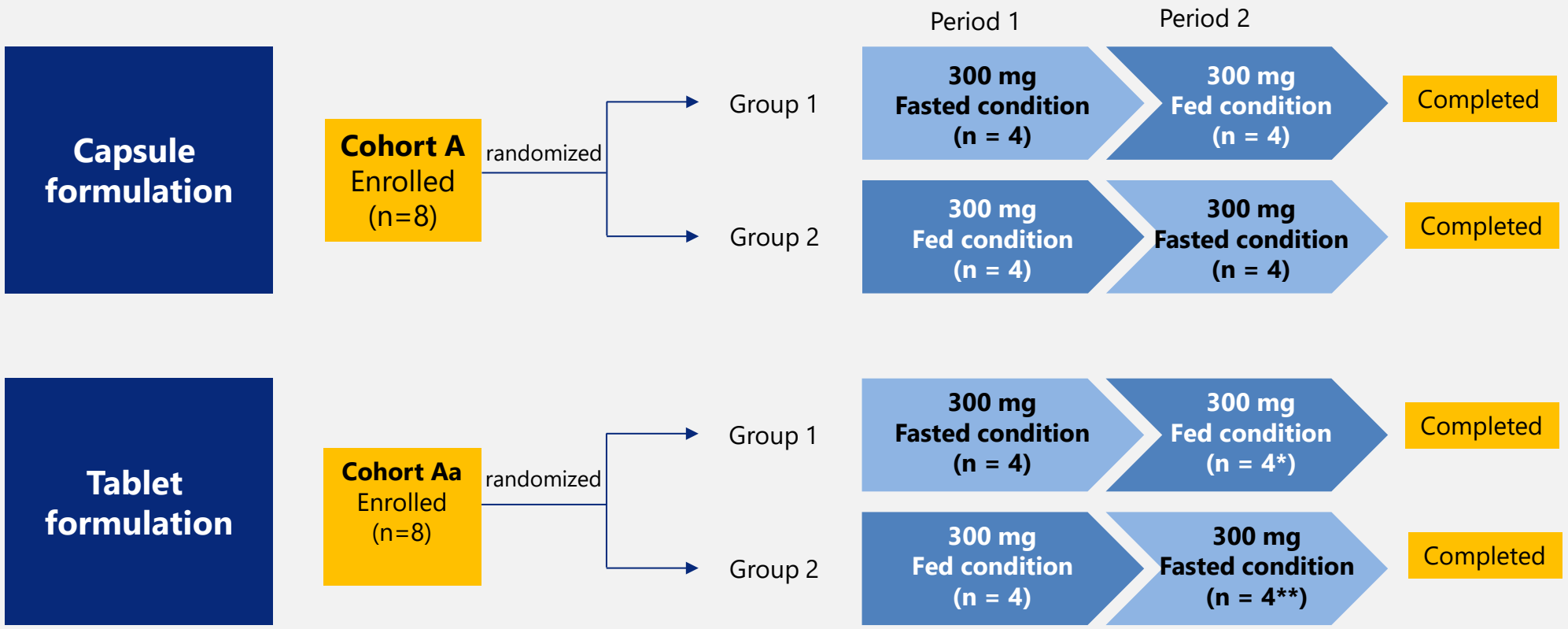




Sofnobrutinib (AS-0871) : Phase 1 MAD Study BA part

Study Design of rBA/FE part

PK, safety, and tolerability after single-dose oral administration of sofnobrutinib, formulated as capsules or tablets, were evaluated under fasted and fed conditions in an open-label, randomized, 2-period crossover design. Eight healthy subjects (Cohort A or Cohort Aa) were randomized to either Group 1 or Group 2 (4 subjects per group).

