ingenious targeting laboratory

MODEL OF THE MONTH

JUNE 2026

DUAL HUMANIZED IMMUNE MODEL

Dual Humanized **IL4 / IL4R** Mouse

hIL4/hIL4R · IT-HU-2000106

A dual humanized mouse model engineered for studying IL-4/IL-13 signaling pathways and developing targeted therapeutics for allergic diseases and asthma — with the authentic human ligand–receptor pairing antibody programs require.

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BACKGROUND	HUMANIZED GENES	ZYGOSITY	STRAIN STATE
C57BL/6	IL4, IL4R	Homozygous	Repository Live

Custom & catalog mouse models since **1998** • **14,774+** catalog models • **100%** germline transmission guarantee

01 THE MODEL

Dual Humanized **IL4 / IL4R** Mouse

The **hIL4/hIL4R** dual humanized mouse model is a critical tool for studying IL-4/IL-13 signaling pathways and developing targeted therapeutics for allergic diseases and asthma.

MODEL NAME **hIL4/hIL4R**	CATALOG NUMBER **IT-HU-2000106**
GENETIC BACKGROUND C57BL/6	HUMANIZED GENES IL4, IL4R
ZYGOSITY Homozygous	STRAIN STATE Repository Live READY TO SHIP
RESEARCH APPLICATION Immunotherapy, cancer research, drug screening	

02 RATIONALE

Why Dual **IL4/IL4R** Humanization?

IL-4 signaling through the type I receptor complex (IL4 + IL4Rα + γc) drives Th2 immune responses. Human therapeutics targeting IL4 or IL4R require **both** the human ligand and the human receptor for proper binding and signaling.

The hIL4/hIL4R model humanizes both genes so antibody and protein therapeutics engage their native human targets within an intact mouse immune system.

Dual humanization provides

- Human IL4 ligand binding to human IL4R receptor
- Authentic type I receptor complex formation
- Proper downstream signaling through humanized pathway
- Normal mouse immune system architecture

This dual humanization enables testing of **anti-IL4/IL4R therapeutics** with their native human targets in a fully immunocompetent model.

