

Immunic Therapeutics IMU-935: Phase 1 SAD/MAD Data in Healthy Human Subjects and Preclinical Update

NASDAQ: IMUX | December 14, 2021

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Development Pipeline

Program	Target	Preclinical	Phase 1	Phase 2	Phase 3	Key 2021/22 Milestones		
vidofludimus calcium (IMU-838)	DHODH	Relapsing Multiple Scle	rosis (RMS)	 Phase 2 UC: top-line data expected in Q2/2022 				
		Progressive Multiple Sc	lerosis (PMS)					
		Ulcerative Colitis (UC)						
		Crohn's Disease (CD)						
		Primary Sclerosing Cho	angitis (PSC)					
IMU-935	RORγt	Psoriasis				 Phase 1b psoriasis: initial data expected in Q2/2022 		
		Castration-Resistant Prostate Cancer (CRPC)				 Phase 1 CRPC: initial data expected in Q3/2022 		
		Guillain-Barré Syndrom	e (GBS)					
IMU-856	Intestinal Barrier Function	Gastrointestinal Disease	25			 Phase 1 healthy volunteers: unblinded SAD/MAD safety data expected in Q3/2022 		



IMU-935: Phase 1 SAD/MAD Data in Healthy Human Subjects and Preclinical Update

01

Phase 1 Clinical Trial of IMU-935

- Trial Design and Status
- Results Part A: Single Ascending Doses
- Results Part B: Multiple Ascending Doses
- Ongoing Part C in Psoriasis Patients

02 Newly Obtained *In Vivo* Data

03 Summary



Autoimmune Diseases and IMU-935



IL-17 in Autoimmune Diseases

- Autoimmune diseases affect millions of patients worldwide^[1]
- Th17/IL-17/RORγt axis plays an important role in auto immunity-related diseases^[2]
- Antibodies targeting this axis corroborate IL-17's role in autoimmune diseases, but are more complex, costly and less patient friendly than oral drugs^[2]



- Develop an orally available and potent IL-17 inhibitor for the safe and efficacious treatment of autoimmune diseases
- Small molecule inhibitor of the pathologic functions of RORyt in autoimmune diseases without affecting physiological functions of RORyt

[1] Rose, Noel R. American journal of epidemiology 2016; 183.5: 403-406 [2] Fasching, Patrizia, et al. Molecules 2017 22.1: 134 Th: T helper; IL: interleukin; TNF: tumor necrosis factor; PDE4: phosphodiesterase type 4; RORy: retinoic acid receptor-related orphan nuclear receptor gamma







Strong Medical Need for Oral IL-17 Pathway Inhibitors such as IMU-935



Phase 1 Clinical Trial of IMU-935

Trial Design and Status

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Results Part A: Single Ascending Doses Results Part B: Multiple Ascending Doses

Ongoing Part C in Psoriasis Patients

Phase 1 Clinical Trial of IMU-935

Trial Design and Status

01

Results Part A: Single Ascending Doses Results Part B: Multiple Ascending Doses

Ongoing Part C in Psoriasis Patients

Clinical Trial Design Phase 1 IMU-935 and Current Status

PART **A**



Evaluation of single ascending doses (SAD)

Healthy volunteers randomized to receive single dose of either IMU-935 or placebo Evaluation of multiple ascending doses (MAD)

Healthy volunteers randomized to receive 14-day treatment of either IMU-935 or placebo PART C

Evaluation of moderate-to-severe psoriasis patients receiving 28-day treatment of either IMU-935 or placebo

- Dose escalation completed: 100, 200, 300 and 400 mg of IMU-935
- > Final PK analysis ongoing
- > 79 subjects enrolled
- IMU-935 was well-tolerated and showed dose-linear PK

- Dose escalation completed: 150 mg QD and 150 mg BID of IMU-935
- Final PK analysis ongoing
- > 15 subjects enrolled
- IMU-935 was well-tolerated and steadystate was achieved after 3-6 days of dosing

- > 150 mg QD and 150 mg BID of IMU-935
- Approximately 52 patients planned to be enrolled
- Initial data expected to be available in Q2/2022



PK: pharmacokinetic; QD: quaque die = once-daily; BID: bis in die = two times daily

Phase 1 Clinical Trial of IMU-935

Trial Design and Status

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Results Part A: Single Ascending Doses

Results Part B: Multiple Ascending Doses

Ongoing Part C in Psoriasis Patients

Dose Escalation Scheme Part A: Single Ascending Doses



BID: bis in die = two times daily

If no dosing regimen is specifically mentioned, then once daily administration in fasted condition was performed.

