



# IMMUNOLOGY

*Lilly*



# SAFE HARBOR PROVISION



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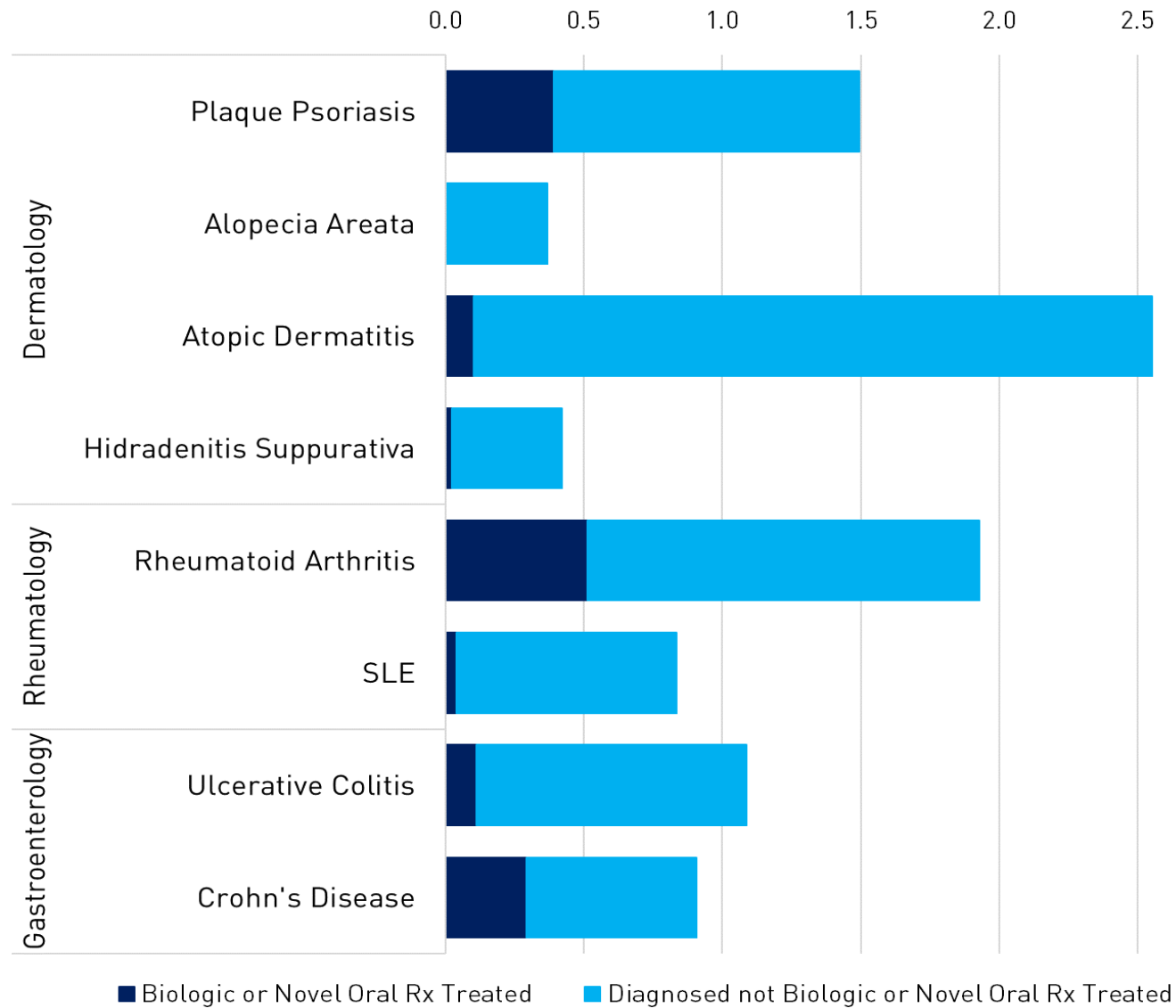
2021 INVESTMENT COMMUNITY MEETING

# PREVALENCE OF IMMUNOLOGIC DISORDERS

## LARGE PATIENT POPULATIONS WITH SIGNIFICANT UNMET NEED



U.S. Patients for Select Immunologic Disorders (in millions)



- Approximately 12 million people in U.S. have diagnosed auto-immune disorders, of which ~20% are treated with a biologic or novel oral medicine
- Lilly's pipeline has the potential to impact a broad spectrum of autoimmune disorders with high prevalence and unmet need
- In addition to internal research, external opportunities help to develop differentiated assets as demonstrated with Dermira acquisition as well as Nektar and Rigel collaborations

2020 US Data : Internal triangulation for select indications of Truven Health Analytics MarketScan Databases, Symphony APLD Database, IQVIA NPA Database, only primary indications are included; SLE = systemic lupus erythematosus

# LATE-STAGE PIPELINE OPPORTUNITIES

POTENTIAL TO ADDRESS UNMET MEDICAL NEED IN KEY AREAS OF IMMUNOLOGY



## MIRIKIZUMAB



- Anti-IL-23p19 monoclonal antibody
- Phase 3 induction and maintenance studies for people with moderately-to-severely active UC met primary and all key secondary endpoints; global submissions are planned for H1 2022
- Phase 3 study in Crohn's disease includes head-to-head versus Stelara and is expected to read out in early 2024

## LEBRIKIZUMAB



- Potential best-in-class IL-13 monoclonal antibody with competitive profile in atopic dermatitis
- Phase 3 induction study demonstrated more than half of people with moderate to severe atopic dermatitis had at least 75% skin clearance as measured by EASI
- Upcoming Phase 3 read outs include combination with topical corticosteroids expected late 2021/early 2022 and 52-week maintenance data expected H1 2022

## OLUMIANT



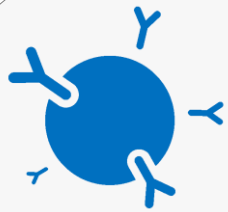
- The first JAK-inhibitor to demonstrate hair regrowth for alopecia areata in a Phase 3 program; Submitted in the U.S., Europe and Japan
- Phase 3 studies in SLE to read out before end of the year
- Approved in the EU and Japan for atopic dermatitis with U.S. regulatory action expected early 2022

Well positioned to become a leader in immunology with growing presence in dermatology and rheumatology as well as emergence in gastroenterology

UC = ulcerative colitis; EASI = eczema area and severity index; JAK = Janus kinase Inhibitors; SLE = systemic lupus erythematosus;

# IMMUNOLOGY DEVELOPMENT STRATEGY

## CORE AREAS OF FOCUS



### ADAPTIVE IMMUNITY

- Offers potential of efficacy across many diseases
  - T cell biology
  - B cell biology
  - Cellular Signaling
- Most industry attention focused here with multiple approved assets

Taltz®

Mirikizumab (Ph 3)

Olumiant®

Lebrikizumab (Ph 3)

RIPK1 SM (Ph 1)



### IMMUNE RESOLUTION

- Possibility of lasting remission
  - Checkpoints
  - Treg biology
  - Immunometabolism
  - Tolerance
- Key area of clinical focus for Lilly with industry-leading pipeline

IL-2 conjugate (Ph 2)

CD200R mAb (Ph 1)

PD-1 mAb (Ph 2)

BTLA mAb (Ph 1)



### INNATE IMMUNITY

- Potential for efficacy in hard-to-treat targets
  - Myeloid cells/neutrophils
  - Dendritic cells
  - Fibrosis
- Emerging area of focus for Lilly

