OSE IMMUNO THERAPEUTICS

Breaking Through the Therapeutic Ceiling with First-In-Class Immunotherapies

September 2024

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Delivering first-in-class immunotherapies from Target to Clinic

Key strategic pharma partnerships driving long-term value

- Founded in **2012**
- IPO/Euronext in **2015**
- **60+ FTEs**
- **500+ granted patents**

- **52 M€** : Equity
- **€219 M** : Partnerships*
  +80% non-dilutive funding

Phase 3 asset in Oncology
Tedopi® most advanced cancer vaccine
NSCLC 2L post-CPI market: ***+$5b/year***

Phase 2 asset in Inflammation
Lusvertikimimab anti-IL-7R mAb
Ulcerative colitis market: ***+$10b/year***

3	**Strategic Pharma Partners**	**+€2.1b** potential milestones	abbvie, Boehringer Ingelheim, Veloxis Pharmaceuticals
5	**Clinical stage assets**	• 3 **Fully** owned (Phase 1, 2, 3) • 2 **Partnered** (Phase 1, 2)	
3	**Pre-clinical** platforms Assets approaching development	• **Innovative MoA & Targets** to address critical unmet need • International Research Collaboration	Harvard University, UKSH Universitätsklinikum Schleswig-Holstein, Memorial Sloan Kettering Cancer Center, Nantes Université, Inserm

* Including upfront, milestones and reinvoiced R&D costs + previous license agreement with J&J and Servier

Strong foundation & recurrent track record of success

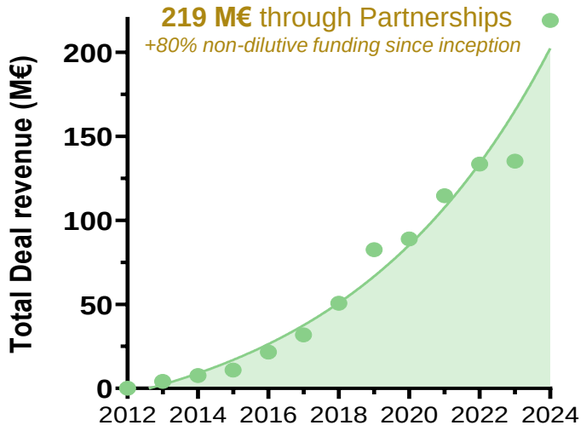
10 years of validated innovation in immunology thanks to an Extra[*not*]Ordinary R&D engine

Validated science
in high-impact publications

500+ granted patents

Strong track record
of Pharma partnerships

Recurrent revenues
Robust first-in-class business model



Strategic partners provide industry-leading clinical support & strong financial foundations

Over €2.1bn in potential milestones; €219m* already received

Immuno-Oncology
Immuno-Inflammation
Potential
Received

BI 770371
+ anti-PD1/cytokine
Solid tumors & Metabolic Diseases

Boehringer Ingelheim

Up to **€1.1bn**

€104m received

+ Tiered royalties
on Global Sales

ABBV-230
Chronic Inflammation

abbvie

Up to **$713m**

$48m upfront

+ Tiered royalties
on Global net Sales

FR104/VEL-101
Kidney transplant

Veloxis PHARMACEUTICALS
an Asahi Kasei company

Up to **€315m**

€13.9m received

+ Tiered royalties
on Global Sales

* Including upfront, milestones and reinvoiced R&D costs + previous license agreement with J&J and Servier

Clinical pipeline

Combining a clinical portfolio of first-in-class immunotherapies and diversified assets in IO and I&I

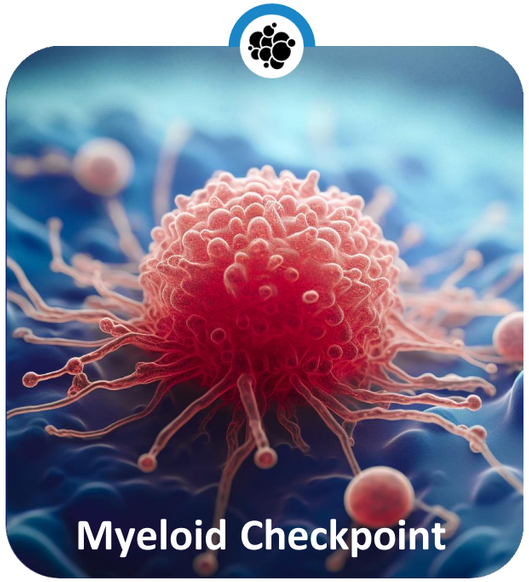
	Product candidate	Target	Indication	Research	IND-enabling	Phase Ia/Ib	Phase II	Phase III
Proprietary	Tedopi® (OSE IMMUNO THERAPEUTICS)	Neoepitope Vaccine	NSCLC Mono post-ICI 3L					
			NSCLC Mono post-ICI 2L					**Pivotal Phase 3**
			PDAC Combo *(exploratory eIIS)*					
			NSCLC Combo 2L post-ICI *(eIIS)*					
			OC Mono or Combo *(eIIS)*					
	OSE-127 Lusvertikimab (OSE IMMUNO THERAPEUTICS)	Anti-IL-7R	**Ulcerative Colitis**					**Positive Results**
			ALL					
	OSE-279 (OSE IMMUNO THERAPEUTICS)	Anti-PD1	Solid tumors					
Partnered	FR104/VEL-101	Anti-CD28 (Veloxis)	Kidney Transplantation					
	BI 770371	Anti-SIRPα (Boehringer Ingelheim)	Solid tumors					
			Cardiovasc-Renal-Metabolic					
	ABBV-230	Anti-ChemR23 (abbvie)	Chronic Inflammation					
	Anti-PD1/cytokine	Anti-PD1/undisclosed (Boehringer Ingelheim)	Solid tumors					
	IL-7R CAR-T	Anti-IL-7R CAR-T (Memorial Sloan Kettering Cancer Center)	IL-7R+ tumors					

Immuno-Oncology
Immuno-Inflammation

NSCLC: Non-Small Cell Lung Cancer; **PDAC:** Pancreatic Ductal AdenoCarcinoma; **OC:** Ovarian Cancer; **ALL:** Acute Lymphoblastic Leukemia. **UC:** Ulcerative Colitis.; **IND:** Investigational New Drug Application.

Research platforms

Extra(not) Ordinary Research PowerHouse



- Anti-SIRPα
- Anti-CLEC-1 mAbs

- Anti-PD1/cytokine
- Cis-Demasking technology

- Anti-ChemR23
- Undisclosed new pro-resolutive GPCRs

- IL-35 mRNA
- Undisclosed programs

Partnered Asset

Key potential catalysts

Readouts

- **Lusvertikimab**
  First positive Phase 2 results in UC
  Complete Phase 2 results
- **OSE-279**
  Positive Phase 1 results
- **BI 770371 *(partnered)****
  Phase 1b results in solid tumors
- **FR104/VEL-101 *(partnered)****
  Positive Phase 1/2 results in Kidney Tx

Progress

- **Tedopi®**
  Phase 3 start in NSCLC 2L
- **FR104/VEL-101 *(partnered)****
  Phase 2 start in Kidney Tx
- **BI 770371 *(partnered)****
  Phase 2 start in CRM
- **ABBV-230 *(partnered)****
  IND/Phase 1
- **R&D programs & Lusvertikimab**
  New partnering opportunities

Readouts

- **Tedopi®**
  Phase 3 results in NSCLC 2L
- **BI 770371 *(partnered)***
  Phase 1b + Phase 2 results
- **FR104/VEL-101 *(partnered)***
  Phase 2 results in Kidney Transplantation
- **ABBV-230 *(partnered)***
  Phase 1 results + Phase 2 results

Progress

- **Lusvertikimab *(to partner)***
  Phase 2b/3 start
- **CLEC-1**
  IND/Phase 1
- **Undisclosed Program I&I**
  IND/Phase 1
- **New R&D programs/platforms**
- **New partnering opportunities**

2024 → 2025-2027

* Best estimate from the Management - not binding

Investment highlights

Late-stage compelling products	**Promising clinical data from the Phase 3 oncology asset Tedopi®** **Positive Phase 2 IBD asset Lusvertikimab**
Large market opportunities	**Focus on multi-billion $ markets** • **I/O:** NSCLC (2L, 3L), HCC (1L, 2L), HNSCC (2L), Leukemia • **I&I:** IBD (Ulcerative Colitis), Kidney Transplantation, Cardiovascular-Renal-Metabolic diseases
Strong pharma partnerships	**Sustainable business through multi-partnership strategy** **> €2.1bn milestones:** AbbVie, Boehringer Ingelheim, Veloxis
Long duration IP portfolio	**IP extends to 2040's** **I/O:** Tedopi® (>2038), BI770371 (>2037), OSE-279 (>2039), CLEC-1 (>2040) **I&I:** OSE-127 (>2037), FR104 (>2035), ABBV-230 (>2040)
Multiple upcoming catalysts	**Multiple key clinical and regulatory milestones expected in next 12 months** • **Tedopi®:** Confirmatory pivotal phase 3 NSCLC 2L start • **Lusvertikimab (OSE-127):** Complete Top-Line efficacy results Ulcerative Colitis Phase 2 • **BI 770371:** Phase 1b results in solid tumors/Phase 2 start in Cardiovascular-Renal-Metabolic diseases • **FR104/VEL-101:** Phase 2 start in Kidney Transplantation • **ABBV-230:** IND/Phase 1
Financial position	**Cash visibility until 2027** **€80.7 million** level of cash as of June 30, 2024, providing solid financial position and visibility until 2027

Our plan to build a leading immunotherapy company

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First-in-class strategy

Position Tedopi® as the best treatment option after ICI-failure in cancer patients

Leverage the clinical advantage of anti-SIRPα in Solid Tumors & CRM — Boehringer Ingelheim

Position Lusvertikimab (OSE-127) as novel First-in-Class in IBD

Confirm FR104/VEL-101 benefit as maintenance therapy in kidney transplantation — Veloxis Pharmaceuticals

Explore the pro-resolutive mAb potential in chronic & severe inflammation — abbvie

Advanced proprietary early-stage assets from OSE's research platforms
+ New Partnering Opportunities

Proprietary clinical programs

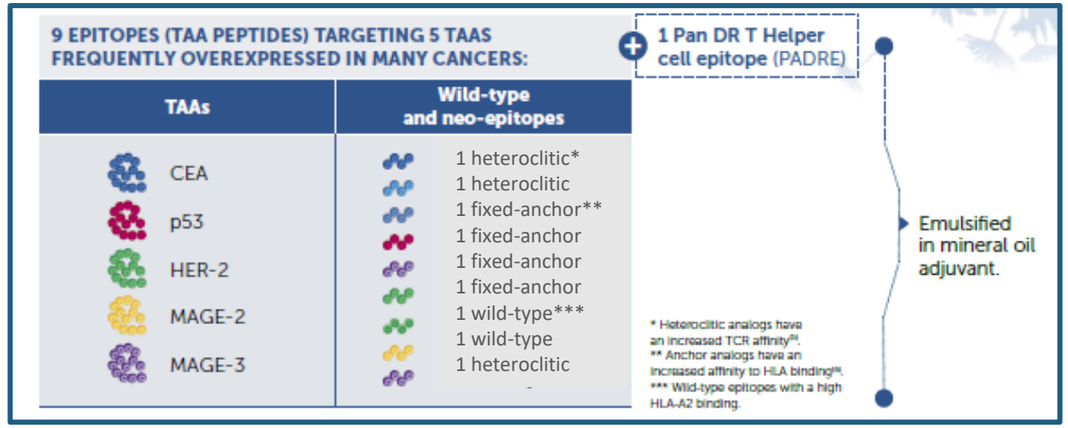
TEDOPI®

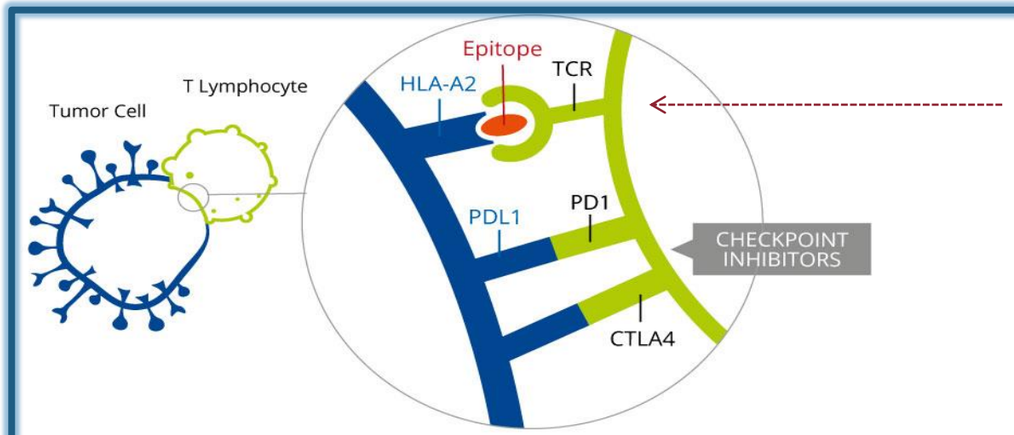
Most Advanced Therapeutic Cancer Vaccine