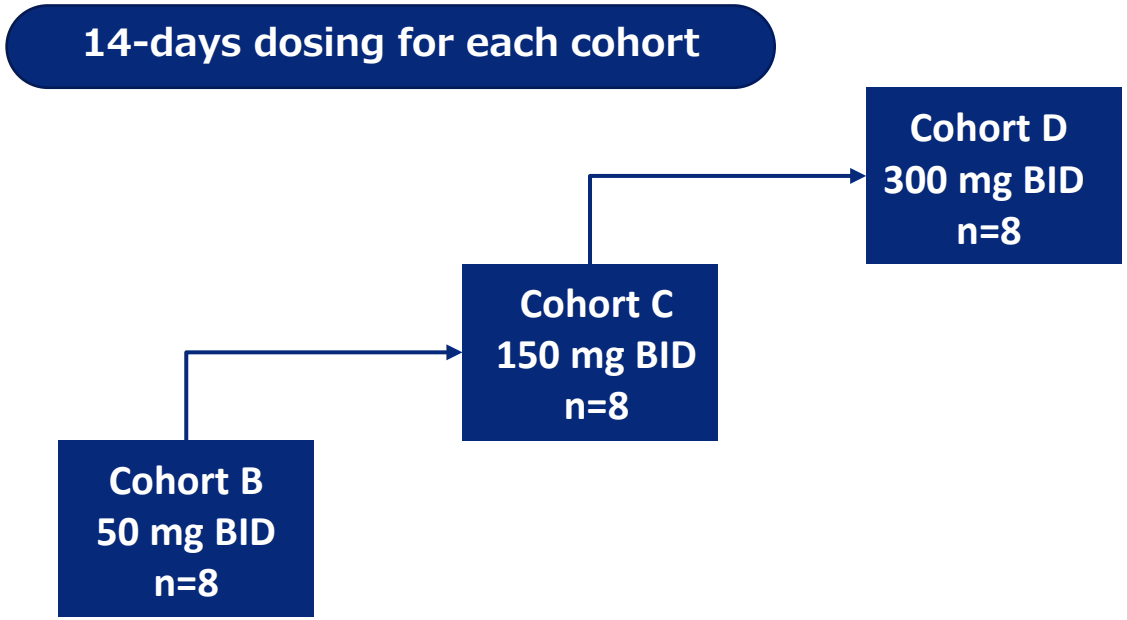


*One subject vomited after dosing (considered not related to study drug), excluded from the PK analysis.
**One subject withdrew from the study due to personal reasons before dosing.

Sofnobrutinib (AS-0871) : Phase 1 MAD Study MAD part

Study Design of MAD part

- In the MAD part, safety, tolerability, PK, and PD of 3 multiple ascending doses of sofnobrutinib, following 14-day multiple dose oral administration of sofnobrutinib, will be investigated using a double blind, placebo-controlled, randomized design in 3 cohorts of 8 healthy subjects each.
- Dosing was completed as planned.
- The final Clinical Study Report (CSR) for the Phase 1 MAD study has been finalized in November 2023.



- Well tolerated with no dose-limiting AEs.
- Favorable safety profile up to 300 mg BID.
- The exposure levels increased dose-dependently, and favorable PK profile with tablet formulation was confirmed.
- Achieved almost complete inhibition of basophil activation (PD marker) at 150 mg and 300 mg BID at a steady state

Sofnobrutinib (AS-0871) : Results from the Phase I Clinical Trial (1)

Objectives of Single Ascending Dose (SAD) study

A single dose of Sofnobrutinib was administered orally to healthy volunteers to evaluate:

- plasma concentration of sofnobrutinib
- safety assessments (clinical laboratory, ECGs, or vital signs, etc.)
- inhibitory potency on B cell and basophil activation

Result of SAD study

After a single-dose administration of 5 mg, 25 mg, 100 mg, 300 mg, 600 mg, and 900 mg of sofnobrutinib:

- plasma concentration of sofnobrutinib were increased in a dose dependent manner.
- no clinically meaningful issues were reported in all safety assessments.
- sufficient inhibition of B cell and basophil activations was observed at 100 mg or above.

New formulations for Multiple Ascending Dose (MAD) study

Plasma concentration was evaluated after administering newly developed capsule formulation and tablet formulation containing 50 mg of sofnobrutinib to healthy volunteers:

- the new tablet formulation was shown to be safe and demonstrated good oral bioavailability, and the tablet formulation was selected for the MAD part.

Sofnobrutinib (AS-0871): Results from the Phase I Clinical Trial (2)

Multiple Ascending Dose (MAD) study MAD part design

- Double blinded, placebo-controlled, randomized multiple ascending dose study in healthy volunteers
- 14-day multiple oral doses of sofnobrutinib tablets in 3 cohorts (50, 150 or 300 mg twice daily)
- The safety, tolerability, PK and PD were evaluated.