CXCR 1/2 mAb (Ph 2)

mAb = monoclonal antibody; SM = small molecule

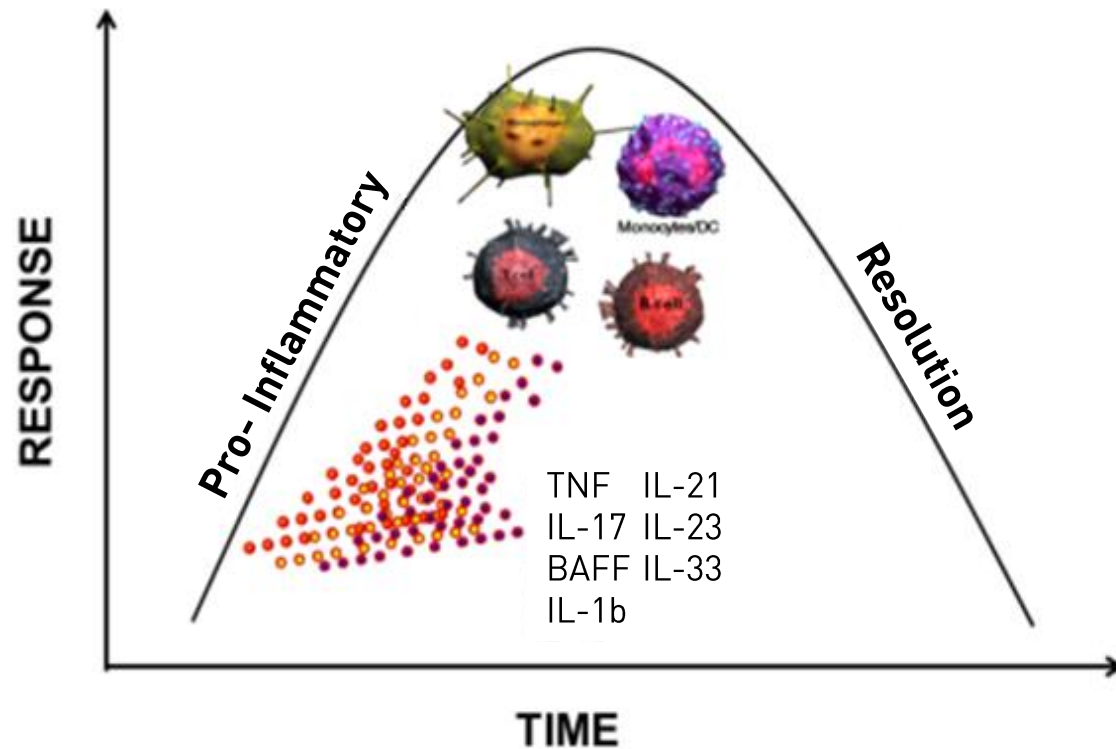
# CHECKPOINT RECEPTOR STRATEGY

AGONIST ANTIBODIES (CD200R, BTLA, PD-1) INHIBIT IMMUNE RESPONSE AND PROMOTE A STATE OF RESOLUTION

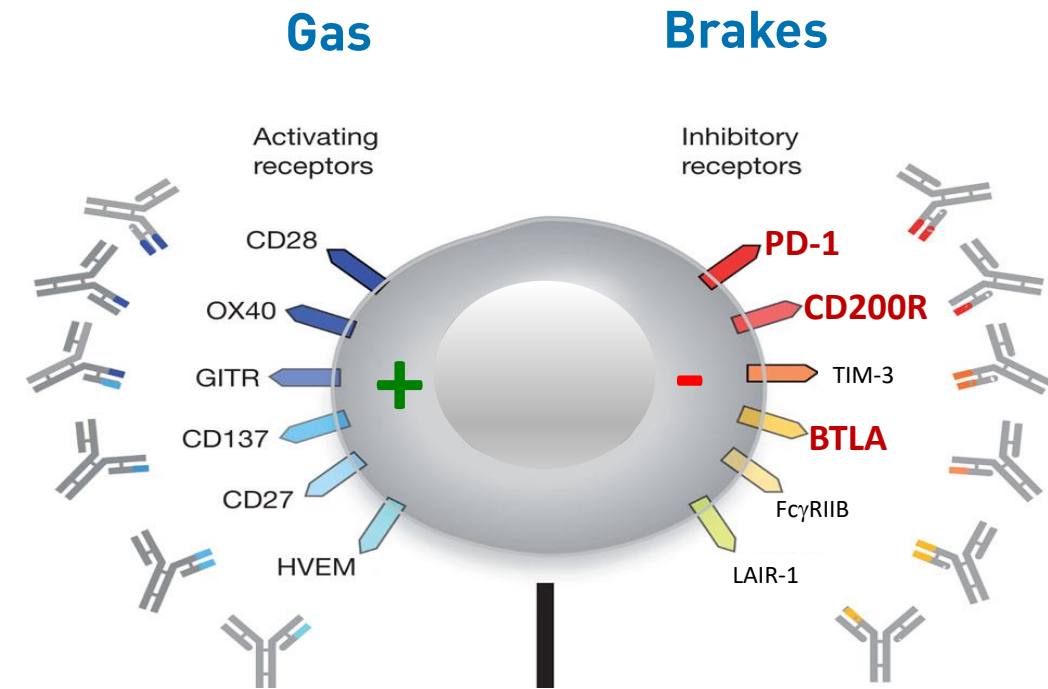


## HISTORICAL IMMUNOLOGY R&D

## CHECKPOINT RECEPTOR FOCUS



Prior efforts focused on pro-inflammatory response, whereas checkpoint agonists are focused on resolution



### Reasons to believe:

- Validated in immuno-oncology
- Associated with autoimmune side effects
- Agonists selectively impact activated cells

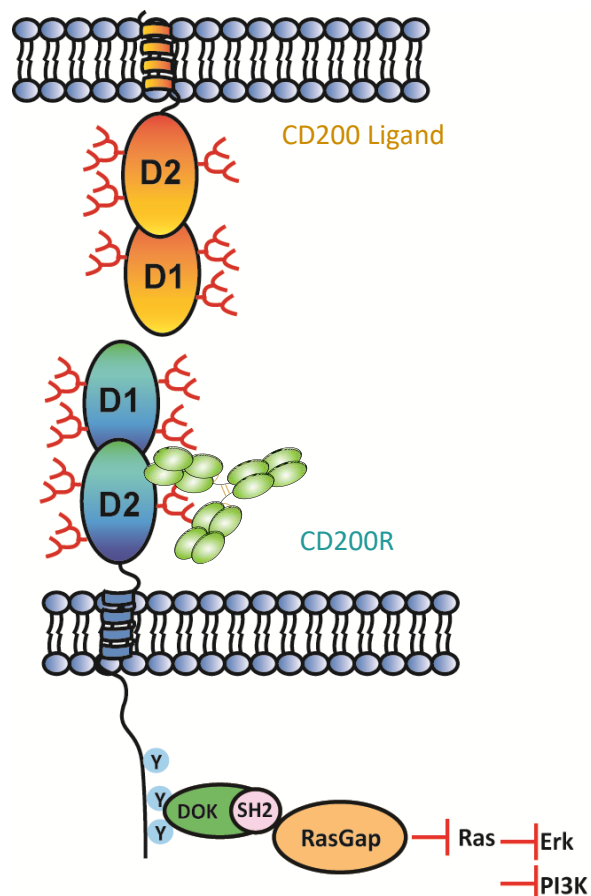
# CD200R AGONIST AB (LY3454738)