Bringing new hope to patients in the fight against ICI resistant NSCLC

Tedopi® (OSE-2101): Product description

Tedopi® is a therapeutic cancer vaccine composed of modified epitopes restricted to HLA-A2+ targeting 5 Tumor-Associated Antigens frequently expressed in lung cancer[1,2]



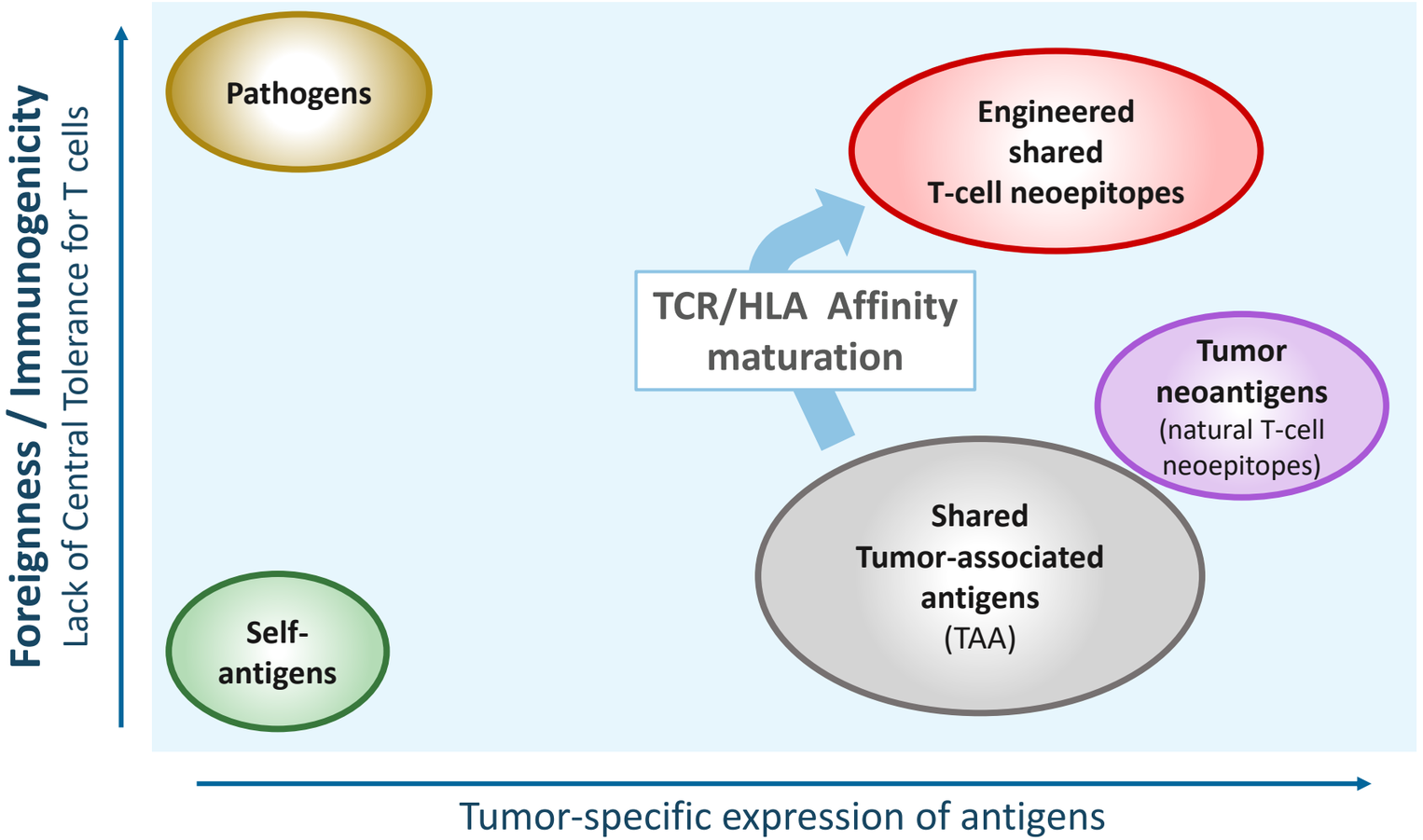


The complex binding of MODIFIED EPITOPES / HLA-A2 / TCR is MANDATORY to activate Cytotoxic T-cell response:

1st SIGNAL for T-Lymphocyte activation

1 Beebe 2008, 2 Kluger 2020 ; HLA=Human Leucocyte Antigen; TAA=Tumor-Associated Antigen; NSCLC=Non-Small cell lung cancer; Carcinoembryonic Antigen (CEA); Human Epidermal Growth Factor Receptor 2 (HER-2/neu); Melanoma A2 Antigen (MAGE-2); Melanoma A3 Antigen (MAGE-3); Protein Tumor 53 (P53)

Cancer antigens immunogenicity



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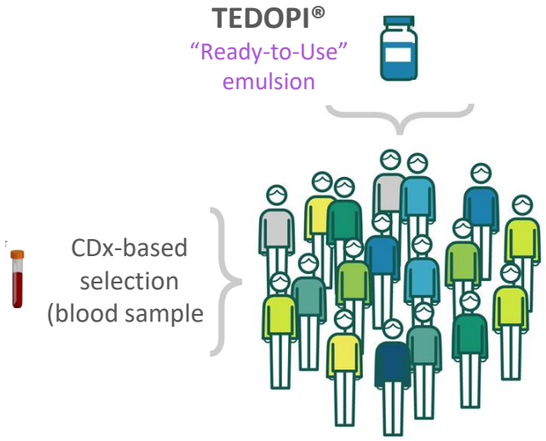
moderna messenger therapeutics

BIONTECH

Personalized vs *Off-the-Shelf* cancer vaccines

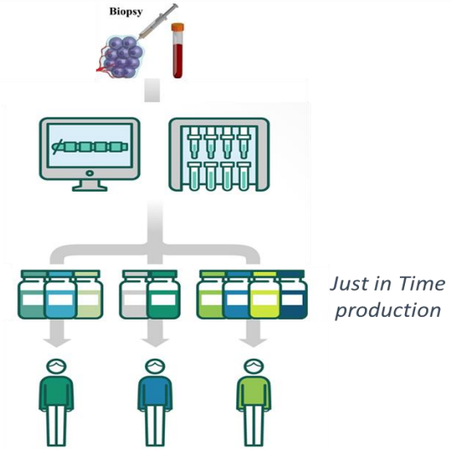
Neoepitope cancer vaccine
= Precision Medicine
-> Off-the-Shelf



Homogeneous HLA-A2+ population (~45%)
Strong CD8+ CTL responses

Positive data to extend survival in metastatic disease
(randomized Phase III NSCLC)

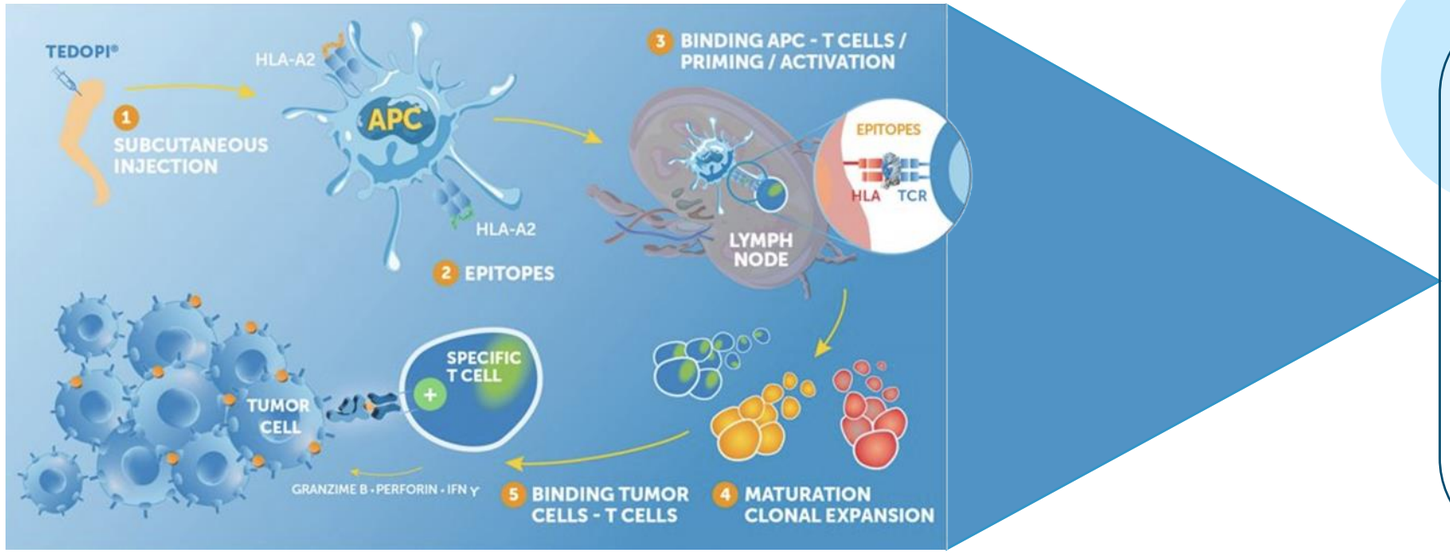
Neoantigen cancer vaccine
= Personalized Medicine
-> Custom



Cons: Tumor biopsy, **Cost**, Time
Epitope prediction robustness
Variable responses/immunogenicity

Adjuvant treatment at early stage to prevent tumor relapse
(non-randomized phases I/II to date)

An immunotherapy activating specific T-cells to revive anti-tumor response



Most advanced Cancer Vaccine in clinical development

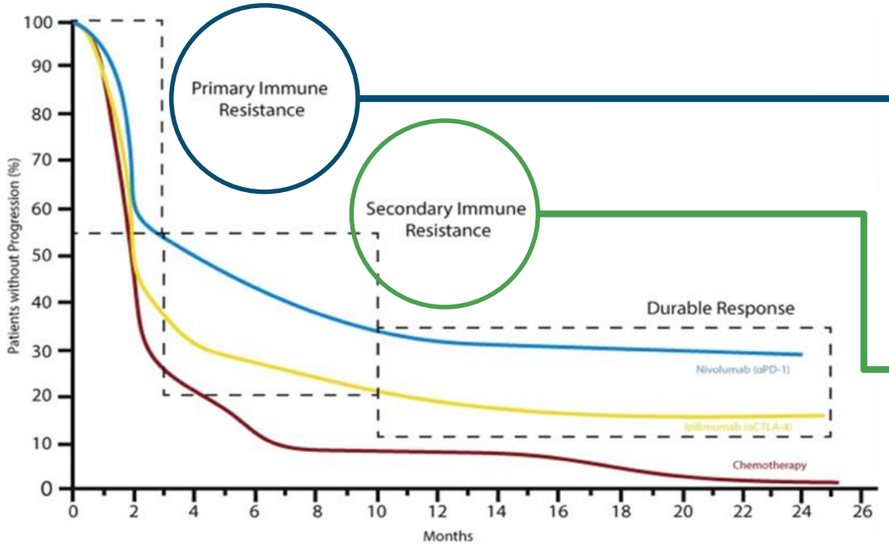
- **Unique** combination of **neoepitopes**: small peptides deriving from **tumor specific** antigens* expressed in various cancers
- Strong **binding to HLA-A2** receptor (45% population)
- Direct activation of tumor specific T-cells **differs from checkpoint inhibitors** releasing the break of immune response

Proprietary combination (9 **optimized neoepitopes** + 1 epitope giving universal T helper response)	Induces early T cell **memory** responses + **Migration** in tissues	**Ready to Use** **subcutaneous** formulation with Q3W injection	**Orphan Drug** Designation (FDA) **>1,000 injection** in clinical trials	Strong IP position until **2038**[1] (US / EU / Asia)

1: *OSE Immunotherapeutics Receives New European Patent*

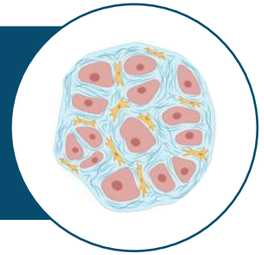
Tedopi® is a novel cancer vaccine with a strong biological rational in post-ICI secondary resistance

Shifting paradigms with cancer vaccine immunotherapy



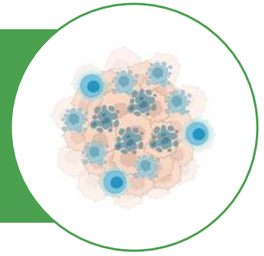
Primary (intrinsic) resistance
Patients who do not respond to ICIs with a rapid disease progression
→ **Immune refractory tumors**

No T-cell refractory tumors



Secondary (acquired) resistance[1]
Patients who have a period of initial ICI therapy benefit followed by disease progression
→ **Immuno-sensitive tumors**

T-cell exhausted & dying



Tedopi® has the **potential to rejuvenate & refresh specific TILs** in immuno-sensitive tumors.
Neoepitope-specific T cells have tumor killing potential and limited side effects.