For full disclosure, data for the Part A pilot formulation can be found in the Extended Information section of this presentation, but will not be presented. The presentation will focus on the powder-in-capsule formulation (Part A-N).



Summary of Safety and Tolerability Findings Part A-N



Single Doses of IMU-935 in Healthy Human Subjects Were Found to Have a Favorable Safety and Tolerability Profile



No serious adverse events



No dose-dependency in adverse events



No maximum tolerated dose reached



No trends for post-dose changes in any laboratory parameter



No related adverse events in the active treatment group regarding any laboratory parameter



No medically relevant changes in vital signs or 12-lead electrocardiograms as compared to placebo



Most Common Treatment-Emergent Adverse Events Part A-N

	Number (%) of subjects with TEAEs occurring in more than 2 subjects [Number of TEAEs reported]							
MedDRA Preferred Term	100 mg (N=5)	200 mg (N=6)	300 mg (N=6)	300 mg fasted (N=6)	300 mg fed (N=6)	400 mg (N=6)	Active (N=29)	Placebo (N=10)
Headache	-	1 (17%) [1]	-	3 (50%) [5]	1 (17%) [1]	1 (17%) [1]	5 (17%) [8]	3 (30%) [4]
Dizziness	-	-	2 (33%) [2]	1 (17%) [1]	-	1 (17%) [1]	4 (14%) [4]	-
Catheter site pain	1 (20%) [1]	2 (33%) [2]	-	-	-	-	3 (10%) [3]	1 (10%) [1]
Constipation	-	1 (17%) [1]	-	-	-	2 (33%) [2]	3 (10%) [3]	-
Fatigue	-	-	-	2 (33%) [2]	-	-	2 (7%) [2]	1 (10%) [1]

Single doses of IMU-935 using the powder-in-capsule formulation were safe and welltolerated with headache, dizziness, catheter site pain, constipation and fatigue being the most common TEAEs.

TEAE: Treatment-Emergent Adverse Event

Displayed are TEAEs that occurred in more than 2 subjects. The treatments 300 mg fasted and fed were given (in two periods) to the same subjects of cohort 5NF.



Summary of Safety and Tolerability Profile Part A-N

- Serious AEs (SAE)
 - None (N=0)
- Treatment discontinuations due to AEs
 - None (N=0)
- Moderate TEAEs
 - Placebo (N=1/10; 10%)
 - o Headache (2 events, unrelated)
 - IMU-935 (N=4/29, 14%)
 - Nausea, toothache, skin abrasion, AST increased (all unrelated)
 - o Headache (related)

Occurred after a single dose of 200 mg IMU-935 on day 2, resolved with treatment after 1 day

Severe TEAEs

- IMU-935 (N=1/29; 3%)
 - o Blood creatine kinase increased (unrelated)

Occurred after a single dose of 300 mg IMU-935 in the fed state, only elevated at end-of-study visit (day 14) and related to a rock climbing event

- Summary of laboratory variables
 - No trend for changes over time for any parameter
 - Shift tables showed no trend of individual changes beyond the normal range for any parameter
- TEAEs associated with laboratory abnormalities
 - Placebo (N=1/10; 10%)
 - o Lipase increase (related)
 - IMU-935 (N=3/29; 10%)
 - All changes of laboratory parameters in these subjects have plausible explanations or can be clearly related to life events (for full disclosure, more detailed information about these events are contained in the Extended Information section of this slide deck)
- TEAEs associated with vital signs
 - None (N=0)
- TEAEs associated with 12-lead ECGs
 - None (N=0)

AE: Adverse Event; SAE: Serious Adverse Event; TEAE: Treatment-Emergent Adverse Event; ECG: electrocardiogram; AST: Aspartate Aminotransferase