LEAD CHECKPOINT AGONIST SHOWS POTENTIAL FOR EFFICACY AND DURABILITY



## MECHANISM OF ACTION

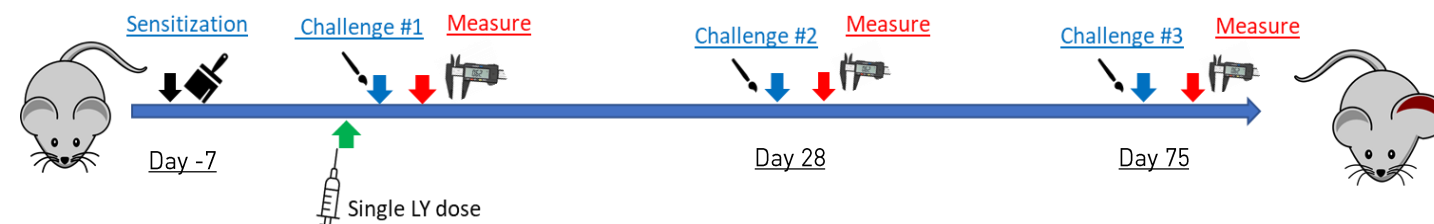
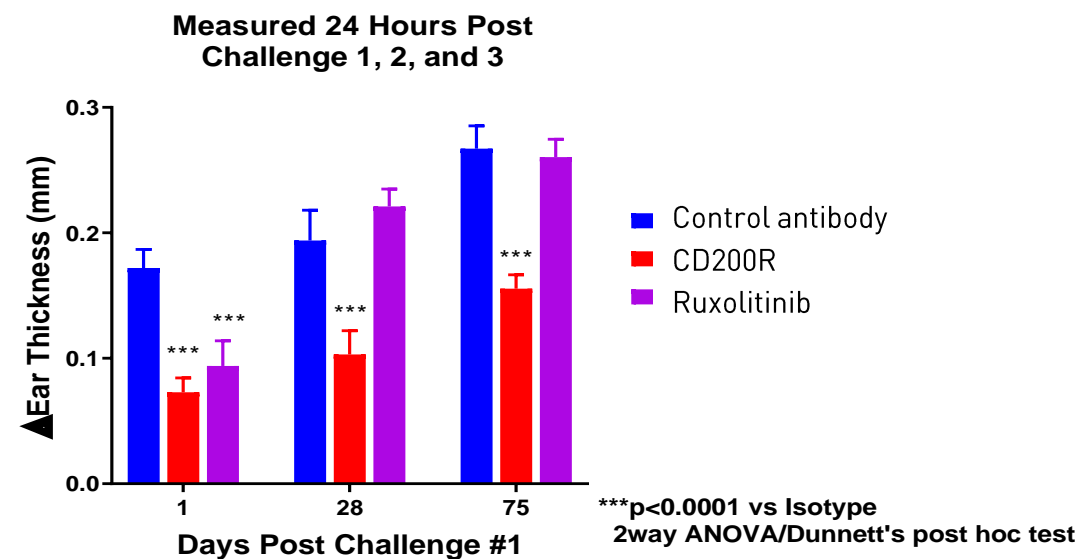
- Expressed on both innate and adaptive immune cells
- Agonism of the receptor leads to decreased cytokine release and decreased cell proliferation
- Pre-clinical data using an agonist antibody demonstrate inhibition of inflammation



## PRECLINICAL DATA

Long-term efficacy without measurable exposure suggest the potential for durable response after a single dose

### Hapten-induced contact dermatitis\*



\* Challenges are defined as hapten-induced dermatitis at predefined intervals

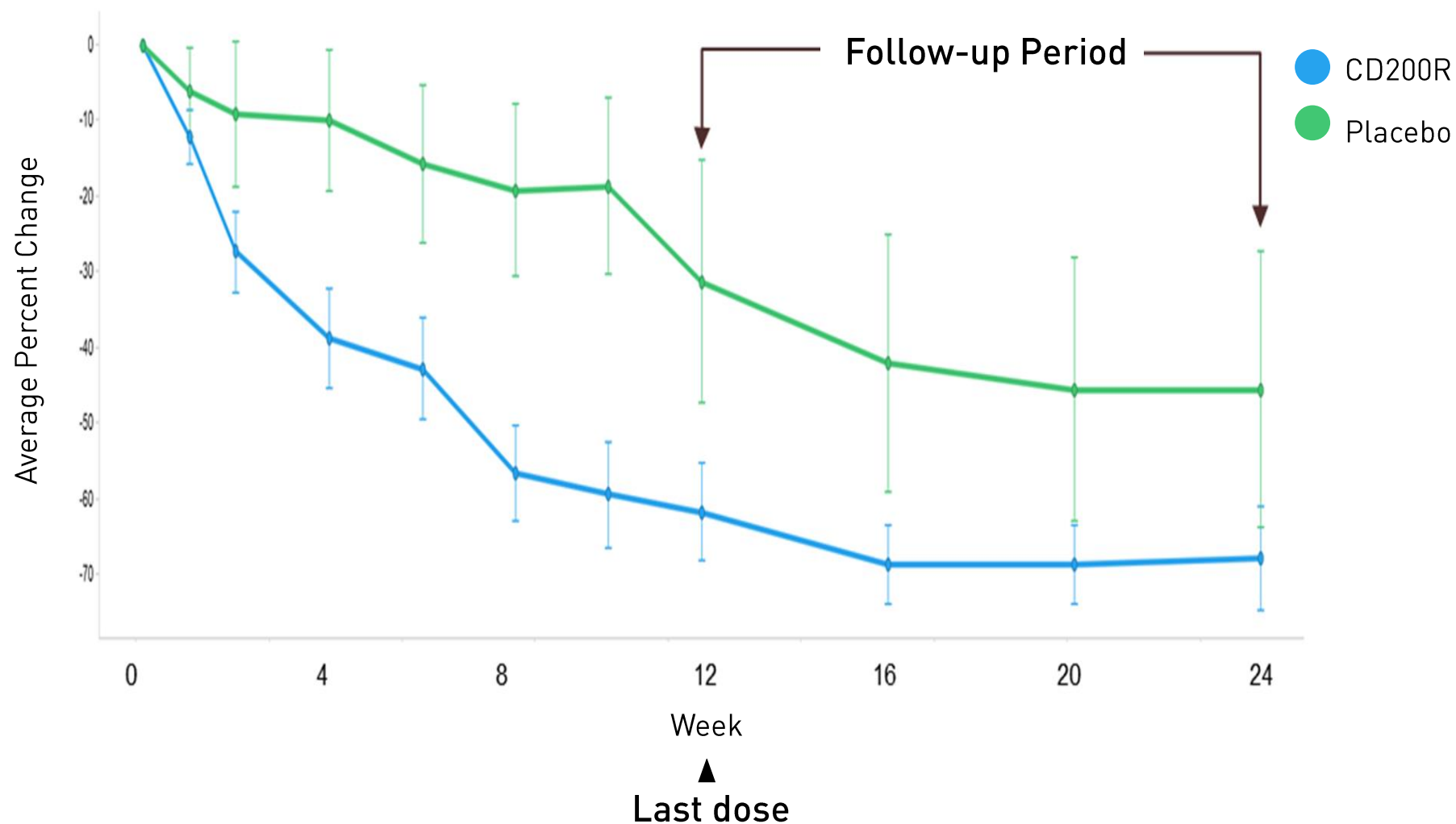


# CD200R AGONIST AB (LY3454738)

FIRST CLINICAL POC FOR CHECKPOINT AGONISM ACROSS THE INDUSTRY



Mean EASI Percent Change from Baseline by Treatment in Atopic Dermatitis\*



- EASI 75 of ~40% at week 12 established proof of concept for checkpoint agonists in Phase 1b study in atopic dermatitis
- Exploring durability of effect and potential for less frequent subcutaneous dosing
- Potential for enriching responses through biomarker-driven tailored approaches

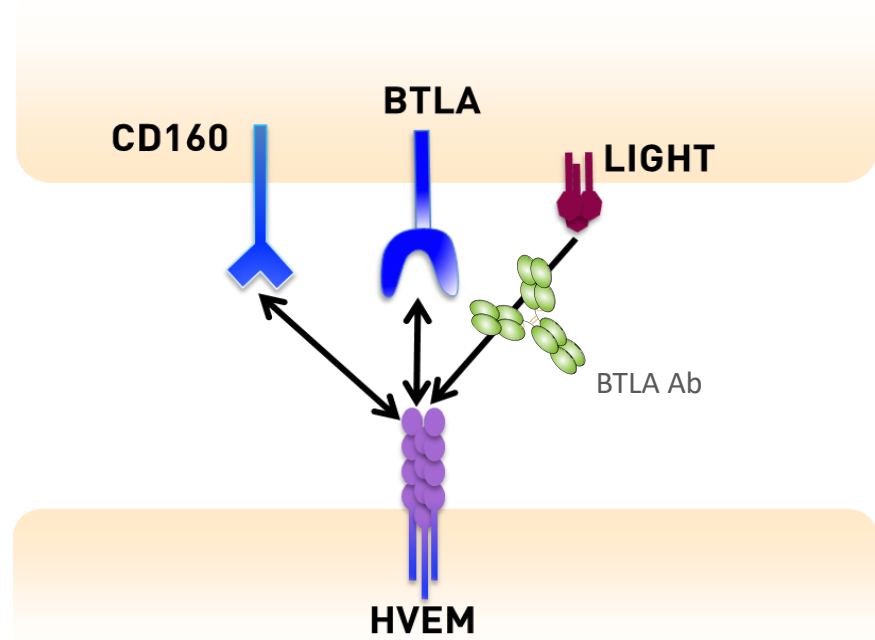
\*Interim analysis  
EASI = eczema area and severity index; POC = proof of concept