Result of MAD study MAD part

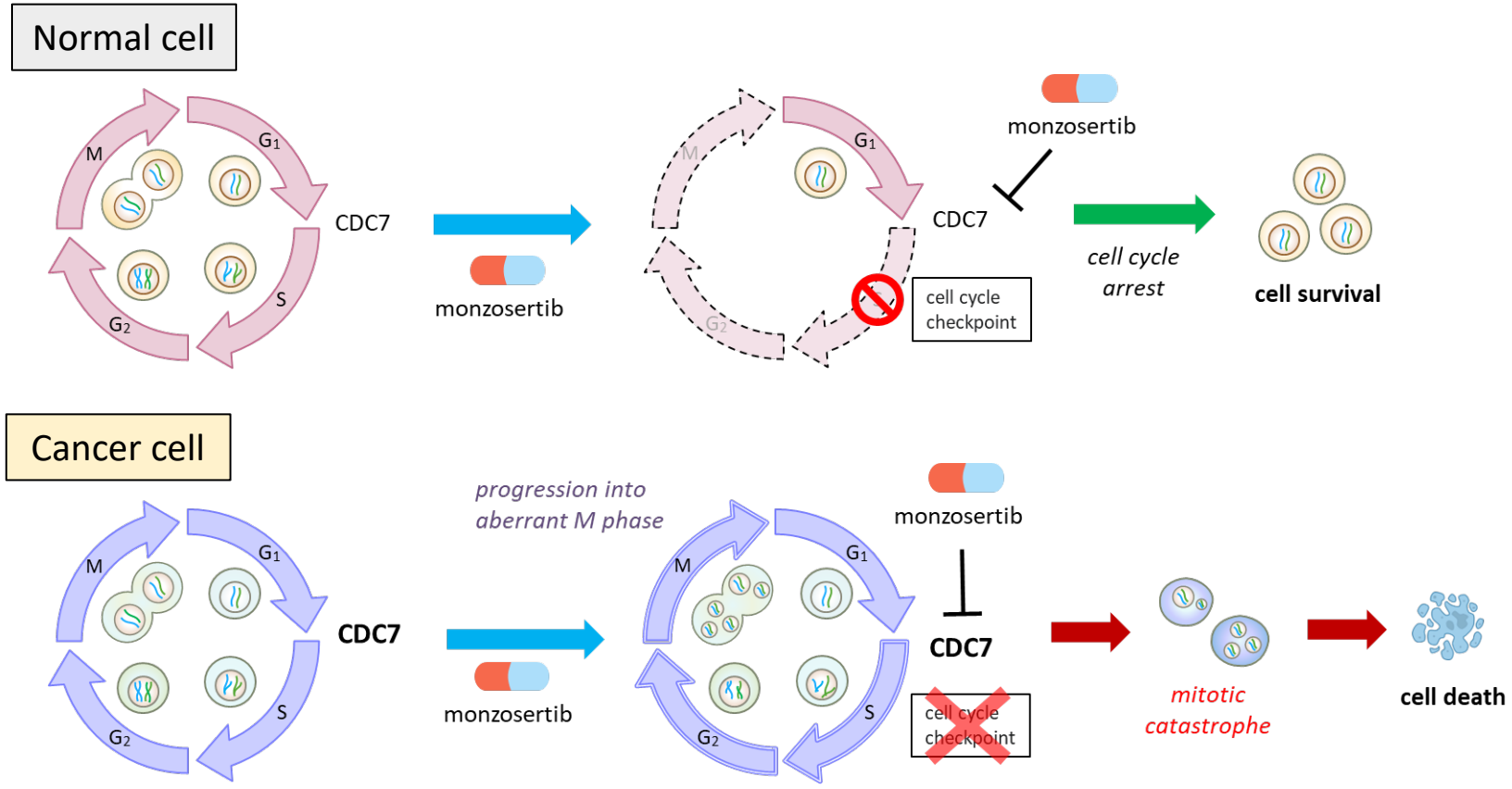
- Well tolerated with no dose-limiting adverse events (AEs): AEs were mostly mild.
- Favorable safety profile up to 300 mg twice daily
- Favorable PK profile: approximately dose proportional with increasing doses
- Robust PD effect was observed: over 90% inhibition for basophils activation on Day 14 at 150 and 300 mg BID doses.

These results from the Phase 1 studies of sofnobrutinib support to advance sofnobrutinib into Phase 2 clinical development for further investigations.

Monzosertib (AS-0141)

CDC7 Kinase Inhibitor: MoA of monzosertib

- CDC7 (cell division cycle 7) is a serine/threonine kinase that facilitates DNA replication during DNA synthesis
- Over expression of CDC7 has been reported to cause uncontrolled proliferation of many cancer types



Inhibition of CDC7 in normal cells does not cause cell death, only leads to cell cycle arrest at the DNA replication checkpoint

Inhibition of CDC7 in cancer cells causes lethal S phase or M phase progression when the cancer cells have a defective cell cycle checkpoint

Monzosertib (AS-0141) : Time-Dependent Inhibitor of CDC7

◆ Monzosertib has a unique inhibitory mechanism for CDC7 kinase (time-dependent inhibition)

Contents lists available at ScienceDirect

European Journal of Medicinal Chemistry

journal homepage: http://www.elsevier.com/locate/ejmech

Research paper

Discovery of novel furanone derivatives as potent Cdc7 kinase inhibitors

Takayuki Irie [a,*], Tokiko Asami [a], Ayako Sawa [a], Yuko Uno [a], Mitsuharu Hanada [a], Chika Taniyama [b], Yoko Funakoshi [b], Hisao Masai [c], Masaaki Sawa [a]

Journal of Medicinal Chemistry

pubs.acs.org/jmc

Drug Annotation

Discovery of AS-0141, a Potent and Selective Inhibitor of CDC7 Kinase for the Treatment of Solid Cancers

Takayuki Irie,* Tokiko Asami, Ayako Sawa, Yuko Uno, Chika Taniyama, Yoko Funakoshi, Hisao Masai, and Masaaki Sawa