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Figure: Schoenfeld AJ, Hellman MD. Cancer Cell 2020. Baxter MA, et al Br J Cancer 2021. **1:** After at least 12 weeks of ICI treatment in monotherapy (Task force SITC 2020 - Kluger H et al 2020).
ICI: immune checkpoint inhibitor. **TILs:** Tumor-infiltrating lymphocytes.

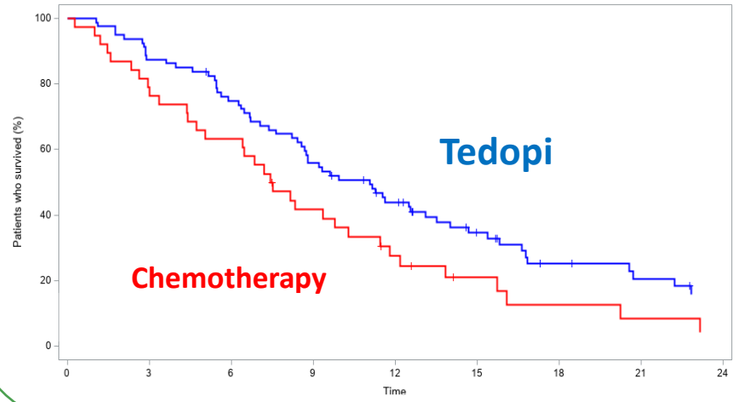
Clinically meaningful benefit of Tedopi® in 3rd line NSCLC

Randomized Phase 3 with positive results vs. standard of care (SOC)

Overall Survival

secondary resistance post anti-PD(L)1

OS rate at 12 months
44%
in **Tedopi®** vs.
27.5%
in SoC



Delta OS: **3.6** months

Tedopi® 11.1 months
vs
SoC 7.5 months

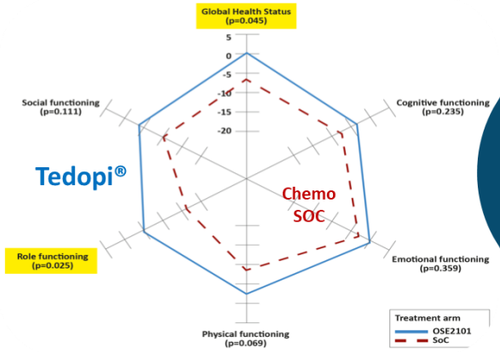
HR 0.59 /
p-value=0.017

Risk of Death reduced by 41% *versus chemo.*

Significantly safer than Chemo.

11% *vs* **35%** *grade 3-5 AEs*

Better Quality of Life



Positive Net Treatment Benefit vs SOC:
P=0.032

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Besse et al. Annals of Oncology 2023

ANNALS OF ONCOLOGY
driving innovation in oncology

Tedopi® delivers important clinical benefits vs competition

Better Safety profile and QoL in current landscape of late-stage drug development post CT-IO

Company	OSE IMMUNO THERAPEUTICS	MIRATI THERAPEUTICS	Roche / EXELIXIS / IPSEN	MERCK / Eisai	gsk	BIONTECH / OncoC4	AstraZeneca / Daiichi-Sankyo	GILEAD	SANOFI	abbvie
Target	Multi-epitopes vaccine	TKIs (anti-angiogenic)			Checkpoint Inhibitors		ADCs			
					TIM-3	CTLA-4	TROP2	TROP2	CEACAM5	c-MET
Current Study	ATALANTE-1	SAPPHIRE	CONTACT-01	LEAP-008	COSTAR Lung	PRESERVE-003	Tropion-LUNG1	EVOKE-01	CARMEN-LC03	NCT04928846
n	219 118 (secondary resistant)	500	350	405	750	600	604	580	554	698
Therapy	Tedopi® vs docetaxel	Sitra + Opdivo vs. docetaxel	Cabo+Tecentriq vs. docetaxel	Lenva + Keytruda vs. docetaxel	Cobolimab + Jemperli vs. docetaxel	Gostistobart vs. docetaxel	datopotamab deruxtecan vs docetaxel	Sacituzumab Govitecan-hziy vs docetaxel	SAR408701 vs. docetaxel	Telisotuzumab Vedotin vs. Docetaxel
Primary endpoints	OS	OS	OS	PFS and OS	OS	OS	PFS and OS	OS	PFS and OS	PFS and OS
Initiation	2017	Q3 2019	Q3 2020	Q2 2019	Dec 2020	Q2 2023	Q4 2020	Q4 2021	Q1 2020	Q1 2022
Read-out	2022	Failed	Failed	Failed	2024+	2027+	Failed OS (interim analysis)	Failed	Failed	2025+
		Safety data from early-stage trials in NSCLC post-ICI								
- TEAEs G3/4	11%	53%	39%	78%	n.a.	43%	25-30%	> 50%	36%	36%
Source	Besse et al. 2023	Borghaei et al, Annals Oncol 2023	Neal et al, ASCO 2022	Taylor et al, J. Clin. Oncol. 38, 1154–1163.	Davar et al, SITC 2018	He et al, ASCO 2023	ESMO 2023 ASCO 2024	ASCO 2024	Gazzah et al, ASCO 2020	Camidge DR, et al. WCLC 2021

1 - OSE internal analysis based on publicly available information. **2** - World Health Organization. Globocan 2020 Fact Sheet. Available at: https://gco.iarc.fr/today/data/factsheets/populations/900-world-fact-sheets.pdf. Accessed December 2021. OSE Internal analysis based on publicly available data. Note: No direct head-to-head data available. Caution advised when comparing across studies

Tedopi® in NSCLC : ARTEMIA study

KEY ELIGIBILITY CRITERIA

- HLA-A2+
- Metastatic squamous & non-squamous NSCLC without actionable mutations
- In 2d line treatment after 1st-line CT- immune checkpoint inhibitor (ICI) with secondary resistance to ICI
- ECOG PS 0 to 1
- No brain metastasis or previously treated brain metastasis

R 2:1

ARM A
Tedopi® (n=242)
Q3W for 6 subcut. inj.,
then Q8W until end Year 1,
then Q12W up to end Year 2
Until loss of clinical benefit

ARM B
Docetaxel (n=121)
Q3W iv infusion
Until loss of clinical benefit

Stratification
- Histology (squamous vs non-squamous)
- ECOG PS (0 vs 1)

PRIMARY ENDPOINT:
Overall Survival*

SECONDARY ENDPOINTS:
- PRO : QLQ-C30 Physical functioning, Role functioning & Global Health Score
- Time to ECOG deterioration (PS >2)

*Final analysis with 269 death-events in 363 patients assuming a hazard ratio of 0.70 (power 80%, 2-sided log-rank test at 5%) with an interim futility analysis after 107 events

HLA: Human leukocyte antigen; NSCLC: Non-small cell lung cancer; SoC: Standard of care; CT: chemotherapy; ICI=Immune checkpoint inhibitors; ECOG PS: Eastern Cooperative Oncology Group Performance Status; PD: Progressive disease; subcut: subcutaneous; inj: injection; iv: intravenous, QLQ-C30: Quality of life questionnaire-core30

Protocol V2.0 on 14-MAR-24 (US, Canada) , 2.1 on 11-JUN-24 (UK), 2.3 on 23-AUG-24 (EU)

Tedopi® answers to real medical need in NSCLC

Tedopi® has the potential to become the new standard for recurrent patients in 2L NSCLC presenting HLA-A2 phenotype

LUNG CANCER : High prevalence, mortality and unmet need - worldwide

- Highest mortality among 36 cancer types and 2nd most frequently diagnosed cancer type (based on data collected from 185 countries)*
- About 2,206,771 new cases of lung cancer diagnosed (11,4% of all cancers) and 1,796,144 deaths from lung cancer (18%)*
- The mortality is associated with a high degree of malignancy and late diagnosis. More than 65.33% of men diagnosed with lung cancer are in stage III-IV
- Majority of NSCLC patients without actionable mutation are treated with immune checkpoint inhibitors (ICI) as 1st line of treatment.

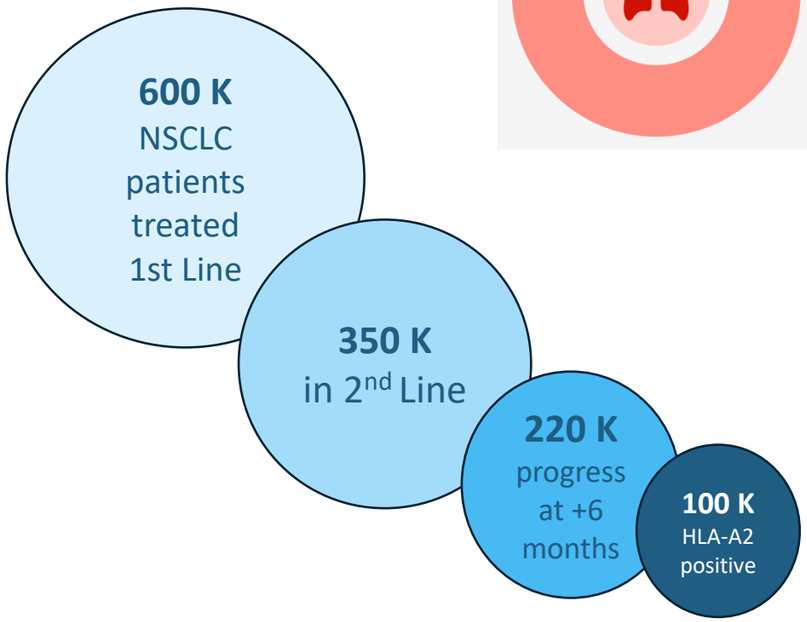
Treatment paradigm in NSCLC with no driver mutation

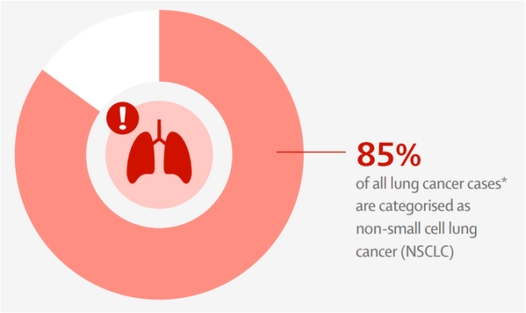
- L1 : treatment anti-PD(L)1 based with/w/out chemotherapy
- L2 : docetaxel remains standard with its limited efficacy and toxicity

Opportunity for Tedopi®

- Great opportunity for new standard without chemotherapy in a remaining high medical need after 1st line of treatment
- HLA-A2 patients represent about 45% of the patients

Incidence of advanced NSCLC in the US/EU5/Japan + China**





* Bray, F et al. CA Cancer J. Clin. 2018; Sung, H et al. CA Cancer J. Clin. 2021; Rodak, O et al Cancers 2021 **Datamonitor projection in 2030

Further additional potential clinical value in combination NSCLC, PDAC and OC

Phase 2 ISS trials in combination with immunotherapy or chemotherapy treatments

2nd line post 1st line chemo IO

CombiTED - NSCLC
In combination with nivolumab

Tedopi® Plus Docetaxel or Tedopi Plus Nivolumab as 2nd line Therapy in Metastatic NSCLC failing standard 1st line Chemo-immunotherapy[1]