Laboratory Parameters: No Change in Neutrophils Compared to Placebo Part A-N



Laboratory Values Over Time Hematology - Neutrophils



Individual Laboratory Values Hematology - Neutrophils











Laboratory Parameters: No Increase of ALT Compared to Placebo Part A-N



Laboratory Values Over Time Biochemistry - ALT



Individual Laboratory Values Biochemistry - ALT











Laboratory Parameters: No Hy's Law Range Cases Observed Part A and Part A-N Combined



Bilirubin vs. ALT Showed No Evidence of DILI Potential



Bilirubin vs. AST Showed No Evidence of DILI Potential







Conclusions Part A-N: Single Ascending Doses

- The powder-in-capsule formulation provided favorable pharmaceutical properties in Part A-N of this clinical trial.
- Its favorable safety and tolerability allowed smooth transition from Part A (SAD) to Part B (MAD) in healthy human subjects.

Phase 1 Clinical Trial of IMU-935

Trial Design and Status

01

Kesults Part A: Single Ascending Doses Results Part B: Multiple Ascending Doses

Ongoing Part C in Psoriasis Patients

Design of Part B: Multiple Ascending Doses of IMU-935





QD: quaque die = once-daily; BID: bis in die = two times daily; D: day Part B was performed with the powder-in-capsule formulation only.



Pharmacokinetic Results

Part B: Summary of QD and BID Dosing Regimen for IMU-935



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Favorable PK Properties for IMU-935 at Steady-State Observed

Pharmacokinetic parameters in steady-state (mean)	150 mg QD	150 mg BID
C _{max, ss} (ng/mL)	124	206
C _{min, ss} (ng/mL)	15.7	48.5
T _{max, ss} (hr)	2.8	2.4
t _{1/2, ss} (hr)	29.0	38.0
AUC _{last} (hr*ng/mL)	1540	3040

Non-compartmental analysis

- Fast achievement of steady-state within first week and stable steady-state trough levels over 14-day treatment period.
- Accumulation factors of 1.29 (150 mg QD) and 2.21 (150 mg BID) allowing predictable trough levels.

Interim data, PK analysis ongoing

QD: quaque die = once-daily; BID: bis in die = two times daily; PK: pharmacokinetic; C_{max}: maximum plasma drug concentration; T_{max}: time to reach maximum plasma concentration; hr: hours; t_{1/2}: half-life; AUC_{last}: area under the concentration-time curve from dosing to last measurement Accumulation factors were calculated as the relationship of AUC_{0-tau} of Day 14/Day 1 (after first dosing).



Summary of Safety and Tolerability Findings Part B



Daily Dosing of IMU-935 in Healthy Human Subjects Over 14 Days Was Found to Have a Favorable Safety and Tolerability Profile



No serious adverse events



No dose-dependency in adverse events



No maximum tolerated dose reached



No trends for post-dose changes in any laboratory parameter



No adverse events regarding any laboratory parameter



No medically relevant changes in vital signs or 12-lead electrocardiograms as compared to placebo



Overall Summary of TEAE, SAE and AE Severity Part B

	Treatment					
Category	150 mg QD (N=6)	150 mg BID (N=5)	Active (N=11)	Placebo (N=4)		
Subjects with TEAEs, n (%)	6 (100%)	4 (80%)	10 (91%)	4 (100%)		
Subjects with mild TEAEs, n (%)	6 (100%)	4 (80%)	10 (91%)	4 (100%)		
Subjects with moderate TEAEs, n (%)	-	1 (20%)	1 (9%)	1 (25%)		
Subjects with severe TEAEs, n (%)	-	-	-	-		
Subjects with SAEs, n (%)	-	-	-	-		
Subjects with TEAEs leading to withdrawal, n (%)	-	-	-	-		
Number of TEAEs	15	7	22	15		
Number of mild TEAEs	15	6	21	11		
Number of moderate TEAEs	-	1	1	4		
Number of severe TEAEs	-	-	-	-		
Number of SAEs	-	-	-	-		
Number of TEAEs leading to withdrawal	-	-	-	-		

Daily 14-day dosing of IMU-935 using the powder-in-capsule formulation was found to be safe and welltolerated:

- No dosedependency in adverse events
- No SAEs
- No discontinuation due to AEs
- All mild TEAEs (except for 1 subject with moderate TEAEs in IMU-935 and placebo each)

QD: quaque die = once-daily; BID: bis in die = two times daily; TEAE: Treatment-Emergent Adverse Event; SAE: Serious Adverse Event; AE: Adverse Event