# BTLA AGONIST MAB (LY3361237)

NOVEL FIRST-IN-CLASS CHECKPOINT AGONIST WITH PLANS FOR PHASE 2 SLE STUDY

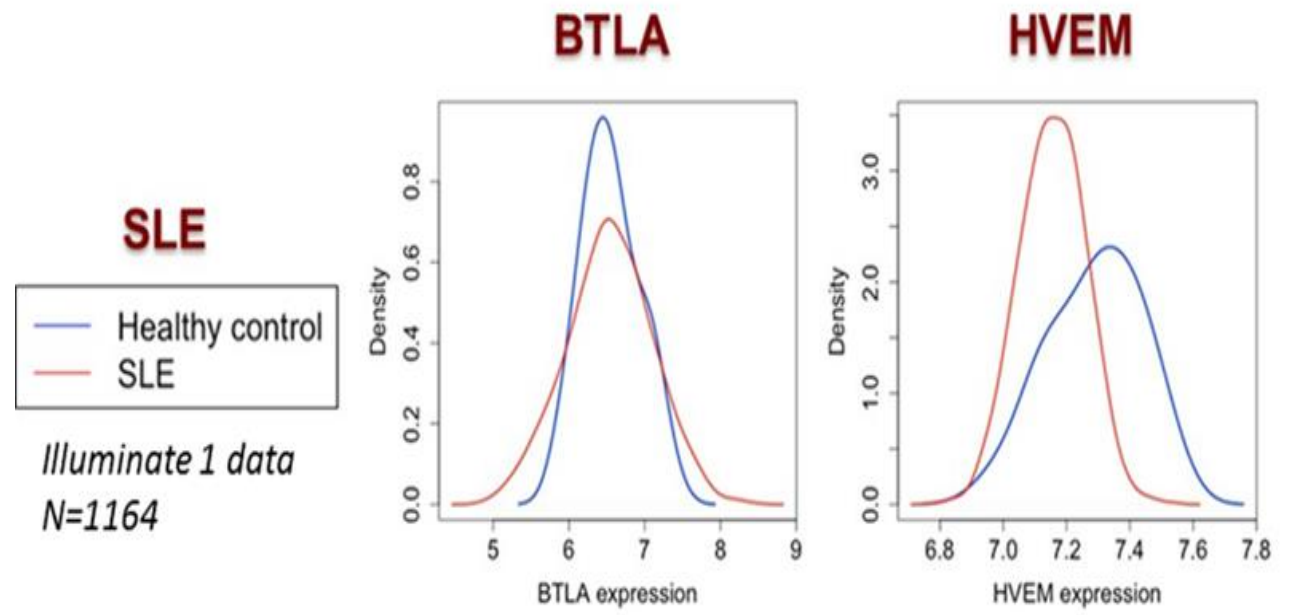


## MECHANISM OF ACTION



Binds BTLA on B cells, T cells, and dendritic cells to suppress immune activation

## POTENTIAL TARGETED THERAPY IN SLE



- HVEM, the BTLA ligand, is reduced in SLE patients
- BTLA agonist antibody may function as HVEM replacement therapy

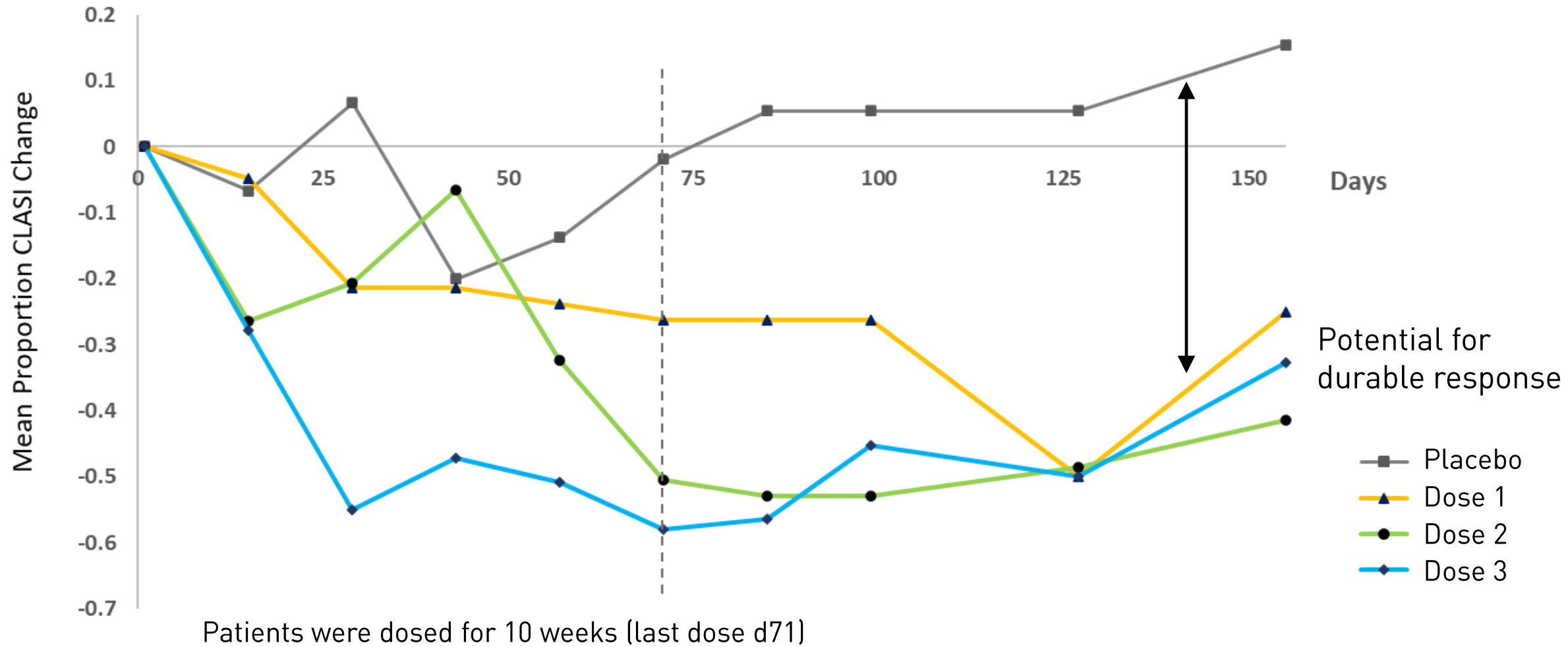
BTLA = B- and T-lymphocyte attenuator; SLE = systemic lupus erythematosus; HVEM = herpesvirus-entry mediator

# BTLA AGONIST MAB (LY3361237)

PHASE 1 DATA SHOWED THE POTENTIAL FOR DURABLE RESPONSE IN SLE



## Phase 1 MAD Study: Skin Disease Improvement in SLE Patients with CLASI $\geq 4$ at Baseline



BTLA = B- and T-lymphocyte attenuator; MAD = multiple ascending dose; SLE = systemic lupus erythematosus; HVEM = herpesvirus-entry mediator; CLASI = Cutaneous Lupus Erythematosus Disease Area and Severity Index