Sponsored by FoRT
PI: Federico CAPPUZZO
(Roma Cancer Institute)
Italy /Spain/ France

FoRT

Readout expected 2025

Maintenance setting post standard of care

TEDOVA - Ovarian Cancer
In combination with pembrolizumab

Tedopi® Alone or in Combination With Pembrolizumab vs Best Supportive Care as Maintenance in Patients with Platinum-Sensitive Recurrent Ovarian Cancer[2]

Sponsored by ARCAGY-GINECO
PI: Alexandra LEARY
(Gustave Roussy Institute)
France/ Germany/ Belgium

ARCAGY - GINECO

Readout expected in 2025

TEDOPaM - Pancreatic Cancer
In combination with FOLFIRI

Tedopi® plus FOLFIRI vs FOLFIRI as Maintenance Treatment in Controlled Advanced or Metastatic Pancreatic Ductal Adenocarcinoma after 8 Cycles of Folfirinox[3]

Sponsored by GERCOR PRODIGE
PI: Cindy NEUZILLET
(Curie Institute)
France

GERCOR

Recruitment completed Q2 2023

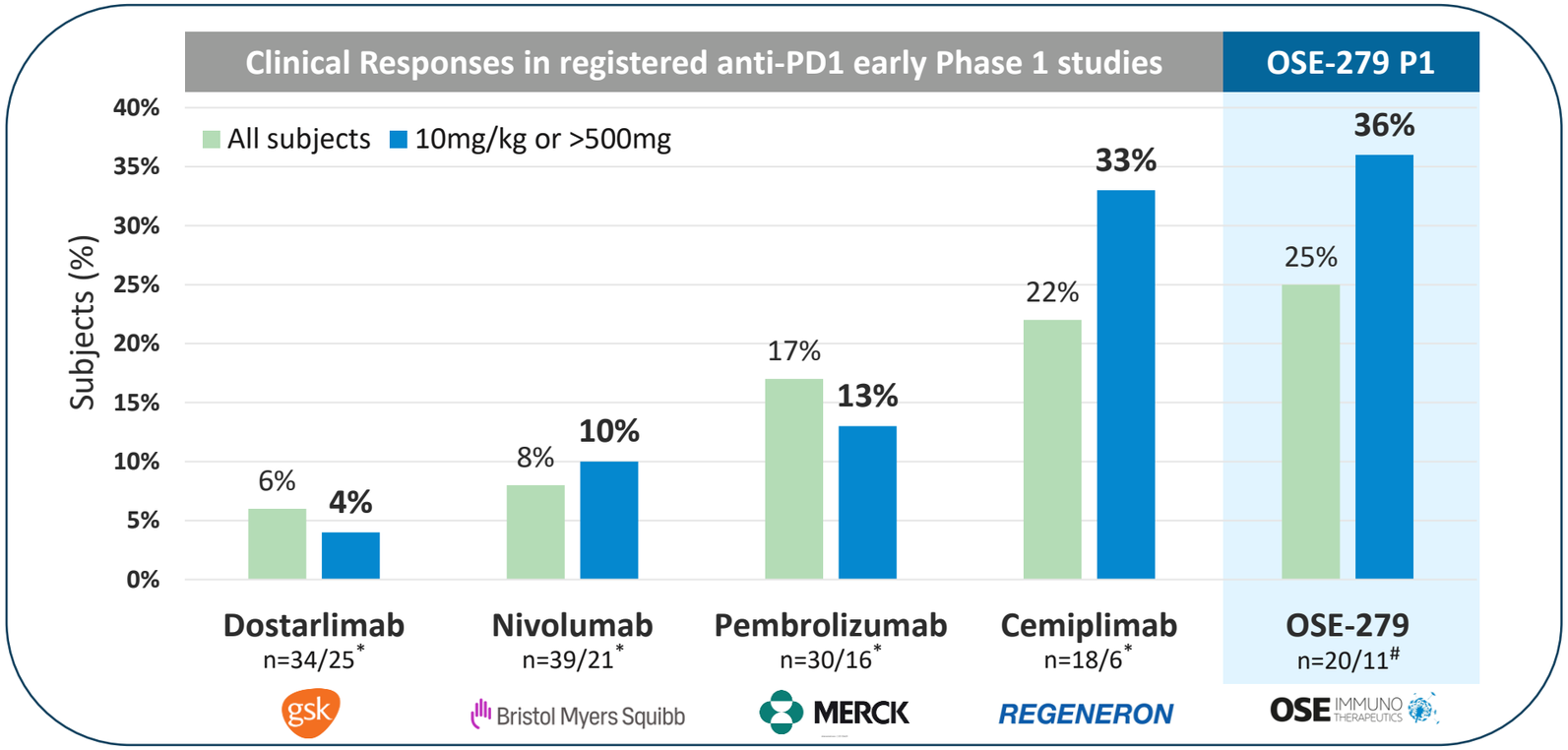
Readout expected in 2024

1 - NCT04884282 105 Patients planned
2 - NCT04713514 180 Patients
3 - NCT03806309 136 patients -recruitment completed

OSE-279: Proprietary anti-PD1 mAb

High affinity PD-1 antibody, recent patent granted in US, Europe, China, Japan

- Potential of combo with internal asset
- Potential for partnership with biotech/biopharma in combo with external assets
- Potential future marketing approvals in orphan indications with strong unmet medical needs



Not a head-to-head comparison. Differences exist between trial designs and subject characteristics, and caution should be exercised when comparing data across trials.
For illustrative purposes only.

* Patnaik et al. Cancer Chem & Pharm 2021; Brahmer et al. JCO 2010; Patnaik et al. Clin Cancer Res 2015; Papadopoulos et al. Clin Cancer Res 2020
\# Robert et al. ESMO-TAT 2024

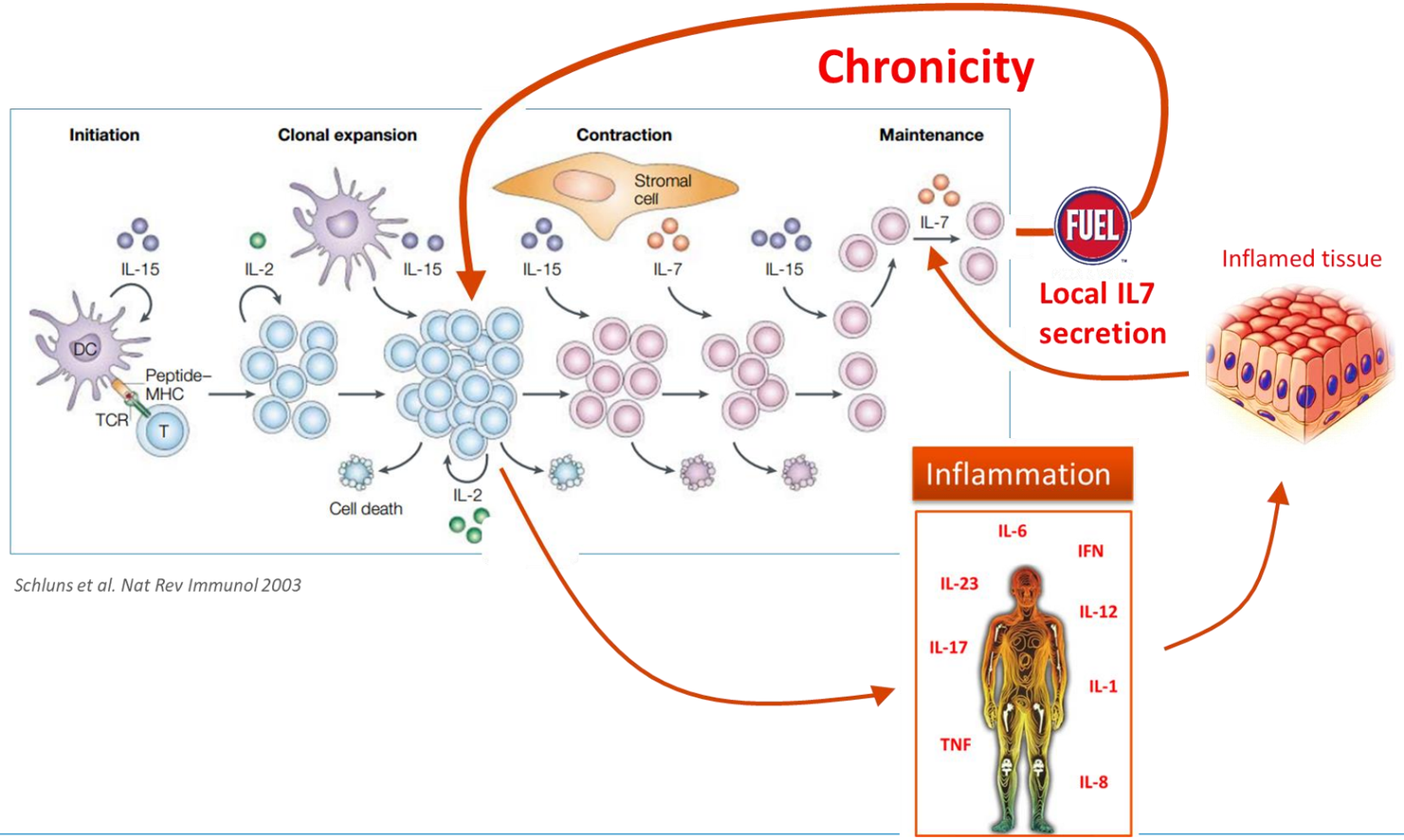
Lusvertikimab

Most advanced anti-IL-7R mAb

Strong biological rational in refractory IBD patients

IL-7 fuels chronic inflammation in tissues

Lusvertikimab controls pathogenic memory T-cell persistence

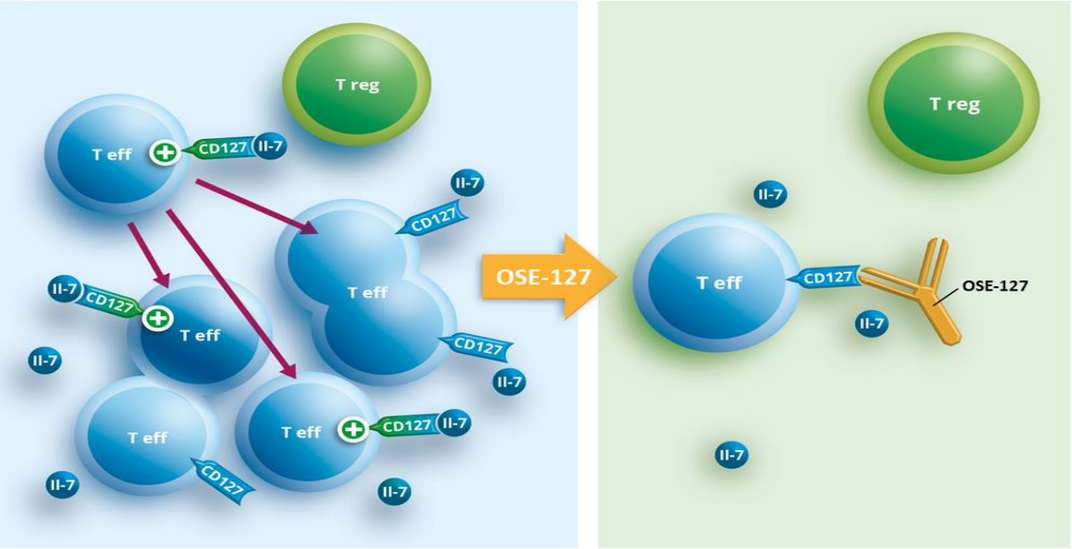


Schluns et al. Nat Rev Immunol 2003

OSE IMMUNO THERAPEUTICS

Lusvertikimab/OSE-127 - Differentiated MoA as full IL-7 receptor antagonist

Tackling the fuel of memory T-lymphocytes while sparing Tregs



A differentiated and highly qualified candidate

- Lusvertikimab, first non-internalizing (fully antagonist) anti-IL-7R mAb[1] and **most advanced** IL-7R antagonist in clinic
- IL7 produced by inflamed tissues sustain **T-cell survival and chronicity**
- IL-7R pathway overexpression in anti-TNF IBD non-responders[2]
- Good safety, PK/PD profile in Phase 1[3], no cytokine release, confirmed target-engagement
- High preclinical activity in acute leukemia (T and B-ALL)[4] ASH Merit Award
- **First positive efficacy results from Phase 2 study in UC**