Cite This: J. Med. Chem. 2021, 64, 14153−14164

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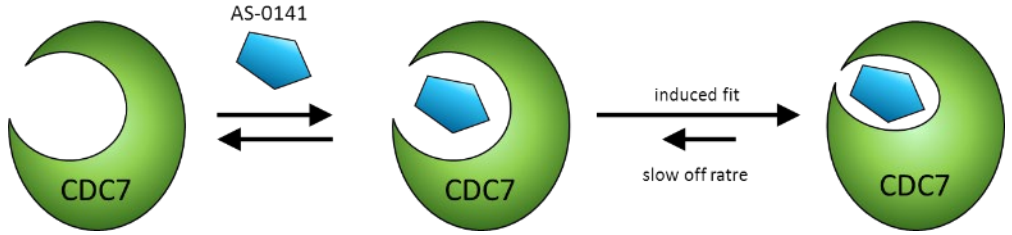
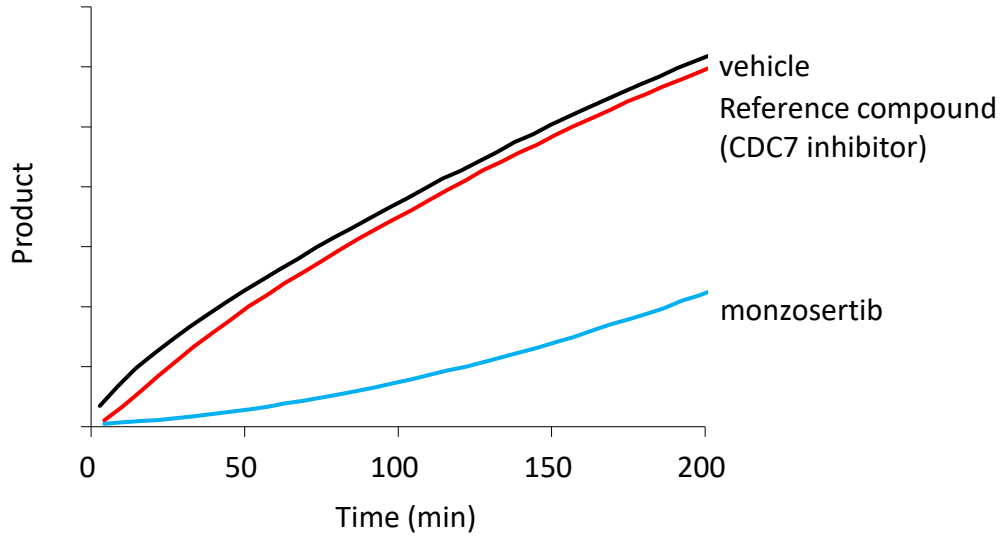


Inhibitory potency (IC50) for CDC7 in the presence of 1 mM ATP	
Without Preincubation	With Preincubation
503 nM	2.4 nM

J Med Chem. 2021 Oct 14;64(19):14153-14164.

◆ Monzosertib inhibits CDC7 in a reversible fashion but has a very slow off-rate

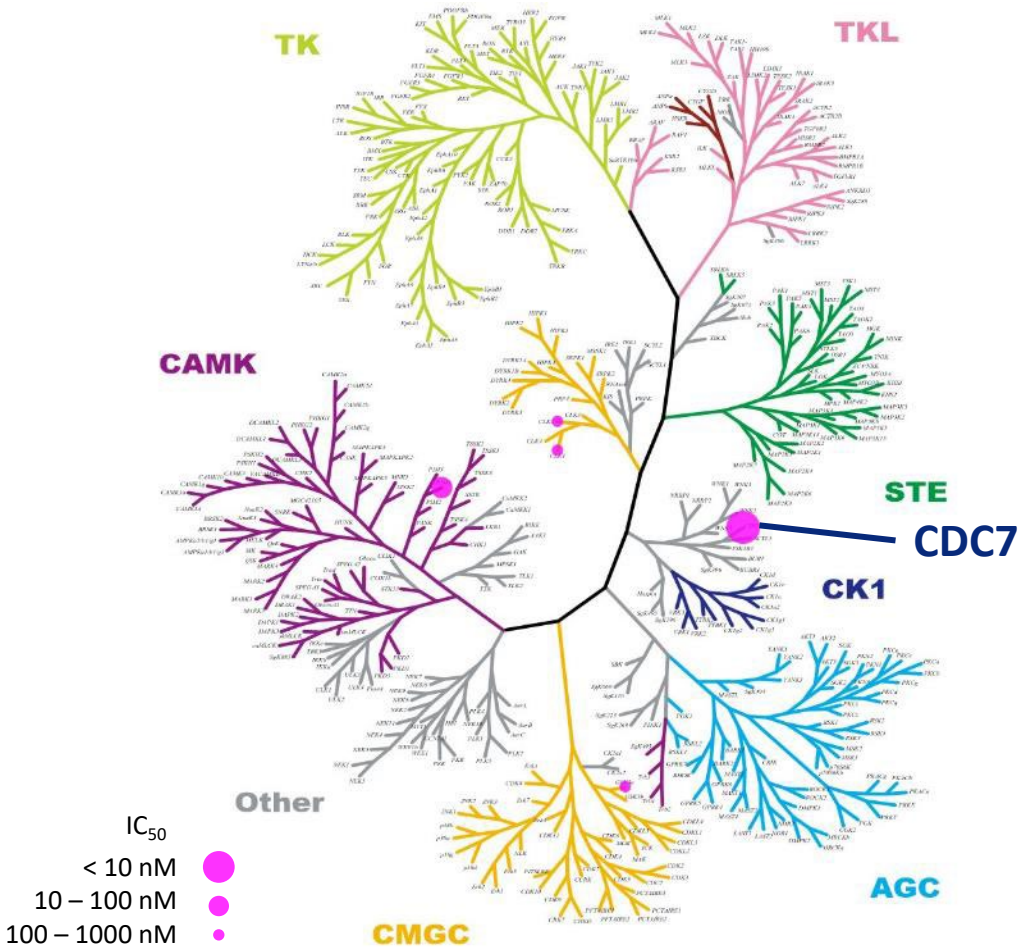
Rapid dilution assay for Cdc7 inhibitors. Recovery of enzymatic activity was monitored by formation of the phosphorylated product.