# PD-1 AGONIST MAB (LY3462817)

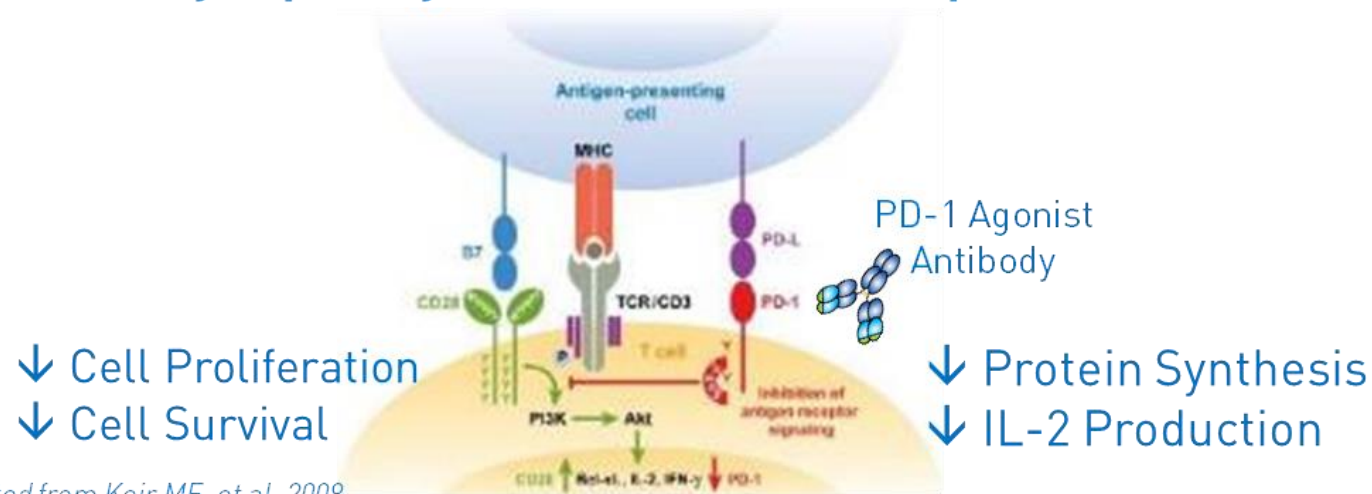
FIRST-IN-CLASS OPPORTUNITY TO AGONIZE A VALIDATED IMMUNE CHECKPOINT RECEPTOR



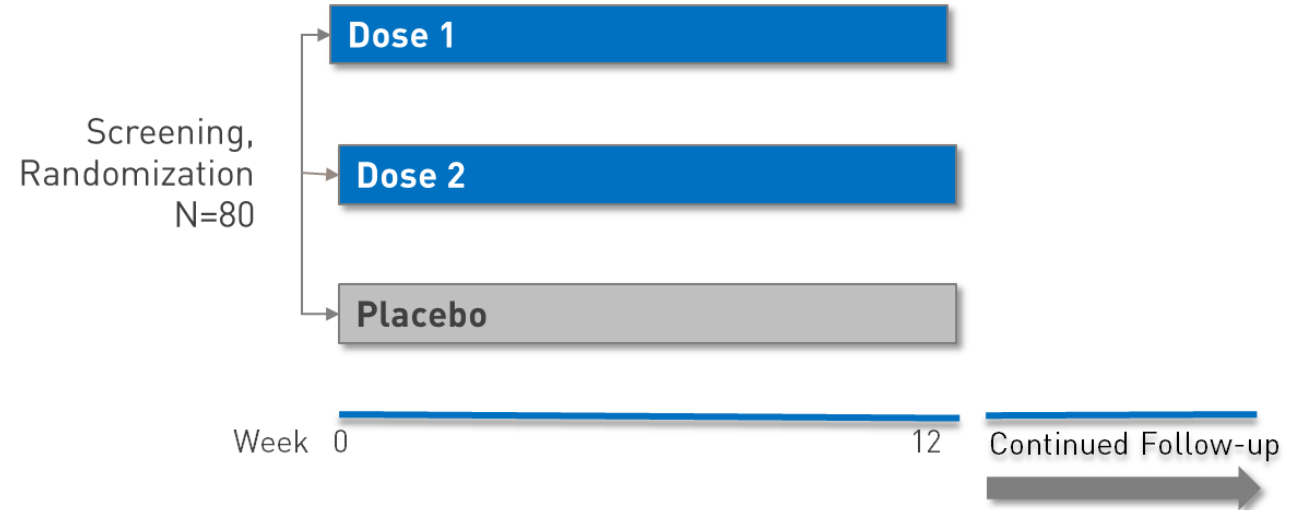
FIRST IN CLASS OPPORTUNITY

ONGOING PHASE 2 POC IN RA

PD-1 agonism suppresses lymphocyte activation & expansion



Adapted from Keir ME, et al. 2008. Annu. Rev. Immunol. 26:677-704



- First-in-class development program will test the hypothesis of durability / disease resolution through checkpoint agonism
- PD-1 inhibition broadly associated with autoimmune side effects including colitis, autoimmune diabetes and inflammatory arthritis

- **Patient Population:** Insufficient responders to conventional, biologic, or targeted synthetic disease modifying anti-rheumatic drugs
- **Primary Endpoint:** DAS28-hsCRP change from baseline at 12 weeks

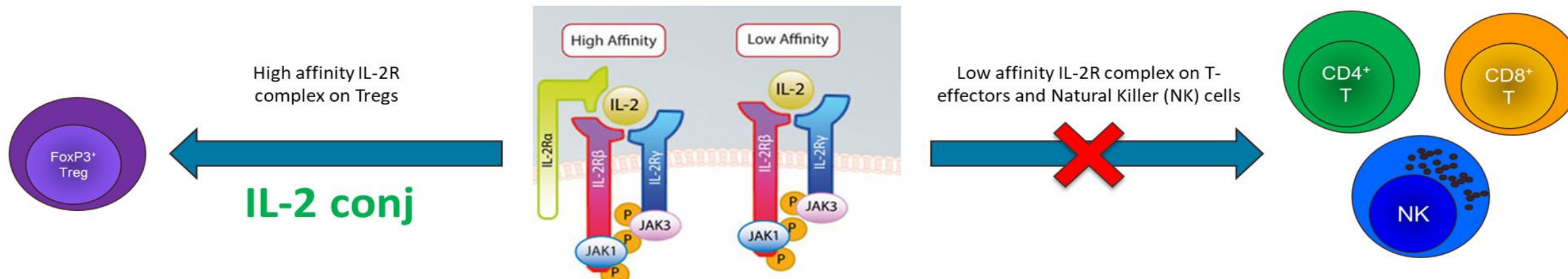
RA = rheumatoid arthritis; POC = proof of concept; LDA = Low Disease Activity; CDAI = Clinical Disease Activity Index; PBO = placebo; RAMRIS = Rheumatoid Arthritis Magnetic Resonance Imaging Score; DAS28 = Disease Activity Score-28; hsCRP = high-sensitivity C-reactive protein

# IL-2 CONJUGATE (NKTR-358)

NOVEL BIOLOGY & TREATMENT APPROACH IN PARTNERSHIP WITH NEKTAR

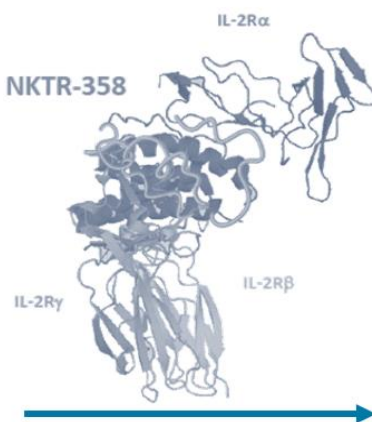
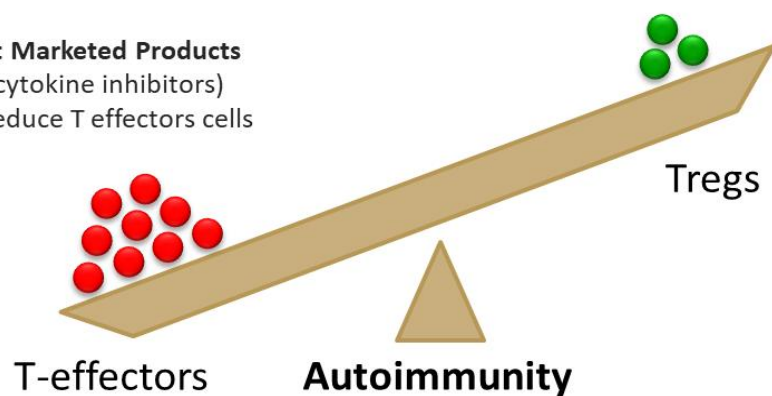


**Novel Biology:** IL-2 conjugate, An IL-2 Agonist biased for Treg expansion, affords a...

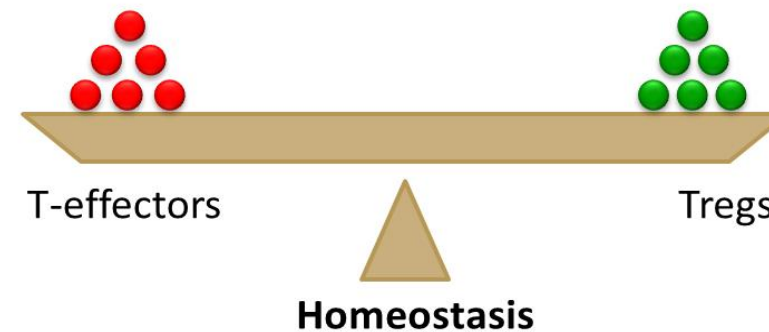


**...Novel Treatment Approach:** Resolution/Restoration of immune system

Current Marketed Products (e.g., cytokine inhibitors) aim to reduce T effectors cells