1: Belarif et al. Nature Communication (2018). **2:** Belarif et al. JCI 2019. **3:** Poirier et al. In revision. **4:** https://www.ose-immuno.com/wp-content/uploads/2022/11/EN_221103_ASH_OSE-127.pdf

Lusvertikimab most advanced First-in-Class anti-IL-7R mAb

Differentiated by its Mechanism of Action

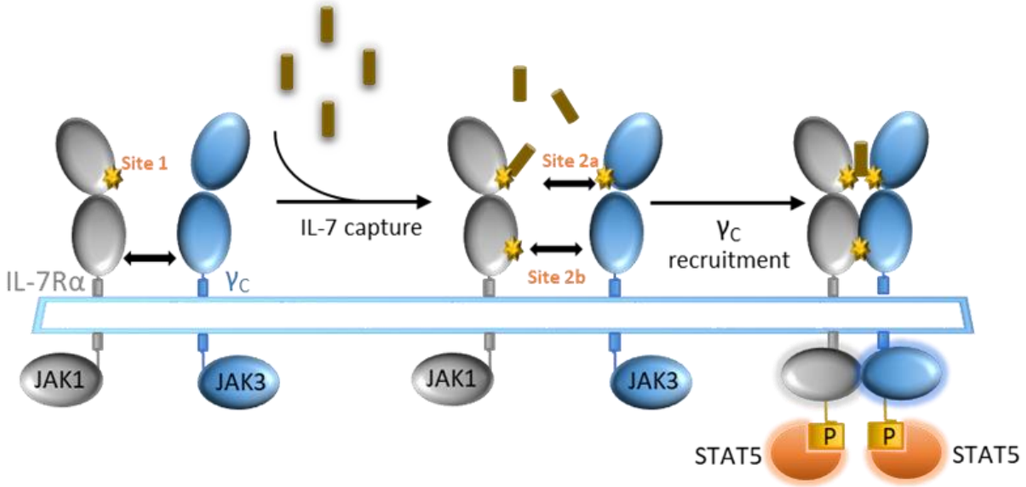
	OSE IMMUNO THERAPEUTICS	Q32 BIO Bristol Myers Squibb	zurabio Pfizer	gsk
Isotype	**IgG4**	**IgG1**	**IgG1**	**IgG1**
MoA	- **Non-Internalizing**[1] - **Full Antagonist IL7R** - **No Depletion**	- TSLP Antago - T-cell Decrease	- Internalizing - Antago + Partial Agonist IL7R - TSLP Antago - T-cell Decrease[2]	- Internalizing - Antago + Partial Agonist IL7R
Phase	**2**	**2a**	**1b**	*Discontinued*
Indication	**Ulcerative Colitis (IBD)** *(Completion Enrollment Q1 2024)*	Atopic Dermatitis *(Initiated Q4 2022)* Alopecia Areata *(Initiated Q3 2023)*	Alopecia Areata *(not initiated)*	Multiple Sclerosis *(dicontinued after Phase 1 High Immunogenicity[3,4])*

1. Belarif et al. Nature Com 2018; 2. Herold et al. JCI Insight 2019; 3. Ellis et al. Br J Clin Pharmacol 2019; 4. Liao et al. PlosOne 2021

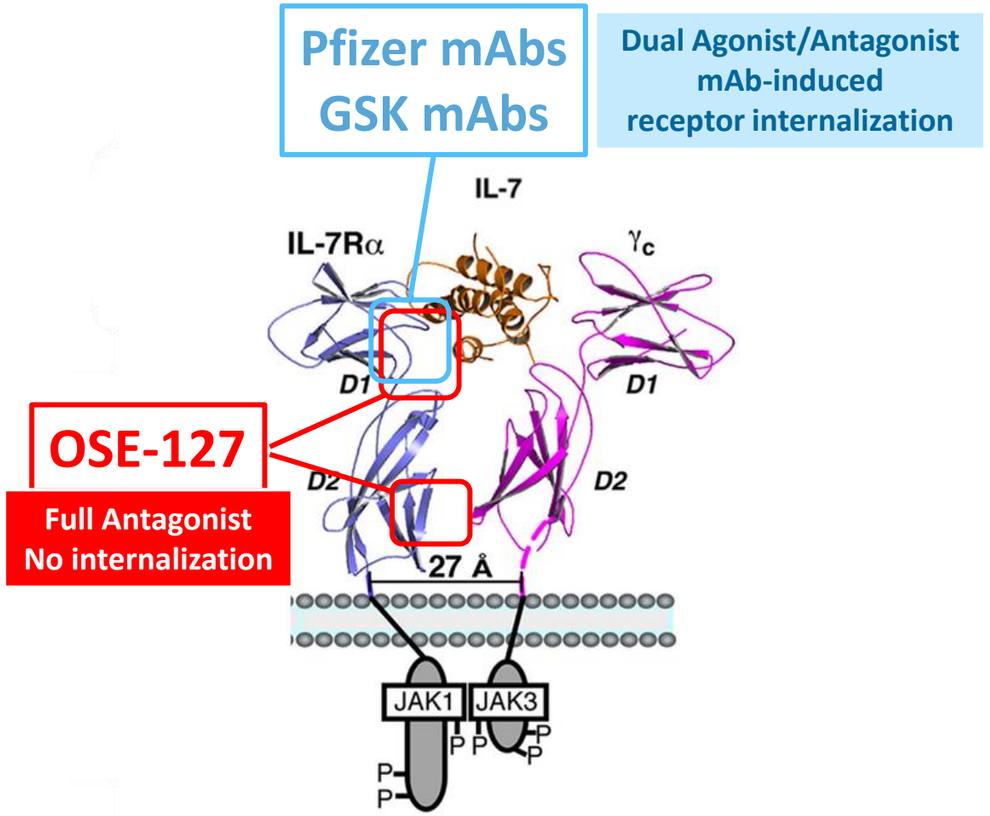
Lusvertikimab - Targets a specific “site 1/2b” epitope

Full antagonist, preventing receptor internalization & signaling

Cytokine-induced receptor heterodimerization signaling mechanism



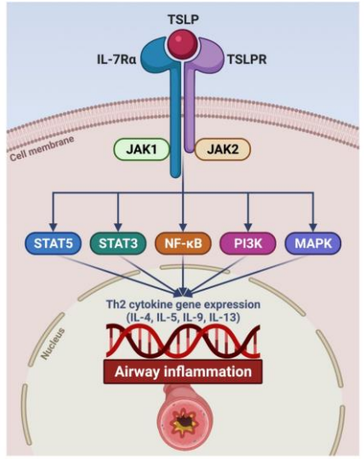
Walsh ST et al Immunol. Rev. 2012



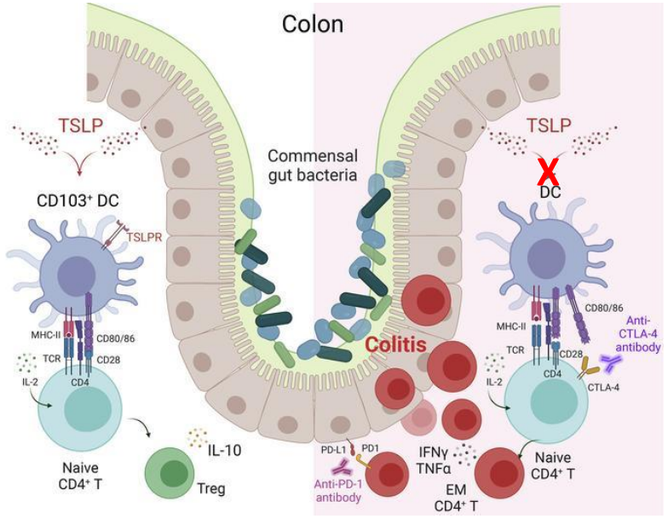
Belarif et al. Nature Com 2018

Protective role of TSLP in intestinal immunity

Lusvertikimab selectively blocks IL7 but not TSLP axis



- TSLP drives Th2 responses → Pathogenic role in allergic diseases & atopic responses
- TSLP drives Foxp3+ Treg induction by DCs against commensal bacteria
  (*Spadoni et al. Mucosal Immunology 2012; Jiang et al. Bio Med Central Immunology 2006)*
- TSLP protects against colitis & intestinal disorders (↘ intestinal cytokine)
  (*Aubry et al. Microbial Cell Factories 2015; Ziegler et al., Adv Pharmacol 2013; Spadoni et al. Mucosal Immunology 2012; Ordonez et al. Inflamm Bowel Dis 2012; Abraham et al Gastroenterology 2011)*
- TSLP blockades or TSLP deficient mice exacerbates severe colon inflammation & gut inflammatory cytokines (IFNg, IL23, IL12p40…)
  (Messerschmidt et al. JCI Insight 2023; Reardon et al. Immunity 2011; Taylor et al. J Exp Med 2009)
- Decreased TSLP gene expression in IBD associated with severity
  (Messerschmidt et al. JCI Insight 2023; Tahaghoghi-Hajghorbani et al. Auto Immu Highlights 2019; Noble et al Infl Bow Dis 2010; Middel et al. Gastroenterology 2006; Rimoldi et al. Nature Immunol 2005)

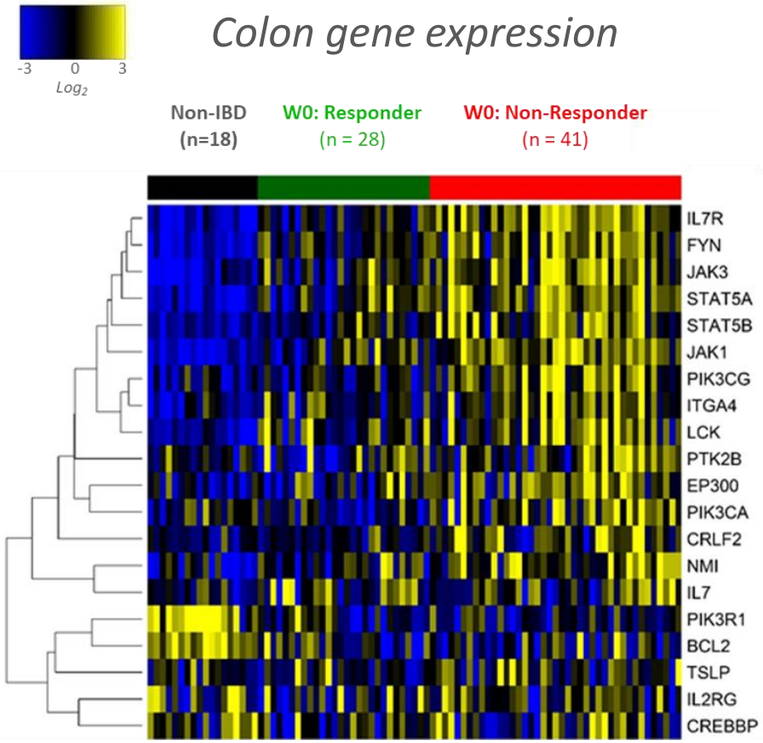


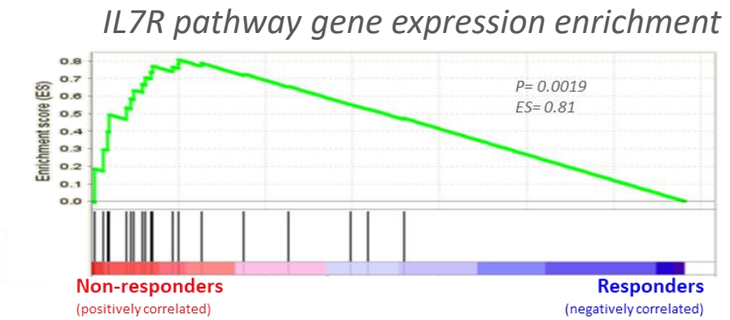
Messerschmidt et al. JCI Insight 2023

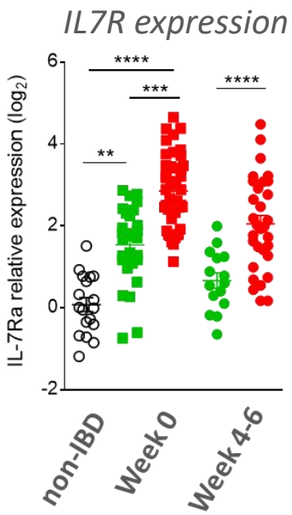
OSE IMMUNO THERAPEUTICS

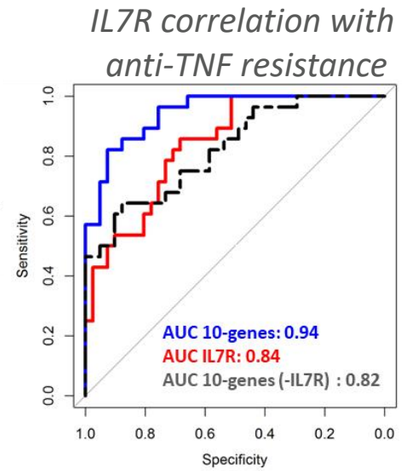
Mucosal IL-7R pathway over-expression in IBD tissues