Monzosertib (AS-0141) : High Kinase Selectivity

◆ Kinase Selectivity Profiling

In the presence of 1 mM ATP with preincubation



◆ IC50 values of hit kinases（at 1 mM ATP）

	IC_{50} (nM)	
	Preincubation	
	-	+
CDC7	503 (210-fold)	2.4
PIM1	30	34
CLK1	212	206
CLK2	270	227
GSK3α	189	251

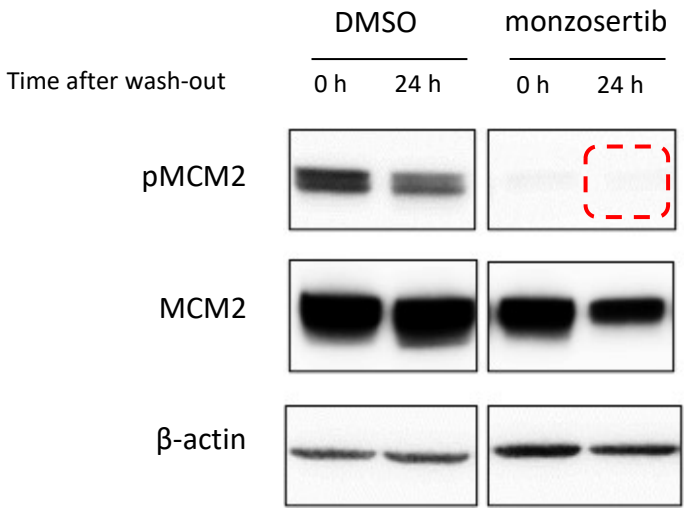
CDC7 is the only kinase that shows preincubation effect

J Med Chem. 2021 Oct 14;64(19):14153-14164.

Monzosertib (AS-0141) : Strong Cellular Activity

◆ Prolonged inhibition in cells

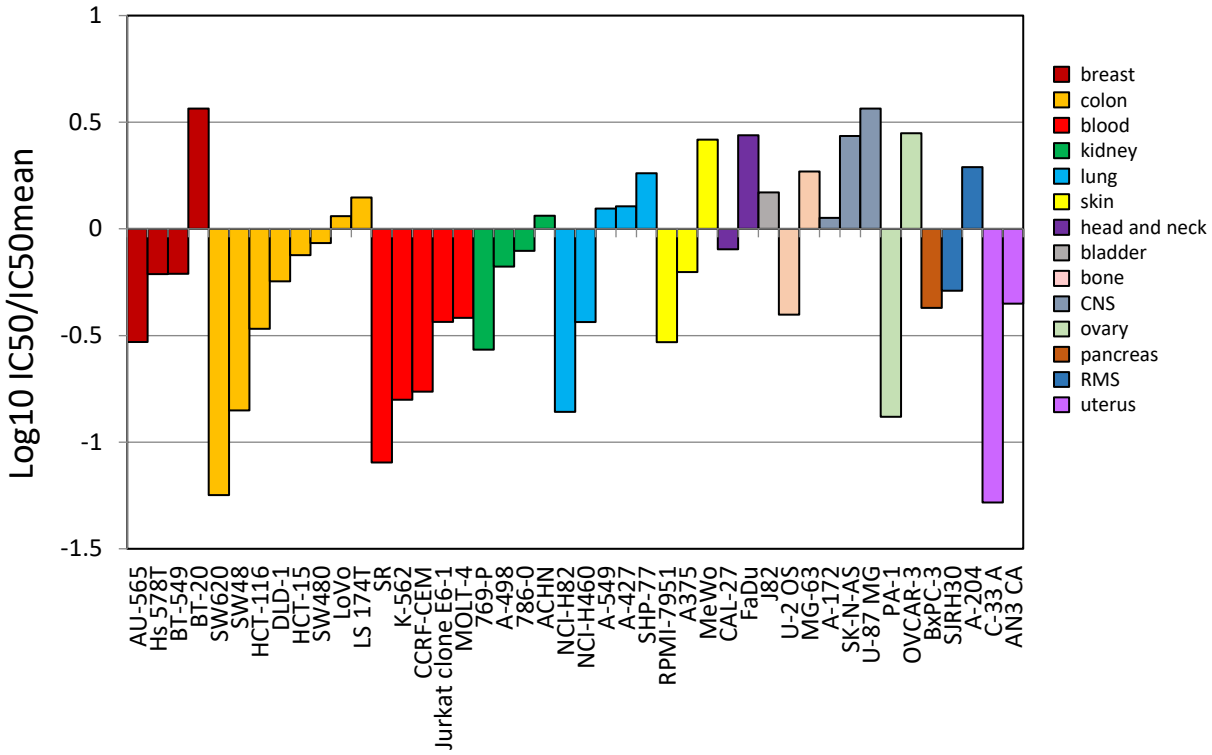
Human colon cancer cell line, Colo-205 cells were treated with DMSO control or monzosertib. After washout of the inhibitor, the cells were further incubated in the same media for 0 or 24 h and subjected to western blot analysis.