NKTR-358 (Rebalance the immune system by increasing Treg population / function)



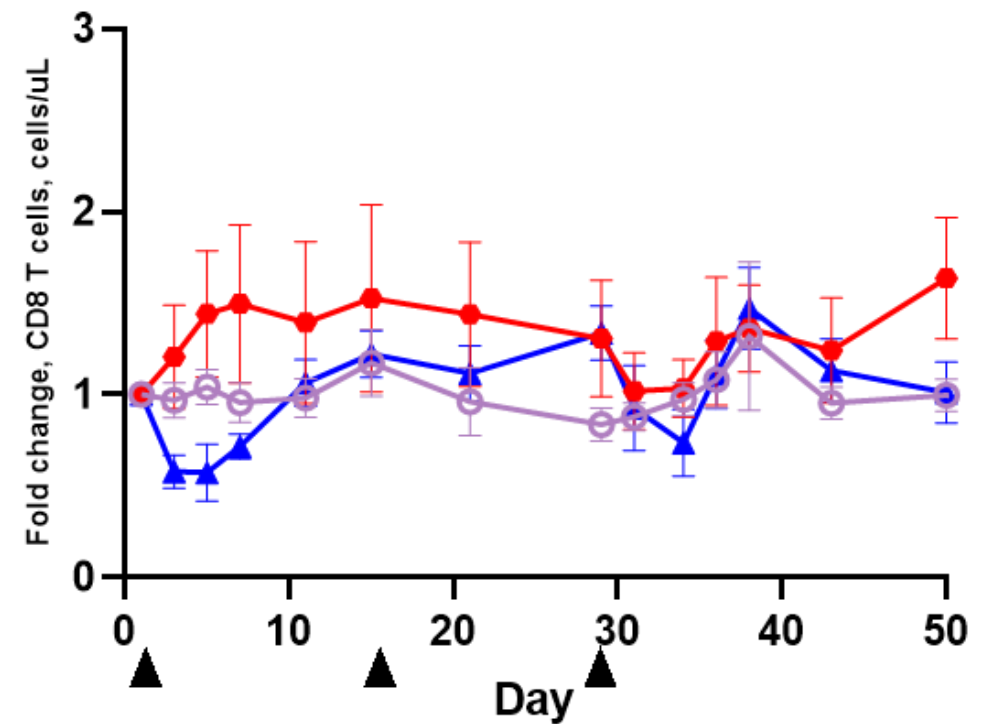
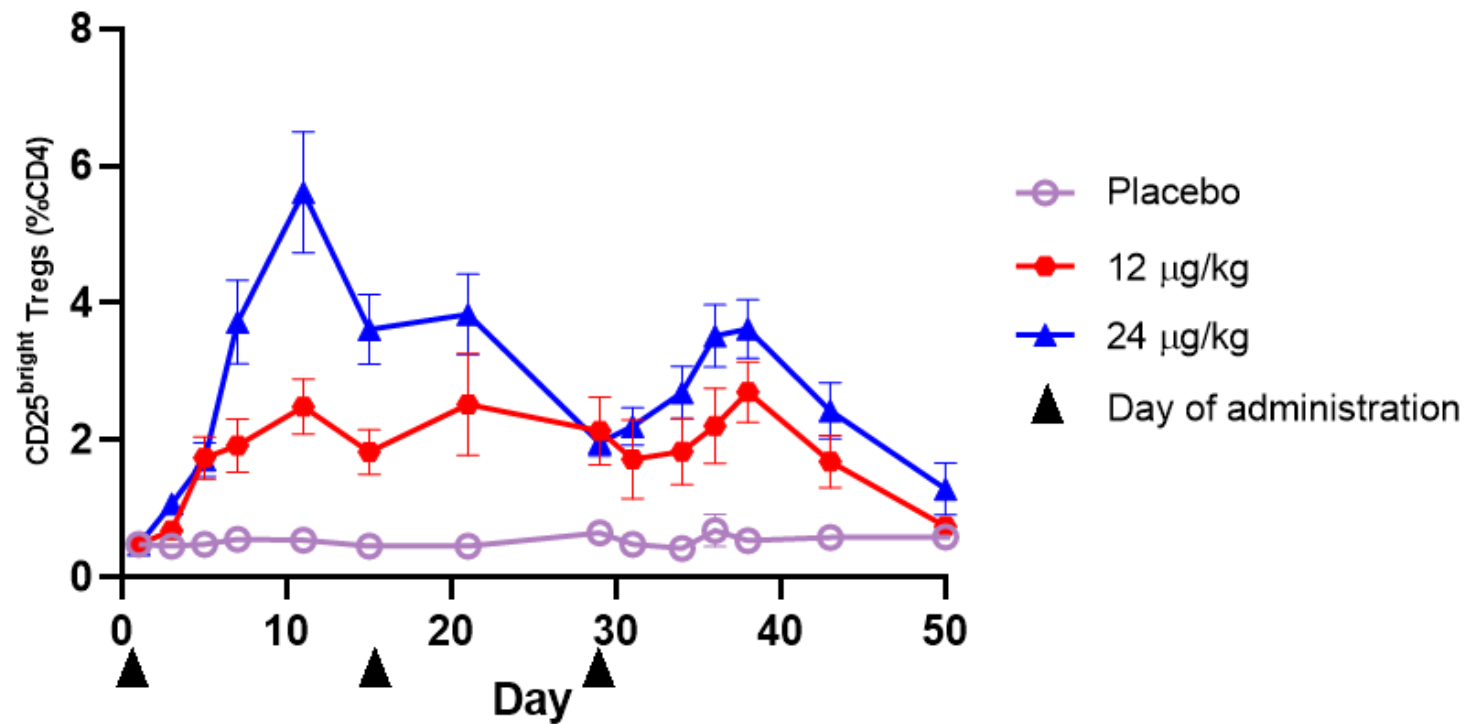
Differential expression of high and low affinity IL-2 receptors allows IL-2 to regulate both pro-inflammatory T-effector cells and anti-inflammatory Treg cells. NKTR-358 is a stable pegylated IL-2 conjugate composition that preferentially stimulates expansion of Tregs with minimal effects on T-effectors.

# IL-2 CONJUGATE (NKTR-358)

## ENCOURAGING MAD DATA IN SYSTEMIC LUPUS ERYTHEMATOSUS



Phase 1 MAD data in SLE demonstrated dose-dependent increase in CD25<sup>bright</sup> Tregs (up to 20-fold) with no appreciable impact on T-effectors and an acceptable safety profile