High IL-7R expression in anti-TNF refractory patients









Anti-TNF Responder patients
Anti-TNF Refractory patients

Belarif et al. JCI 2019

OSE IMMUNO THERAPEUTICS
JCI The Journal of Clinical Investigation

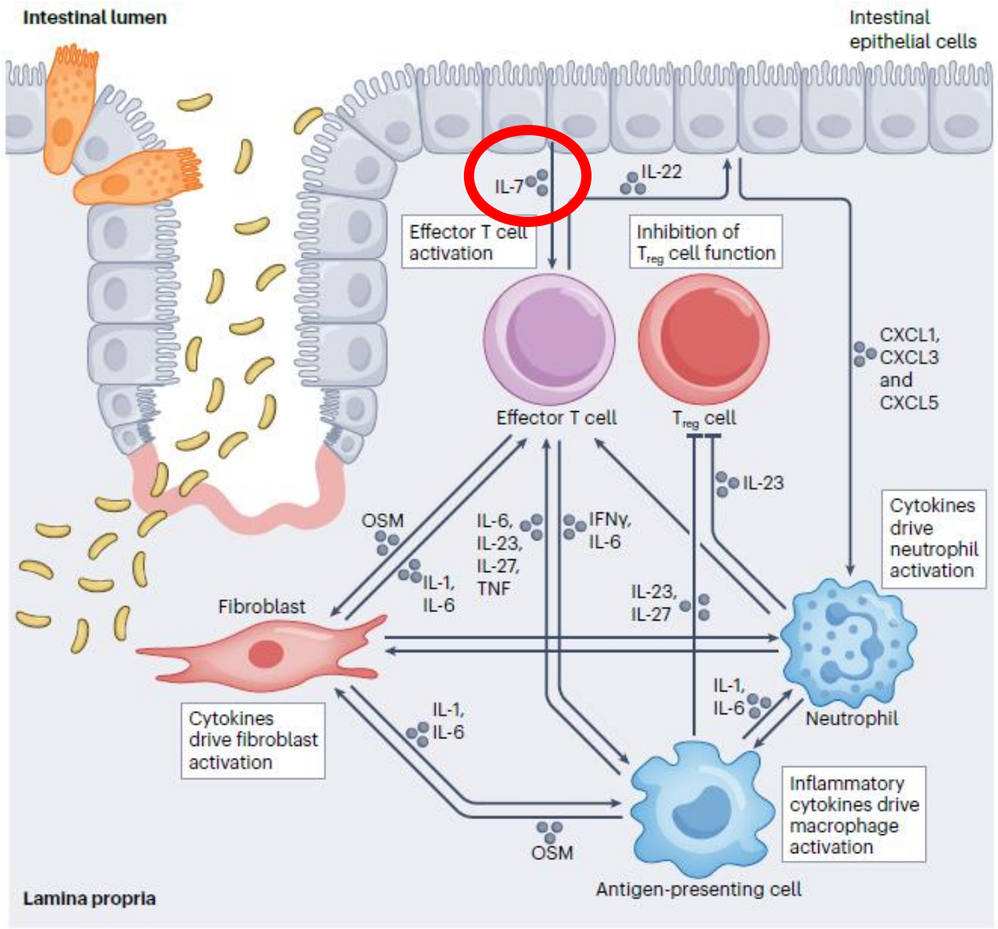
IL-7 at the source of resistance in hyper-inflammatory IBD

“ The ‘angry’ cell concept and resistance to anti-cytokine therapies.

Recent evidence suggests the presence of highly pro-inflammatory — or ‘angry’ — cells in the intestinal mucosa in inflammatory bowel disease (IBD) that drive molecular resistance to anti-cytokine therapy (such as anti-tumour necrosis factor (anti-TNF) and anti-IL-12/IL-23 therapies).

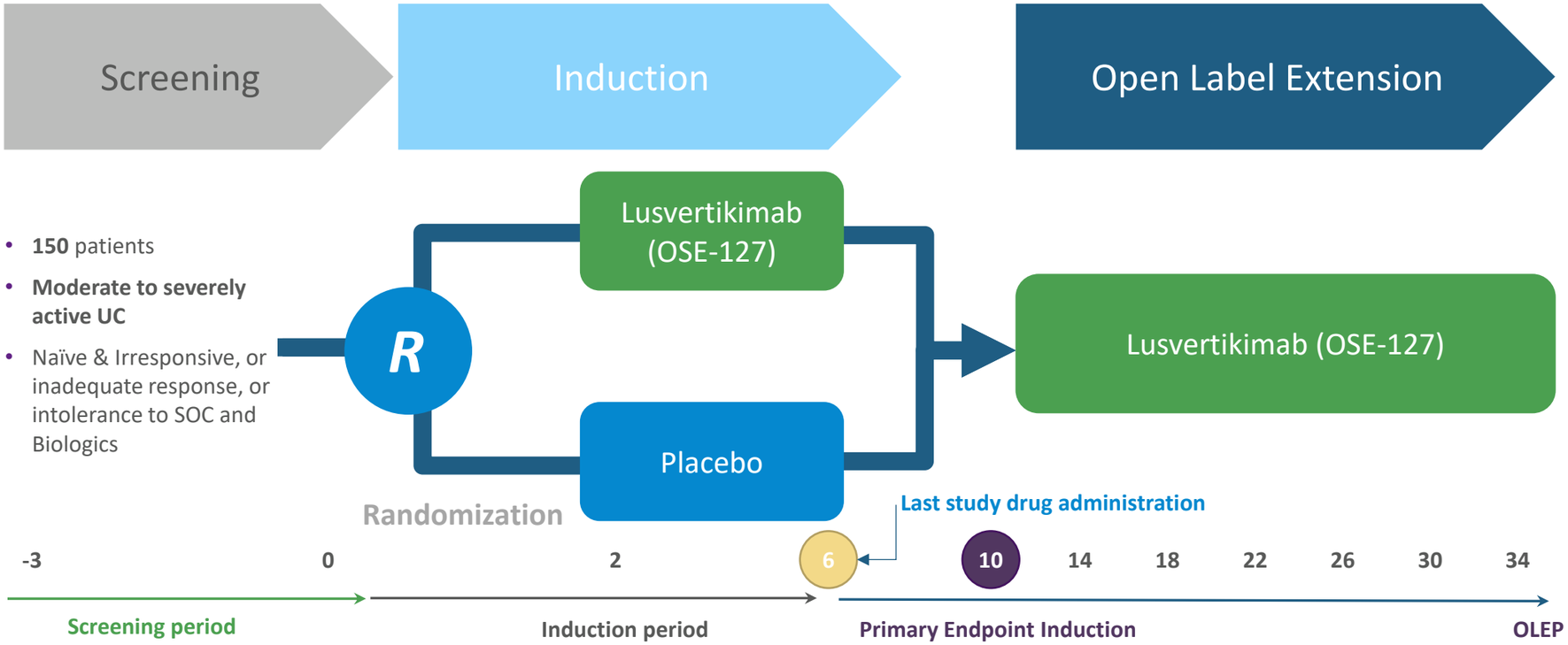
[...]

Intestinal epithelial cells (IECs) produce cytokines such as **IL-7** to activate effector T cells and can produce chemokines such as CXCL1, CXCL3 and CXCL5 to induce neutrophil recruitment and activation.”



Neurath M. **Nature Review Immunology 2024**

Lusvertikimab in moderate-to-severe Ulcerative Colitis



- **150** patients
- **Moderate to severely active UC**
- Naïve & Irresponsive, or inadequate response, or intolerance to SOC and Biologics

Positive Recent Futility Analysis[1]

- Futility analysis conducted on 33% of the total patient enrolment (n=150)
- Primary endpoint is the efficacy assessment of Lusvertikimab vs. placebo on the reduction of the modified Mayo Score at W10
- 24 weeks open-label extension study planned (NCT04605978)

First positive efficacy results July 24

OSE IMMUNO THERAPEUTICS

- OSE Immunotherapeutics is Pleased to Announce the Continuation of its Phase 2 Trial Testing Anti-IL-7 Receptor Antagonist OSE-127/S95011 in Ulcerative Colitis after the Interim Futility Analysis

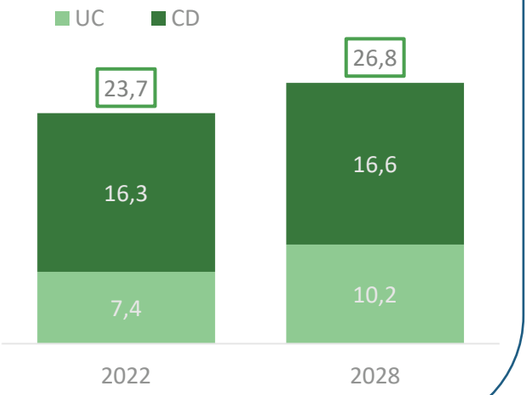
Secondary endpoints at Week 10 include:
1/ **Clinical Remission** by adapted Mayo score components: a stool frequency score of 0 or 1, a rectal bleeding subscore of 0, and a Mayo endoscopy subscore of 0 or 1.
2/ **Clinical Response** by adapted Mayo Score: reduction in adapted Mayo score ≥ 3 and ≥ 30%, with a reduction in the rectal bleeding subscore ≥ 1 or an absolute subscore ≤ 1
3/**Endoscopic Remission**: Mayo endoscopic subscore = 0; 4/**Endoscopic Healing**: Mayo endoscopic subscore ≤1

Significant opportunity in Ulcerative Colitis & Acute Lymphoblastic Leukemia targeted markets

Ulcerative Colitis (UC)

- UC affects 3.3 million patients in US, Europe and Japan
- ~50% UC patients "moderate to severe", requiring methotrexate, corticosteroids, anti-TNFa, JAK etc.
- Despite broad options, remission rates are of only 25-30% leaving most patients without satisfactory treatment

IBD Global market projections for G7 major markets (USDbn[1])



Acute Lymphoblastic Leukemia (ALL)

- ALL is a rare disease with a diagnosed incident cases in EU, US, China, Japan estimated to achieve 26,482 in 2029[2].
- 40% cases of ALL diagnosed are in adults and among them about 50% present refractory disease or undergo relapse under current conventional therapies[3].
- IL-7R expression in >84% of B-ALL and T-ALL samples[4]

ALL Global market projections for G7 major markets (USDbn[5])