the inhibitory effect of monzosertib on the phosphorylation of MCM2 in cells continued up to 24 h after washing out

J Med Chem. 2021 Oct 14;64(19):14153-14164.

◆ Monzosertib potently inhibited growth in a wide range of tumor cell lines, including solid and hematological tumors

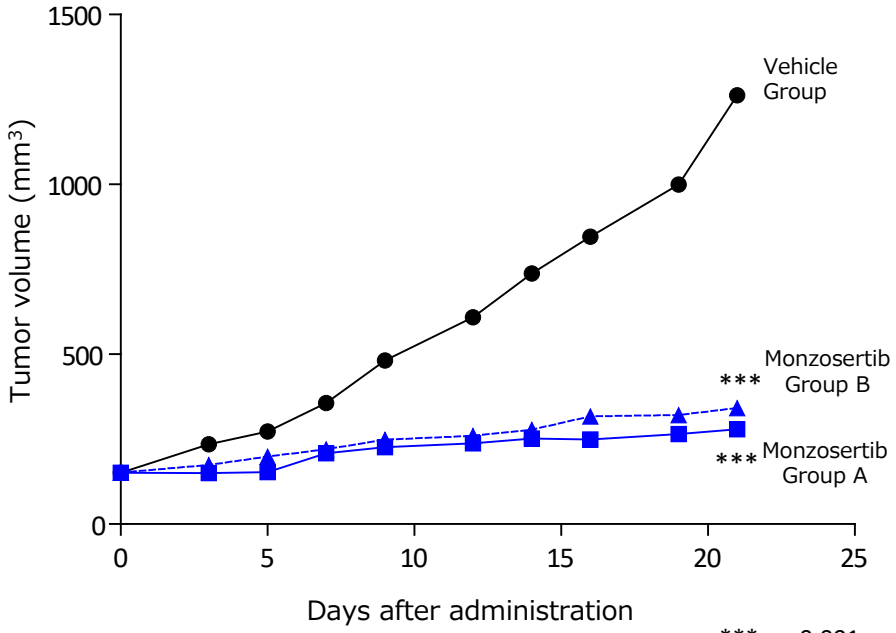


44 Cancer cell lines (Oncolines at NTRC)

Monzosertib (AS-0141): Robust In Vivo Antitumor

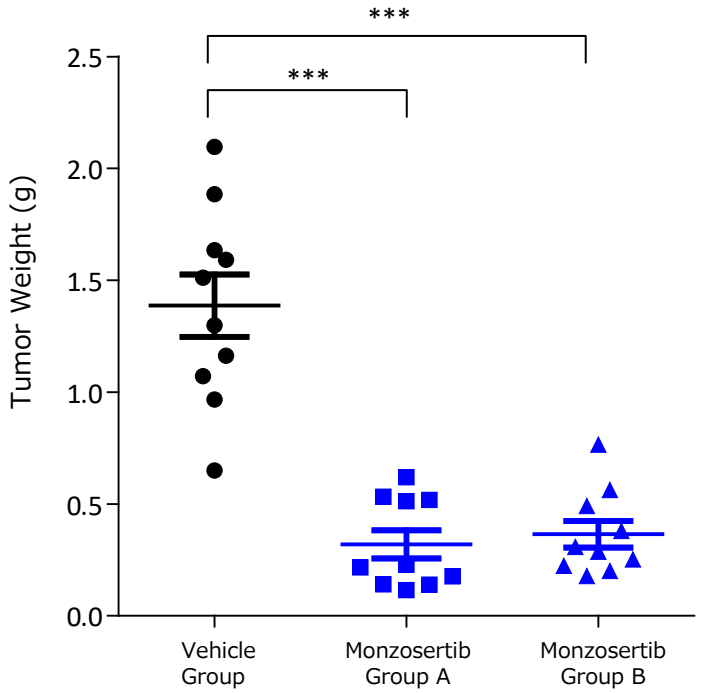
In vivo antitumor efficacy of monzosertib in a SW620 (human colon cancer) xenograft mouse model