MAD = multiple ascending dose; SLE = systemic lupus erythematosus

# IL-2 CONJUGATE (NKTR-358)

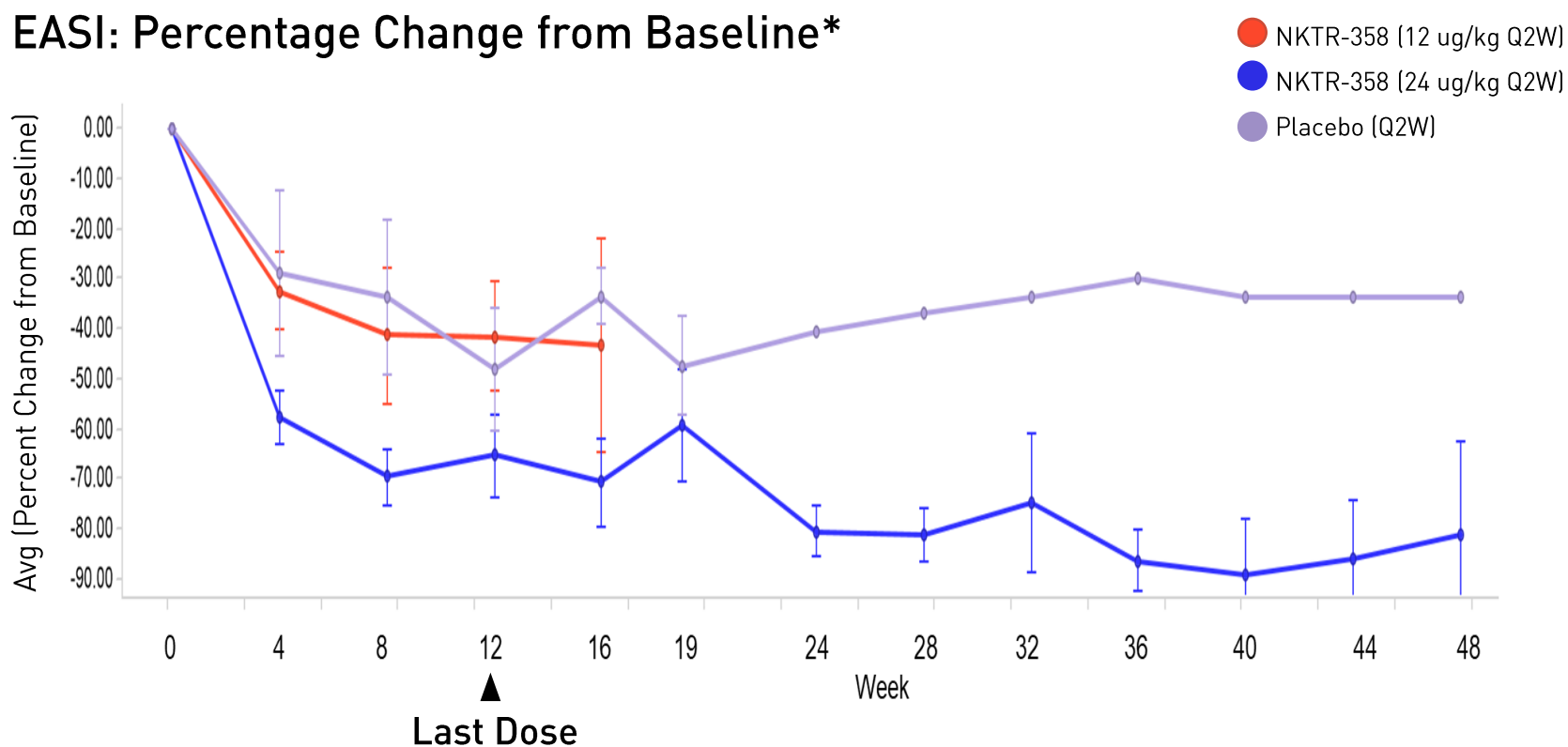
PHASE 1B POC DATA IN ATOPIC DERMATITIS SUPPORTS CLINICAL PROGRAM EXPANSION



## PHASE 1B DATA FOR PATIENTS WITH MODERATE-TO-SEVERE ATOPIC DERMATITIS

## CLINICAL STATUS

EASI: Percentage Change from Baseline\*



- SLE** Phase 2 trial recruiting (NCT04433585); Encouraging Phase 1b data (NCT03556007)
- ULCERATIVE COLITIS** Phase 2 trial recruiting (NCT04677179)
- ATOPIC DERMATITIS** Encouraging Phase 1b data (NCT04081350); Plan to initiate Phase 2 clinical study in 2022

○ Sustained disease control for at least 6 months after last dose demonstrates potential for NKTR-358 to differentiate from standard of care

○ POC data demonstrated dose dependent reduction in EASI

\* Interim analysis; SLE = systemic lupus erythematosus; EASI = eczema area and severity index; POC = proof of concept

# CXCR1/2L (LY3041658)

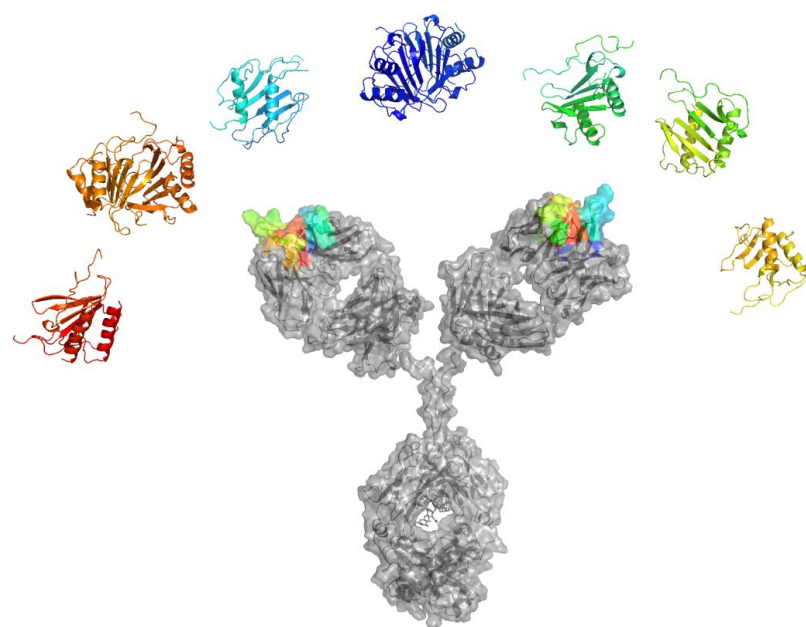
NOVEL NEUTROPHIL-TARGETED MAB BEING STUDIED IN HIDRADENITIS SUPPURATIVA



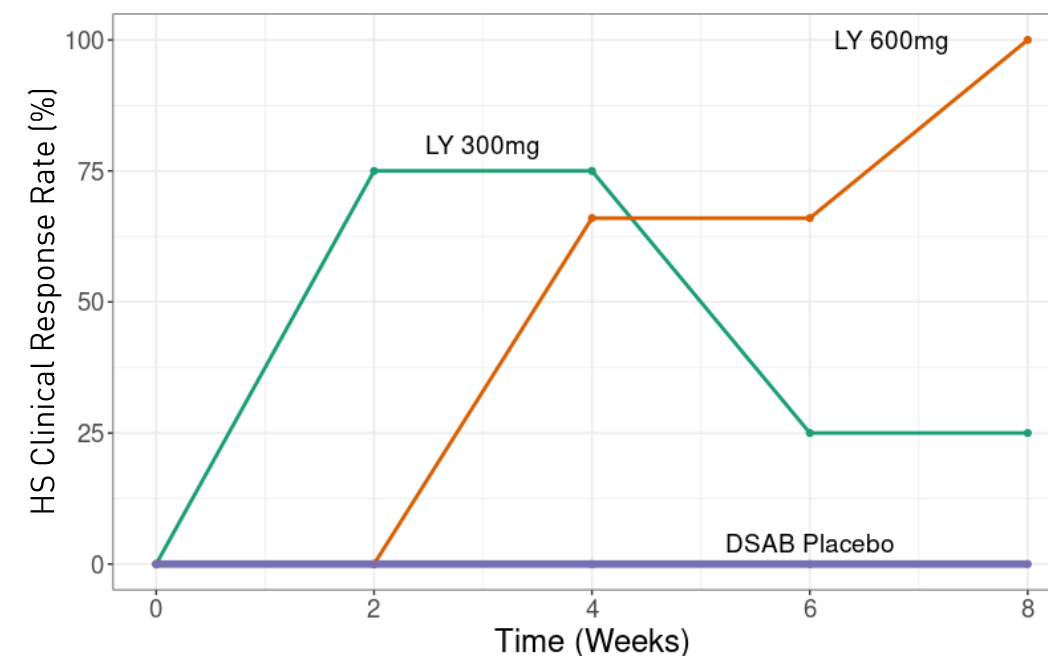
## MECHANISM OF ACTION

Neutralizing all ELR+ chemokines acts as a dual CXCR1/CXCR2 antagonist, impacting the ability of neutrophils to migrate to sites of inflammation

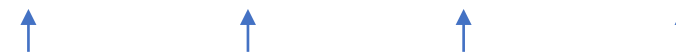
Due to the interplay between the innate and adaptive immune system, reducing neutrophil infiltration may result in downregulation of the adaptive autoimmune response



## PHASE 1 MAD DATA IN HS



LY doses (Q2W):



Potential application in neutrophil-driven autoimmune diseases including HS, ulcerative colitis and other neutrophilic skin diseases