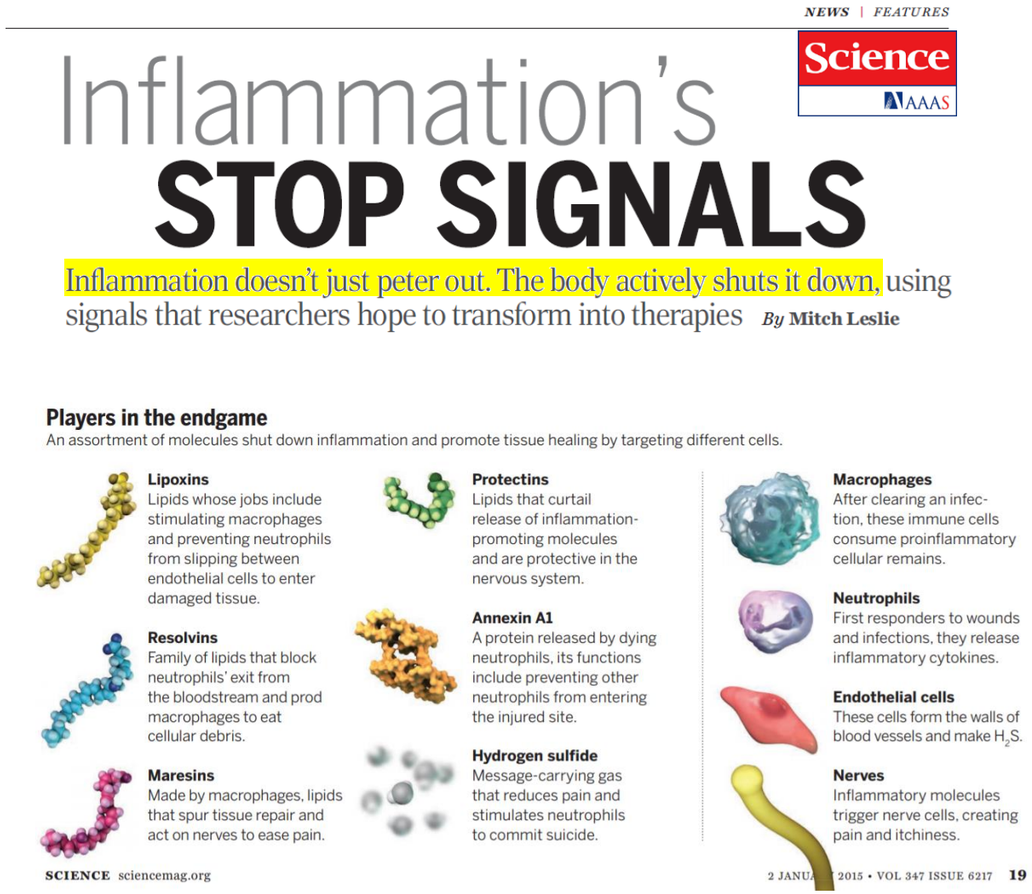
1: Evaluate Pharma 2: Global Data 3: Childhood Acute Lymphoblastic Leukemia Treatment (PDQ®)–Health Professional Version, accessed October 2022
4: OSE internal data released at ASH2022 5: Researchandmarkets.com/reports/4857889

Partnered clinical programs

Resolution of inflammation

Pr. C. Serhan, Harvard seminal works
(OSE SAB member)

HARVARD UNIVERSITY



NEWS | FEATURES

Science AAAS

Inflammation's STOP SIGNALS

Inflammation doesn't just peter out. The body actively shuts it down, using signals that researchers hope to transform into therapies *By* Mitch Leslie

Players in the endgame

An assortment of molecules shut down inflammation and promote tissue healing by targeting different cells.

Lipoxins
Lipids whose jobs include stimulating macrophages and preventing neutrophils from slipping between endothelial cells to enter damaged tissue.

Resolvins
Family of lipids that block neutrophils' exit from the bloodstream and prod macrophages to eat cellular debris.

Maresins
Made by macrophages, lipids that spur tissue repair and act on nerves to ease pain.

Protectins
Lipids that curtail release of inflammation-promoting molecules and are protective in the nervous system.

Annexin A1
A protein released by dying neutrophils, its functions include preventing other neutrophils from entering the injured site.

Hydrogen sulfide
Message-carrying gas that reduces pain and stimulates neutrophils to commit suicide.

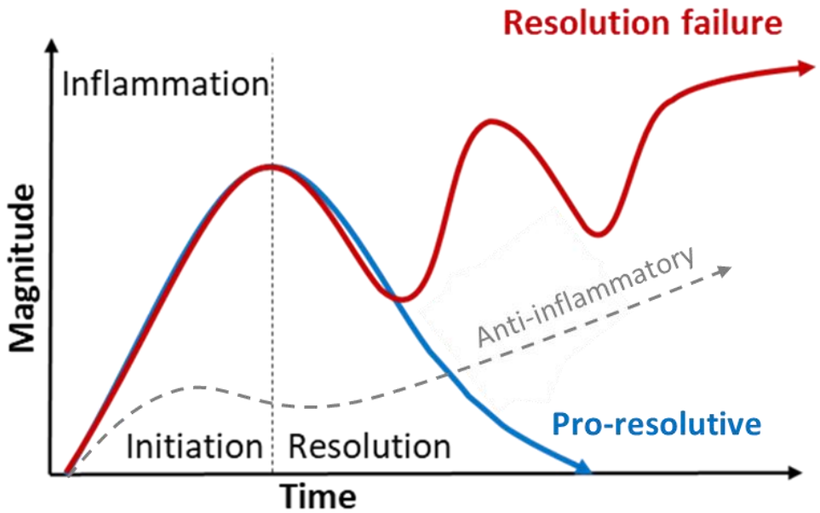
Macrophages
After clearing an infection, these immune cells consume proinflammatory cellular remains.

Neutrophils
First responders to wounds and infections, they release inflammatory cytokines.

Endothelial cells
These cells form the walls of blood vessels and make H_2S.

Nerves
Inflammatory molecules trigger nerve cells, creating pain and itchiness.

SCIENCE sciencemag.org 2 JANUARY 2015 • VOL 347 ISSUE 6217 19



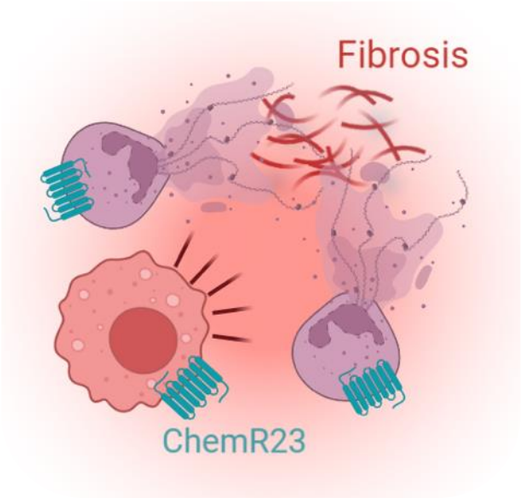
Serhan CN: Nature Review Immunol 2013, Immunity 2014, Nature 2014, Science 2015, …

ABBV-230 - Resolving inflammation is an active immune process

abbvie

During chronic inflammation

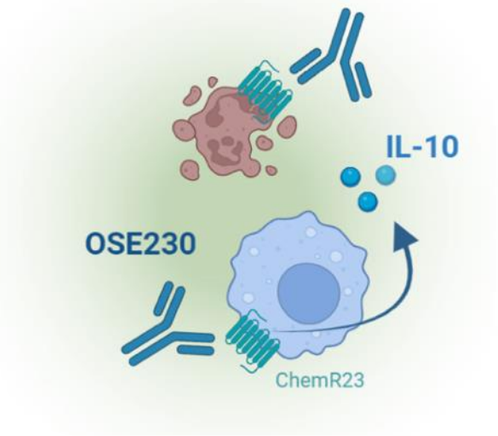
Dying neutrophils **send out inflammatory signals (e.g. NETosis)** that are important in maintaining chronic inflammation & fibrosis



With ChemR23 agonistic mAbs

ABBV-230 limits recruitment, survival & NETosis of inflammatory neutrophils & reprograms macrophages, **removing further chronic inflammatory signals**

Restoration of homeostasis



Potential First-in-class pre-IND candidate

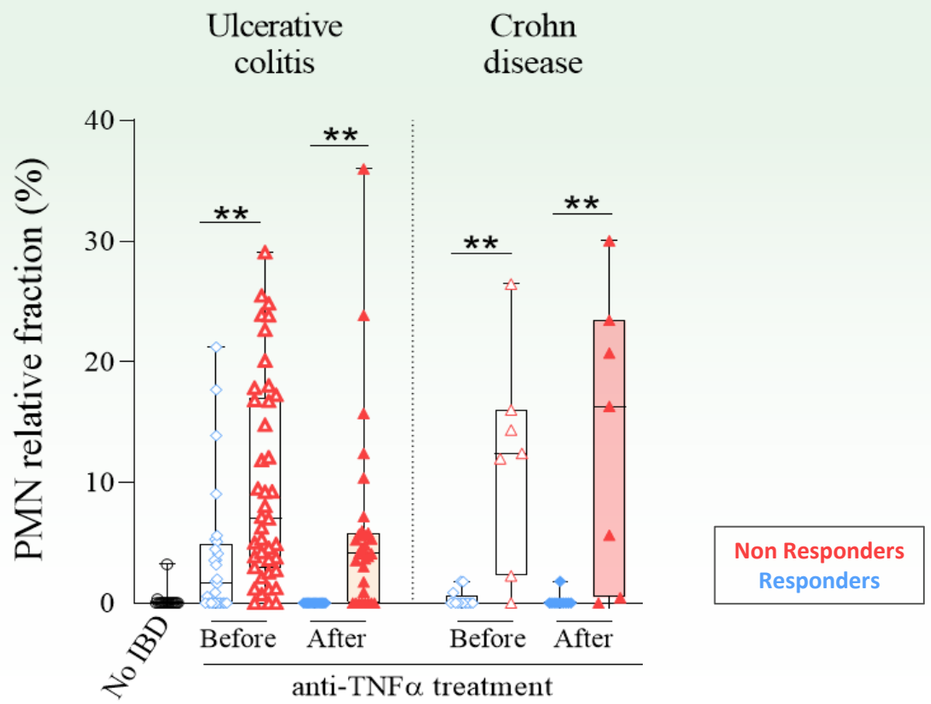
Published in Science Advances AAAS

Trilleaud et a. Science Advances 2021; Poirier N. PEGS 2022

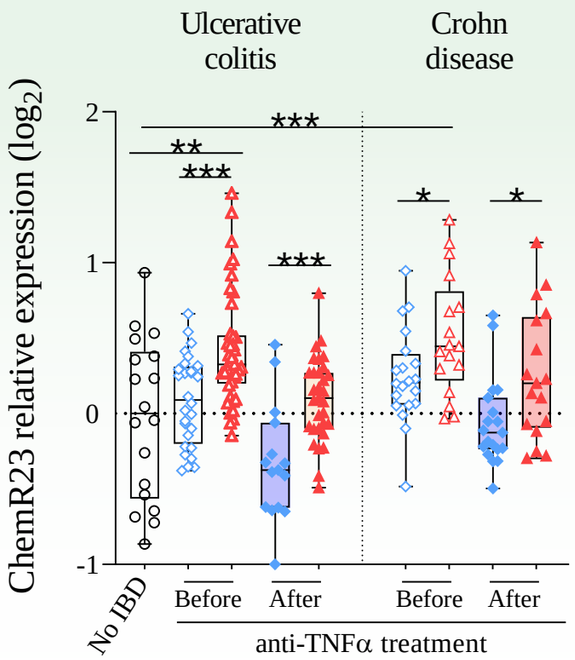
ABBV-230 - Strong rationale in IBD

abbvie

High Neutrophil infiltrates in anti-TNFα refractory patients

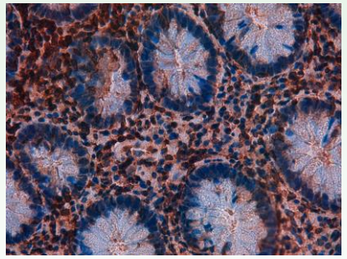


High ChemR23 expression in anti-TNFα refractory patients

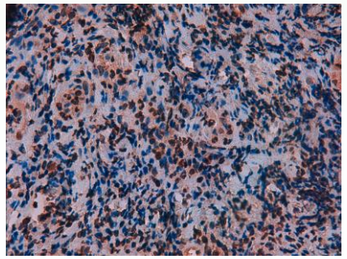


ChemR23 staining

Crohn Disease



Ulcerative colitis



OSE IMMUNO THERAPEUTICS

Trilleaud et al. Science Advances 2021

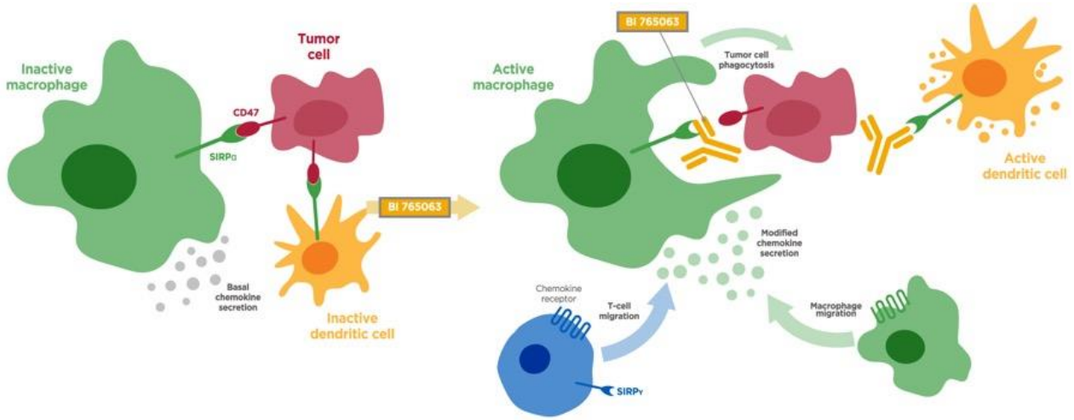
Science Advances AAAS

SIRPα inhibition may have a synergistic antitumour effect when combined with ICIs