Tumor Growth Curve (Mean, n = 10)



***: p<0.001

Final Tumor Weight of Each Mouse



***: p<0.001

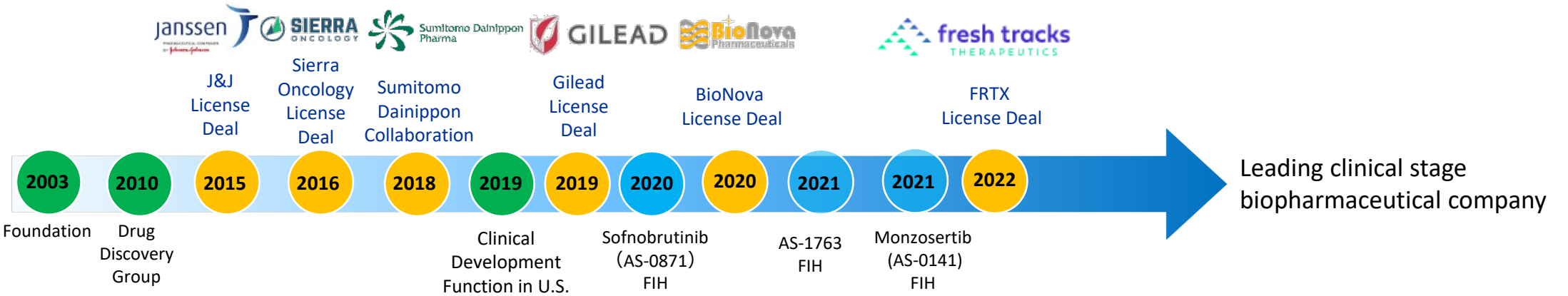
Monzosertib group A: 60 mg/kg TID, 4d ON/2d OFF
Monzosertib group B: 120 mg/kg QD

J Med Chem. 2021 Oct 14;64(19):14153-14164.

Appendix 2

Building Long-Term Value

Our goal is to deliver innovative therapies for patients suffering from serious diseases



2003 – 2024	2025 Plan	Long term plan
● Founding members who had expertise in kinase drug discovery technology spun out from Nippon Organon and established Carna. ● Started offering kinase proteins and screening services to pharmaceutical companies for kinase inhibitor drug discovery. ● In 2010, Drug Discovery Group was established to conduct internal drug discovery. ● Entered into five license agreements and one joint-development agreement with pharmaceutical companies. ● Initiated FIH study of BTK inhibitor docirbrutinib (AS-1763), sofnobrutinib (AS-0871) and CDC7 inhibitor monzosertib(AS-0141). ● Completed Phase 1 study of BTK inhibitor sofnobrutinib(AS-0871) and started partnering activities.	● Actively seek a strategic partner to bring sofnobrutinib into late clinical development stages. ● Advance Phase 1 studies of BTK inhibitor docirbrutinib (AS-1763) and CDC7 inhibitor monzosertib (AS-0141). ● Strengthen global clinical development capability. ● Create next wave of pipeline.	● Advance clinical studies of docirbrutinib (AS-1763) and monzosertib (AS-0141). ● Find strategic partners for late stage development and commercialization. ● Receive milestone payments and royalties from licensees and strengthen financial position. ● Create next wave of pipeline.

FIH: First in Human

Management Team

Directors

Kohichiro Yoshino, Ph.D. **President & Chief Executive Officer, Representative Director**

Dr. Yoshino founded Carna Biosciences in 2003 as a spin-out venture from Nippon Organon, a subsidiary of N.V. Organon where he was the head of the Osaka Research Center. As a member of Organon Research Committee, Dr. Yoshino contributed to research and development of NV Organon. Before joining Nippon Organon, he engaged in the research and development of small molecule drugs at Kanebo Corporation Inc.
From 2004 to 2008, he was a Visiting Professor at Center for Advanced Science and Innovation, Osaka University.
He earned M.S. in Chemistry from the Graduate School of Tokyo Institute of Technology and Ph.D. from Kyoto University

Masaaki Sawa, Ph.D. **Chief Scientific Officer, Director**

Dr. Sawa built the current drug discovery group at Carna. Before joining Carna, he held positions at Sumitomo Dainippon Pharma.
Prior to that, he was a medicinal chemist at Nippon Organon, a subsidiary of N.V. Organon.
From 2004 to 2006, he was a visiting scientist at the Scripps Research Institute in San Diego.
Dr. Sawa was a Visiting Professor at Graduate School of Medicine, Kobe University from 2013 to 2015.
He received his Ph.D. from Kyoto University.