Full Phase 2 HS data expected H1 2022



# RIPK1 INHIBITOR R552 / LY3871801 (INLICENSED)

BROAD POTENTIAL AS AN ORAL THERAPY IN DISEASES TARGETED BY TNF INHIBITORS



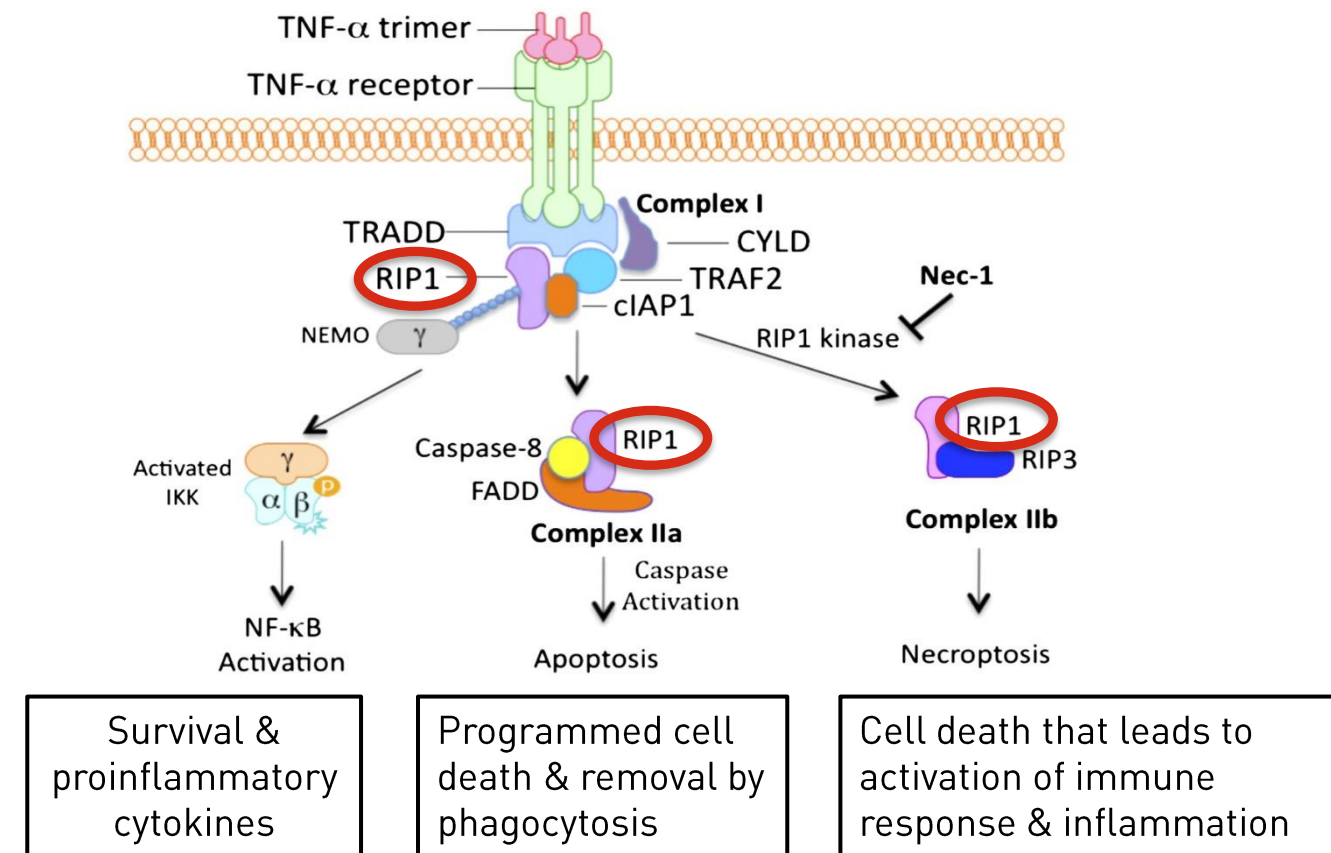
## BIOLOGIC RATIONALE

Orally available, potent and selective inhibitor of RIP1 kinase, recently in-licensed from Rigel

RIP1 kinase plays a key role in TNF signaling and in the induction of pro-inflammatory necroptosis, which could support indications in psoriasis, RA and IBD

R552/LY3871801 could achieve best-in-class status relative to competition based on current Phase 1 data

## DOWNSTREAM SIGNALING

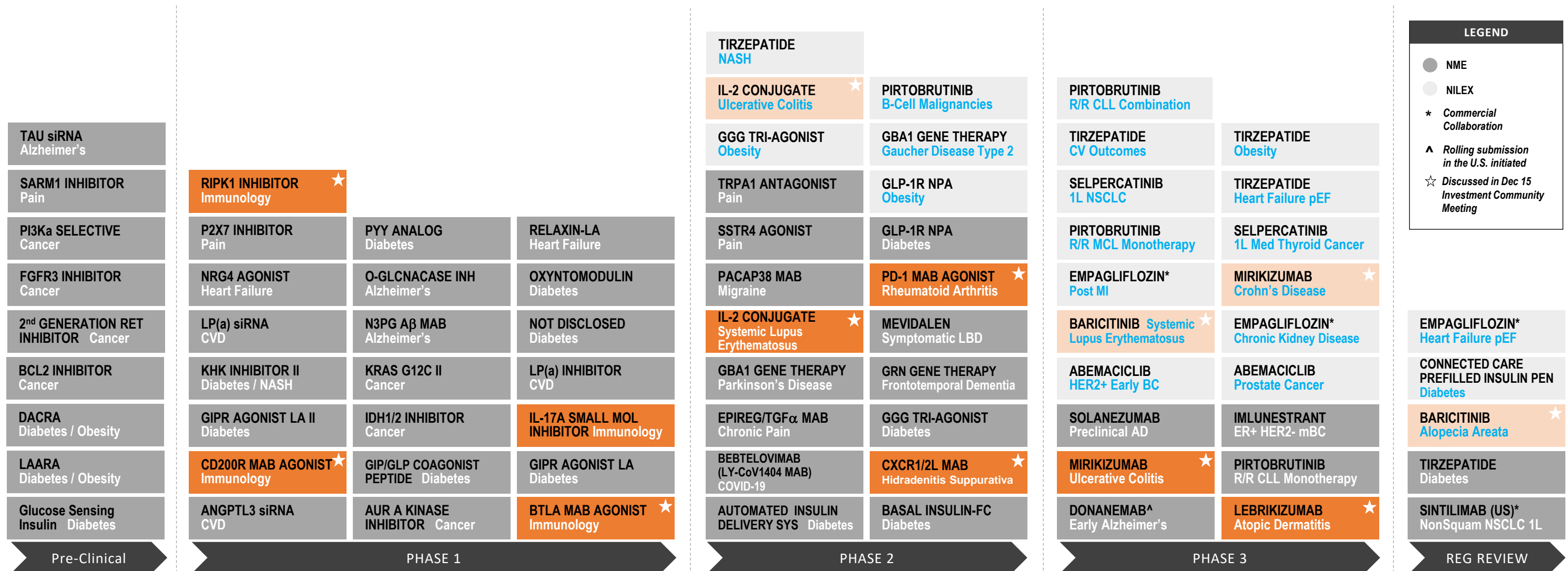


Adapted from Yuan J. & Kroemer G., Genes & Dev 2010

RIP1 = receptor-interacting serine/threonine-protein kinase 1; TNF = tumor necrosis factor; RA = rheumatoid arthritis; IBD = inflammatory bowel disease

# LILLY IMMUNOLOGY PIPELINE

## SELECT NME AND NILEX PIPELINE AS OF OCTOBER 22, 2021



**LEGEND**

- NME
- NILEX
- \* Commercial Collaboration
- ▲ Rolling submission in the U.S. initiated
- ☆ Discussed in Dec 15 Investment Community Meeting

Note: select pre-clinical assets listed, most of which were discussed at the Lilly Investment Community meeting on December 15, 2021; NME = new molecular entity; NILEX = new indication or line extension

Not for promotional use

# IMMUNOLOGY SUMMARY



- Marketed products and late-stage assets, including Taltz, Olumiant, mirikizumab and lebrikizumab, support potential for continued growth and competitiveness in immunology
- Over the last decade, Lilly has built a deep early- and mid-stage portfolio with several potential first-in-class or best-in-class assets addressing improved efficacy, durability and formulations from both internal and external innovation
- Lilly is a leader in key areas of emerging science, including checkpoint agonism and Treg biology, and we are starting to deliver promising early phase data to validate these approaches



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