Most Common Treatment-Emergent Adverse Events Part B

	Number (%) of subjects with TEAEs occurring in more than 1 subject [Number of TEAEs reported]					
MedDRA Preferred Term	150 mg QD (N=6)	150 mg BID (N=5)	Active (N=11)	Placebo (N=4)		
Headache	2 (33%) [2]	3 (60%) [3]	5 (45%) [5]	2 (50%) [5]		
Back pain	1 (17%) [1]	1 (20%) [1]	2 (18%) [2]	1 (25%) [1]		
Epistaxis	2 (33%) [3]	-	2 (18%) [3]	-		
Constipation	-	-	-	2 (50%) [2]		
Catheter site irritation	1 (17%) [1]	-	1 (9%) [1]	1 (25%) [1]		

Daily 14-day dosing of IMU-935 using the powder-in-capsule formulation was found to be safe and welltolerated:

 Most common TEAEs were nonspecific events, including headache, back pain, epistaxis, constipation and catheter site irritation

QD: quaque die = once-daily; BID: bis in die = two times daily; TEAE: Treatment-Emergent Adverse Event Displayed are TEAEs that occurred in more than 1 subject



Summary of Safety and Tolerability Profile Part B

- Serious AEs (SAE)
 - None (N=0)
- Treatment discontinuations due to AEs
 - None (N=0)
- Moderate TEAEs
 - Placebo (N=1/4; 25%)
 - o Constipation (related)
 - Animal bite, animal scratch and exacerbation of back pain (all unrelated)
 - 150 mg IMU-935 BID (N=1/11; 9%)
 - o Catheter site reaction (unrelated)
- Severe TEAEs
 - None (N=0)

- Summary of laboratory variables
 - No trend for changes over time for any parameter
 - Shift tables showed no trend of individual changes beyond the normal range for any parameter
- TEAEs associated with laboratory abnormalities
 None (N=0)
- TEAEs associated with vital signs
 - None (N=0)
- TEAEs associated with 12-lead ECGs
 - 150 mg IMU-935 QD (N=1)
 - o PR prolongation

Benign ECG finding in young healthy individuals (for full disclosure, more detailed information about this event is contained in the Extended Information section of this slide deck)



Laboratory Parameters: No Change in Neutrophils Compared to Placebo Part B



Laboratory Values Over Time Hematology - Neutrophils



Individual Laboratory Values Hematology - Neutrophils











Laboratory Parameters: No Increase in ALT Compared to Placebo Part B



Laboratory Values Over Time Biochemistry - ALT



Individual Laboratory Values Biochemistry - ALT











Laboratory Parameters: No Hy's Law Range Cases Observed Part B



Bilirubin vs. ALT Showed No Evidence of DILI Potential



Bilirubin vs. AST Showed No Evidence of DILI Potential





Conclusions Part B: 14-Days Multiple Ascending Doses

- Multiple ascending doses of IMU-935 demonstrated a favorable safety, tolerability and pharmacokinetic profile.
- This allowed smooth transition from Part B (MAD) to Part C (28-day dosing in psoriasis patients) which is currently ongoing.

Phase 1 Clinical Trial of IMU-935

Trial Design and Status

01

Results Part A: Single Ascending Doses Results Part B: Multiple Ascending Doses

Ongoing Part C in Psoriasis Patients

Ongoing First-in-Human Study Part C: IMU-935 in Psoriasis Patients



Study Design

- Double-blind, placebo-controlled dose escalation study to evaluate safety, tolerability, pharmacodynamics and exploratory efficacy of IMU-935 in patients with moderate-to-severe psoriasis
- Psoriasis patients will receive 28 days of daily treatment
- Up to 52 psoriasis patients will be enrolled in 2 cohorts:
 - A cohort of 16 patients will receive a low dose of IMU-935 (150 mg QD) or placebo at a ratio of 3:1
 - A cohort of 36 patients will receive a high dose of IMU-935 (150 mg BID) or placebo at a ratio of 3:1
- Enrollment started on October 27, 2021



QD: quaque die = once-daily; BID: bis in die = two times daily

Ongoing First-in-Human Study Part C: IMU-935 in Psoriasis Patients



QD: quaque die = once-daily; BID: bis in die = two times daily; EoS: End of Study