Akinori Arimura, Ph.D. **Chief Development Officer, Director**

Dr. Arimura joined Carna Biosciences in 2018 as head of newly established clinical development department and has since established Carna's clinical development capability both in Japan and in the U.S. Prior to joining Carna, Dr. Arimura led the global development of anticancer drugs at Shionogi & Co., Ltd, with responsibility for planning and implementing the clinical studies as well as for collaboration with biotech companies. Prior to that, he engaged in the drug discovery research at Shionogi as head of allergy, immunology and oncology areas.
He was a visiting scientist at Columbia University, where he was recognized for his achievement in Molecular Immunology research.
Dr. Arimura received his Ph.D. from Gifu Pharmaceutical University.

Norio Aikawa **Head of Drug Discovery and Support Business, Director**

Mr. Aikawa is one of the founding member of Carna Biosciences. Mr. Aikawa has a long and extensive experience in the area of intellectual property and has contributed to strengthening Carna's IP strategy. Before joining Carna in 2003, he was the head of Intellectual Property Department at Nippon Organon. Before that, he was the head of Intellectual Property Department at Kanebo Corporation.
He holds a bachelor's degree in Science from Hirosaki University.

Emi Yamamoto **Chief Financial Officer, Director, President of CarnaBio USA, Inc.**

Ms. Yamamoto joined Carna Biosciences in 2004 after engaged in fund administration at CSK Venture Capital. She built Carna's accounting and business management group and held a responsible role in Carna's IPO. Since 2017, she leads administration group, in charge of accounting, finance, human resources, and corporate planning.
Ms. Yamamoto holds a bachelor's degree in Business Administration from Aoyama Gakuin University, and a Certified Public Accountant.

Kaoru Suzuki, Ph.D. **Outside Director**

Dr. Suzuki joined the Board of Directors of Carna Biosciences in 2024. Before joining Carna, Dr. Suzuki held key senior positions in business development and partnering at Roche Pharma Japan, Roche Partnering. He was the representative of Roche Pharma Japan, Roche Partnering and the Japan/Korea Business Development Head from 2010 to 2022 and has been serving as a Senior Advisor since 2022. Prior to that, he engaged in research & development, business development and licensing activities at Daiichi Pharmaceutical Co., Ltd. Dr. Suzuki earned a M.S. in Pharmacy from the Graduate School of Tokyo University of Science and his Ph.D. in Medicine from the Jikei University School of Medicine.

Management Team

Directors

Atsuo Arita **Outside Director**

Before joining the Board of Directors in 2020, Mr. Arita served as External Auditor of Carna Biosciences from 2004 to 2020, overseeing its management as a full-time company auditor. He held various responsible roles in accounting, finance, and sales management at Kanebo Corporation Ltd. and was the head of business management at Kanebo.
He holds a bachelor's degree in Business and Commerce from Keio University.

Tsuguo Ogasawara **Outside Director**

Mr. Ogasawara served as External Auditor of Carna Biosciences from 2005 to 2020 before joining the Board of Directors in 2020. He has brought Carna his extensive experience in international business. He was a Director at Chugai Pharmaceutical Co. Ltd., in charge of international business. Prior to that, he was engaged in business management, finance, and international business at Toray Industries, Inc.
He holds a bachelor's degree in Economics from Keio University.

Teruo Takayanagi, Ph.D. **Outside Director**

Dr. Takayanagi joined the Board of Directors of Carna Biosciences in 2015. He was the Director of Daiichi Pharmaceutical Co., Ltd. from 2001 to 2006 where he engaged in the R&D management and led post-marketing surveillance to promote proper use of its pharmaceutical products. He also held a responsible role in business integration with Sankyo. He was a full-time Auditor of Daiichi Sankyo Company, Limited from 2007 to 2011. Dr. Takayanagi is an Auditor of Japanese Society of Drug Informatics.
Dr. Takayanagi received his Ph.D. from the University of Tokyo.

Takao Matsui **Outside Director**

Mr. Matsui served as External Auditor of Carna Biosciences since 2019 to 2020 before joining the Board of Directors in 2020. He has over 35 years of experience in financial audit and related advisory business. He served as Certified Public Accountant at KPMG AZSA LLC. from 1982 to 2018. Mr. Matsui also currently serves as Outside Director of AIR WATER, INC. He was a Specially Appointed Professor at School of Accountancy, Kansai University since April 2018 to March 2020. He is a part-time lecturer at Kansai University and School of Accountancy, Kansai University since April 2020.
Mr. Matsui holds a bachelor's degree in School of Business Administration from Kwansei Gakuin University, and a Certified Public Accountant.

"Carna" is a goddess of Roman mythology who takes care of human health, protecting the human heart and other organs as well as everyday life, and is said to be the root for the word "cardiac."

The word "biosciences" is derived from the words 'biology' and 'life sciences.'

Carna Biosciences has created contemporary Carna goddess with protein kinase.

Carna Biosciences, Inc.

Corporate Planning

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