Boehringer Ingelheim

- Infiltrating **myeloid cells promotes immune evasion**, and this has generated interest in **myeloid-immune targets**[1,2]
  - The CD47–SIRPα interaction transduces inhibitory signals on macrophages and other myeloid cells[2]
- Preclinical studies have indicated that **CD47 or SIRPα blockade in combination with ICIs** may have a synergistic antitumour effect[3]

The use of SIRPα antagonists to enhance antitumour immunity is currently being explored[4]



	Anti-CD47	Anti-SIRPα	
Broad/restricted expression	Broad	Restricted to cells of the myeloid lineage	Limited **side effects** expected and less frequent dosing
Safety signals	Acute anemia, Thrombocytopenia	**No hematotoxicity**	Higher therapeutic window expected
Interaction CD47/SIRPγ	**Inhibit human T cells**	OSE-172 is SIRPα specific	Favors T cell responses in solid tumors

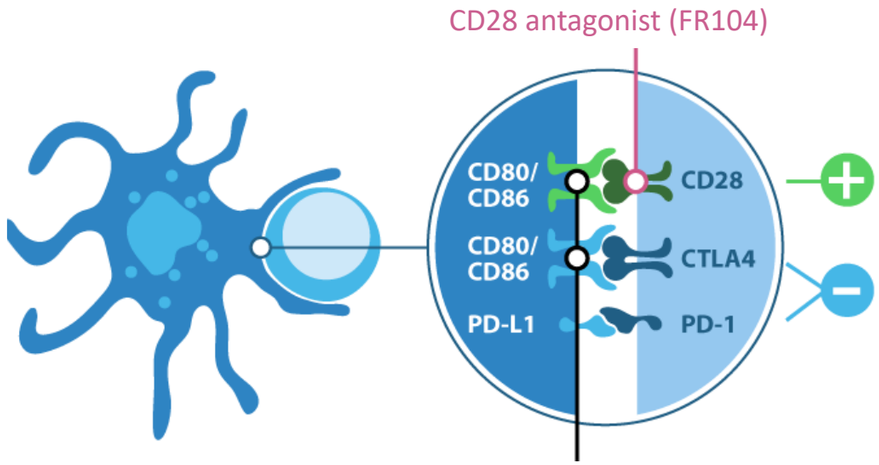
CD: cluster of differentiation; ICI: immune checkpoint inhibitor; SIRPα: signal regulatory protein-α.

1: Khair DO, et al. Front Immunocol 2019;10:453; **2:** Weiskopf K, et al. Eur J Cancer 2017;76:100-9; **3:** Murata Y, et al. Cancer Sci 2018;109(8):2349-57; **4:** Boehringer Ingelheim. Data on file.

FR104/VEL-101
CD28 antagonist in organ Transplantation

Veloxis PHARMACEUTICALS
an Asahi Kasei company

Selective CD28 antagonist mAb in Kidney Transplantation



Ambitious Partnership & Development Plan with Veloxis

- **Veloxis** is a global leader in transplantation with leading product Envarsus XR (tacrolimus) realizing **c. USD 140m**[1] turnover; Joined **Asahi Kasei** in FY2019[2], a **USD 17bn** annual turnover conglomerate with healthcare representing 17% of sales

- **Strong Preclinical data in Kidney & Cardiac transplantation + GVHD**[3,4,5]
- **Positive Phase 1/2 in kidney transplantation** (intravenous)[6]
- **Positive Phase 1 subcutaneous**[7]

Phase 2 in kidney transplantation (subcutaneous) under preparation by Veloxis

1 – https://www.asahi-kasei.com/ir/library/presentation/pdf/211005.pdf
2 – https://www.asahikasei.com/ir/library/presentation/pdf/191125eng.pdf
3 – Poirier et al. Science Transl. Medicine 2010
4 – Poirier et al. Am J Transplant 2015
5 - Watkins et al. Journal of Clinical Investigation 2018
6 - PR OSE of June 5th, 2024: Presentation at the 2024 ATC
7 - PR Veloxis of May 30th, 2024: Presentation at the 2024 ATC

FR104/VEL-101 - Transforming kidney transplant management

Veloxis PHARMACEUTICALS

Positive results of the FIRsT phase I/II clinical evaluation in kidney transplantation[3]

Good Safety profile and early sign of efficacy:

- *Drug exposure allow high receptor occupancy maintenance during the one-year follow-up.*
- *No acute rejection under FR104/VEL-101 treatment, including after calcineurin-inhibitor (CNI) discontinuation.*
- *No biopsy-proven acute rejection (BPAR) observed at 1-year*
- *No donor-specific antibodies (DSA) detected at 1-year*

Kidney Transplant Market: A multi-billion dollar commercial opportunity

- **45k+** new kidney transplant annually for an estimated **500k+** people living with a functioning kidney graft in G7 countries
- 90k+ Americans in transplant waiting list, many transplanted patients require repeat transplants
- Chronic exposure to **CNIs** is associated with **renal toxicity**, cardio-metabolic complications, **insufficient** graft protection as well as **cancer** and **infections**
- FR104/VEL-101 seeks to address challenges associated with current immunosuppressive transplantation regimens using CNI-based therapies

1 – OSE Immunotherapeutics and Veloxis Pharmaceuticals Enter Into Global License Agreement to Develop, Manufacture, and Commercialize FR104, a CD28 Antagonist, in the Organ Transplantation Market
2 – https://www.asahi-kasei.com/ir/library/presentation/pdf/211005.pdf ; 3 – https://www.asahikasei.com/ir/library/presentation/pdf/191125eng.pdf
3 – PR OSE of June 5th, 2024: Presentation at the 2024 ATC

The OSE team

A Board of Directors combining international expertise in drug development, industry & finance & experience in listed biotech companies

Didier Hoch, MD
Chairman
- 25+ years in pharma and vaccine industry (Sanofi-Pasteur MSD, Rhone-Poulenc)
- Several functions incl. commercial, marketing, general management

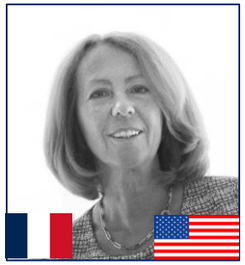
Maryvonne Hiance
Vice Chairwoman
- Founder and CEO of Effimune
- General Manager SangStat Atlantic, DrugAbuse Sc.
- Former President & Vice President of France Biotech

Nicolas Poirier, PhD
Director, Chief Executive Officer & Chief Scientific Officer
- 20 years experience in biotech/immunotherapy
- Advanced 6 novel therapies to clinic
- Leading to 6 pharma deals
- Global Management (INSEAD,HEC)

Anne-Laure Autret-Cornet
Director representing the employee shareholders,
Chief Financial Officer
- 15+ years in Finance & Biotech
- ESSCA Management School
- Finance Corporate, HEC

Marc Dechamps
Independant Director
- 35+ years in pharma industry (GSK, ViiV Healthcare)
- Expertise in market development for new products, I&I, I/O, vaccines
- CEO of Bioxodes

Markus Goebel, MD, PhD, MBA
Independent Director
- 30+ year experience in the Life Science industry (Novartis, Roche)
- Positions in BD&L, Corporate M&A, Corporate Venture Funds
- Founder & CEO of M&G Advisor
- Certified MD in oncology/hematology, MBA



Martine George, MD
Independent Director
- 30+ year experience in pharma & academic in the US (Pfizer, J&J, Sanofi, Sandoz-Novartis)
- Service Chief Gustave Roussy, Cancer center
- Expertise in clinical research, drug development, medical and regulatory affairs specializing in oncology

Eric Leire, MD
Independent Director
- Genflow Bioscience CEO
- Previously chairman & CEO of several biotech listed in US
- Previous Marketing Director position in Pharma US & EU

Cécile Nuyen-Cluzel
Independent Director
- Extensive experience in financial engineering & healthcare private equity
- Senior advisor in healthcare for France & Europe at Apposite Capital
- Master 2 « Ingénierie financière & « Leading the digital transformation in healthcare »certification from Harvard Medical School

Brigitte Dréno, MD
Independent Director
- Head Depart of Dermatology, Nantes university hospital
- Director of Biotherapy Clinical Investigation Centre
- Operational functions and research responsibilities

An experienced Executive leadership team

Nicolas Poirier, PhD
CEO, CSO

- 20 years experience in biotech/immunotherapy
- Advanced 6 novel immunotherapies to clinic
- Leading to 6 pharma deals
- Global Management & Finance (INSEAD, HEC)

Anne-Laure Autret-Cornet
Chief Financial Officer

- 15+ year experience in Finance / Biotech
- Graduated from ESSCA Management school
- Corporate Finance, HEC

Dominique Costantini, MD
Chief Development & Strategy

- 30+ years in product development/ marketing
- Chairwoman, Co-founder
- IPO completion in 2015

Jean-Jacques Mention, PhD
Chief Business Officer

- 15+ years of Research in Immunology at King's College London, Institut Pasteur
- 10 years experience in Business Development

Aurore Morello, PhD
Head of Research

- 13+ year experience in Immunotherapy
- International Post-doctoral Fellowship (MSKCC, NYC)

Silvia Comis, MD
Head of Clinical

- 30+ year experience in Pharma
- Previously Senior Medical Director IQVIA, and European Head of Early Products Medical Affairs in oncology at Novartis

Valérie Gabarre, PharmD
Medico-Marketing Director

- 25+ years of experience in Pharma/Biotech, in Medico-Marketing & Sales - EU & Global, Immunotherapy & Oncology
- Global Network of Leaders & Corporative Groups in Oncology
- PharmD

International SAB - Renowned experts in IO and I&I

Wolf-Hervé Fridman, MD
Chairman of the SAB, Professor Emeritus of Immunology at the Université de Paris, France

Myriam Merad, MD, PhD
Director of the Precision Immunology Institute at Mount Sinai School of Medicine in New York and the Director of the Mount Sinai Human Immune Monitoring Center (HIMC)

Charles N. Serhan, PhD, DSc
Professor of Anaesthesia (Biochemistry and Molecular Pharmacology) at Harvard Medical School, Professor of Oral medicine, Infection and Immunity at Harvard School of Dental Medicine

Jennifer Wargo, MD, M.M.Sc
Professor of Genomic Medicine & Surgical Oncology, UT MD Anderson Cancer Center

Bernard Malissen, PhD
Group Leader at Centre d'Immunologie de Marseille-Luminy and Founding-Director of Center for Immunophenomics, Marseille, France

Sophie Brouard, PhD
Immunologist and Director in Veterinary Sciences, Director of Research at the Institut National de la Santé et Recherche Médicale (Inserm, National Institute for Health and Medical Research) in Nantes

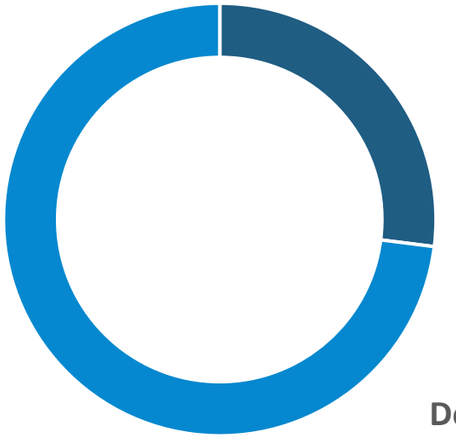
Key financial and Shareholding structure

EURONEXT

Key financials

ISIN code	FR0012127173
Market	Euronext Paris
Shares outstanding	21 817 777
Market cap *(Sept 5, 2024)*	€193 m
Level of Cash *(June 30, 2024)*	€80.7 m (of which €75.7 m classified in financial assets)
Financial visibility	2027

Shareholding structure



December 31, 2023

Analyst coverage

Kepler Cheuvreux

EDISON BRILLIANT KNOWLEDGE

INVEST SECURITIES

Degroof Petercam

OSE IMMUNO THERAPEUTICS

Breaking through the therapeutic ceiling with first-in-class immunotherapies

Immuno-Oncology & Immuno-Inflammation

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