IMU-935: An Oral IL-17 Inhibitor

02

Newly Obtained In Vivo Data

IMU-935 Selectively Inhibits Th17 Differentiation and IL-17 Secretion





The differentiation towards Th17 cells is inhibited by IMU-935



The production of IL-17A and IL-17F is inhibited by IMU-935



The physiological maturation of T cells within the thymus is **not affected by IMU-935**

Th: T helper; IL: interleukin; IFN: interferon; DN: double-negative; DP: double-positive; CD: cluster of differentiation



IMU-935's *in vitro* Selectivity on Th17 Suppression Confirmed, Well Differentiated to Other RORγt Inhibitors





IMU-935 Allows Normal Thymocyte Maturation *in vivo* Acute Model, 3 Days of Treatment





IMU-935 (100 mg/kg BID), MRL-871 (100 mg/kg BID) and Cintirorgon (30 mg/kg BID) were tested for 3 days in C57BL/6j mice

Guo et al., 2016, Cell Reports (MRL-871), Guntermann et al., 2017, JCI Insight (Cpd1), Mahalingam et al., 2019, Clin Cancer Res. (Cintirorgon)

In contrast to

IMU-935 does

MRL-871,

not impact

thymus size,

numbers or

thymocyte

acute mouse

model.

thymocyte cell

maturation in an

IMU-935 Allows Normal Thymocyte Maturation *in vivo* Chronic Model, 28 Days of Treatment



In contrast to Cpd1, IMU-935 does not impact thymus size, thymocyte cell numbers or thymocyte maturation in a chronic mouse model.

C57BL/6j mice (male, 9wks, n=8-9 per group) were administrated with IMU-935 (100 mg/kg), Cpd1 (40 mg/kg), or Cintirorgon (30 mg/kg) for 4 weeks (BID)

Guo et al., 2016, Cell Reports (MRL-871), Guntermann et al., 2017, JCI Insight (Cpd1), Mahalingam et al., 2019, Clin Cancer Res. (Cintirorgon)



IMU-935 Has Shown a Favorable Safety Profile in Preclinical Studies

28-day safety studies in rats and dogs **completed** before start of phase 1 3-months safety studies in rats and dogs **completed** in 2021 6-months (rats) and 9-months (dog) longterm safety studies scheduled for 2022

- **3-months tox studies** confirmed NOAEL seen in 28-day studies:
 - There were no IMU-935-related clinical observations, changes in body weight, food or water consumption, neurobehavioral exams, and clinical pathology parameters (urinalysis, hematology, coagulation, serum chemistry).
 - There were no drug-related observations in the gross pathological evaluation at scheduled termination or after recovery.
- No changes in liver parameters or thymus have been observed.
- Data from preclinical safety studies and *in vivo* models for thymocyte maturation pave the way for IMU-935 to be a best-in-class oral IL-17 inhibitor.



IMU-935: An Oral IL-17 Inhibitor

Summary

03

IMU-935: A Potentially Best-in-Class Oral IL-17 Inhibitor



- IMU-935 showed a very favorable safety, tolerability and PK profile in this phase 1 clinical trial with no serious adverse events seen in the SAD and MAD parts.
- In particular, IMU-935 was safe and well-tolerated in 14-day repeated oral dosing in healthy human subjects at doses expected to exceed required therapeutic dosing.
- IMU-935's outstanding selectivity profile on Th17 over thymocyte development was confirmed in an impressive fashion in a mouse model.
- IMU-935 is currently being tested in psoriasis patients with initial data expected in Q2/2022 – setting the stage for a potential best-in-class oral psoriasis therapy.
- IMU-935 may offer extensive potential beyond psoriasis in other autoimmune diseases.



Outlook: Multiple Value Inflection Points Expected in 2022



vidofludimus calcium (IMU-838)

 Phase 2 top-line data in ulcerative colitis expected to be available in Q2/2022

<u>IMU-935</u>

- Initial phase 1b psoriasis data expected to be available in Q2/2022
- Initial phase 1 CRPC data expected to be available in Q3/2022

<u>IMU-856</u>

 Unblinded SAD/MAD safety data in healthy volunteers expected to be available in Q3/2022



Thank You!



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