Humanized Expression & **Phenotype**

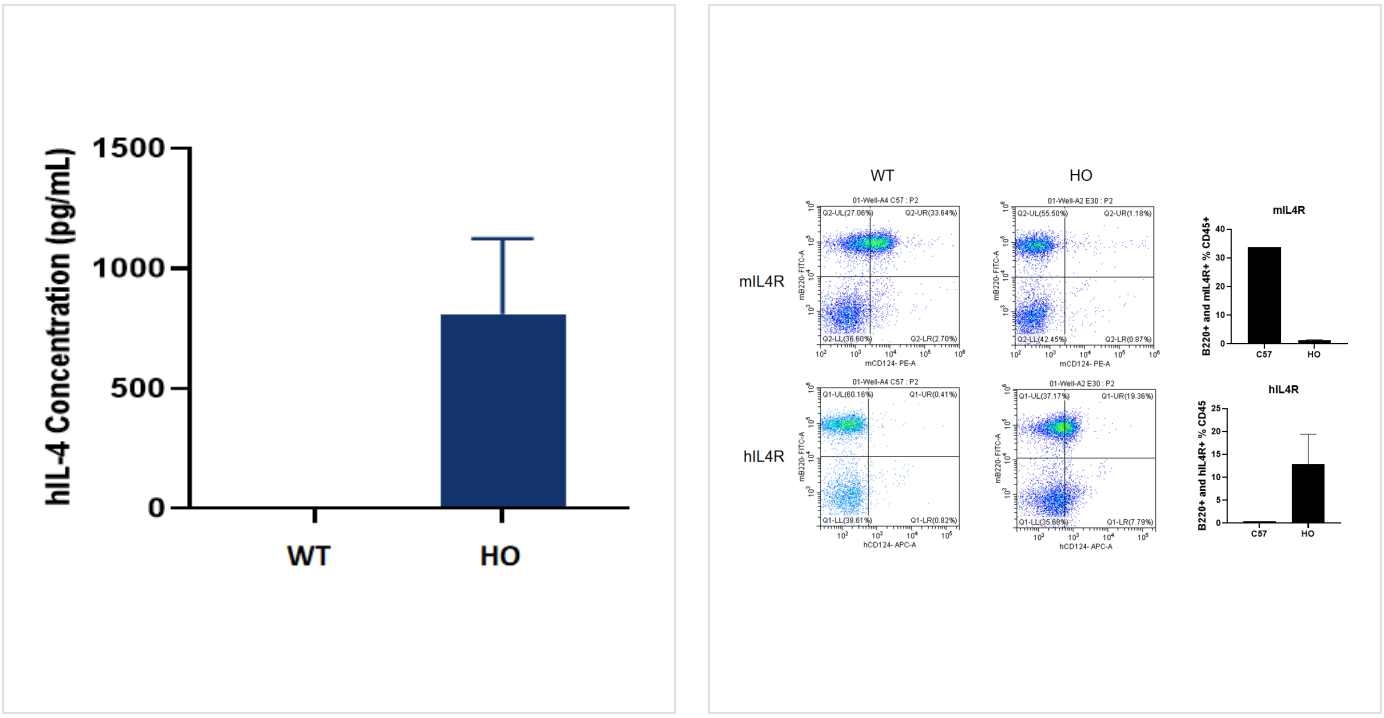


Fig. 1–2 **(1)** hIL4 expression in serum by ELISA — homozygous KI mice express hIL4 after concanavalin A treatment. **(2)** hIL4R expression in spleen by FACS — KI mice express hIL4R; WT express only mIL4R.

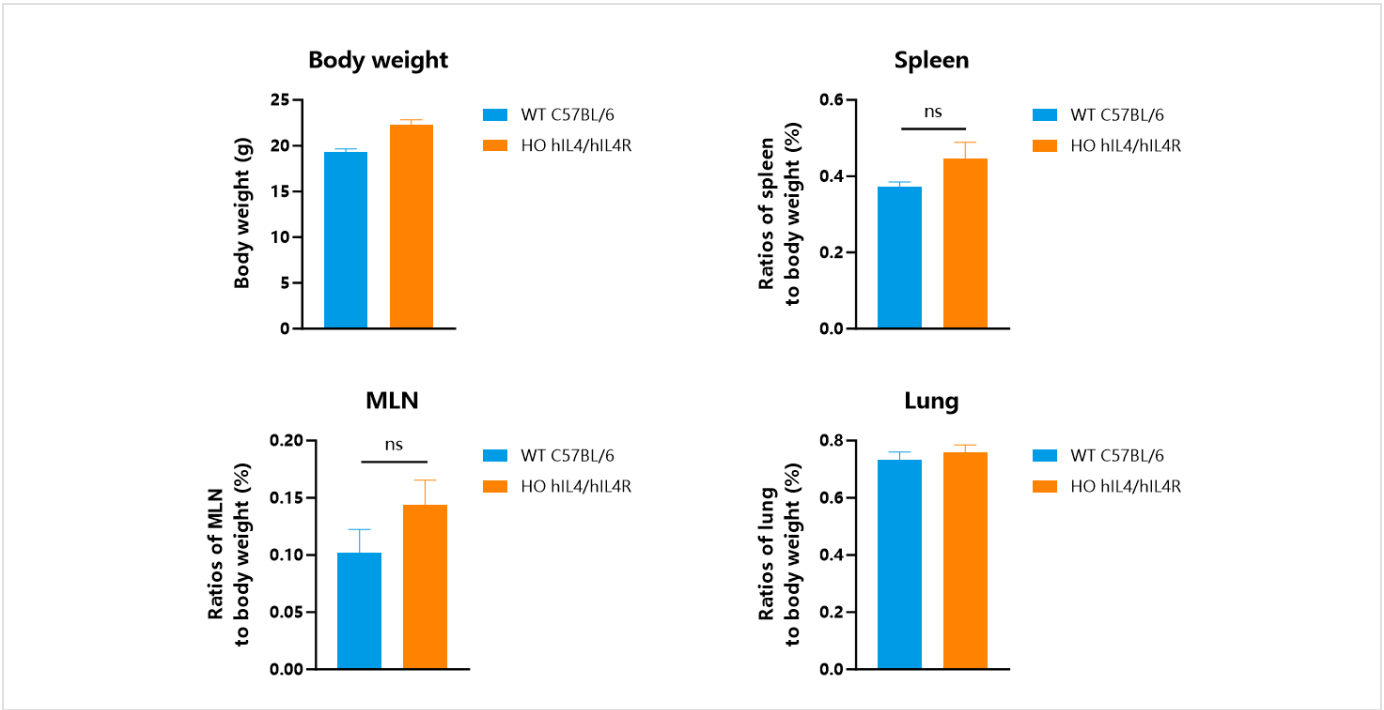


Fig. 3 Body weight and ratios of spleen, MLN, and lung to body weight of WT and hIL4/hIL4R knockin mice (n=5–6, female, 8–10 weeks old, Mean ± SEM).

Abbr. HO, homozygous; WT, wild type; MLN, mesenteric lymph nodes.

Immune Cell **Profiling**

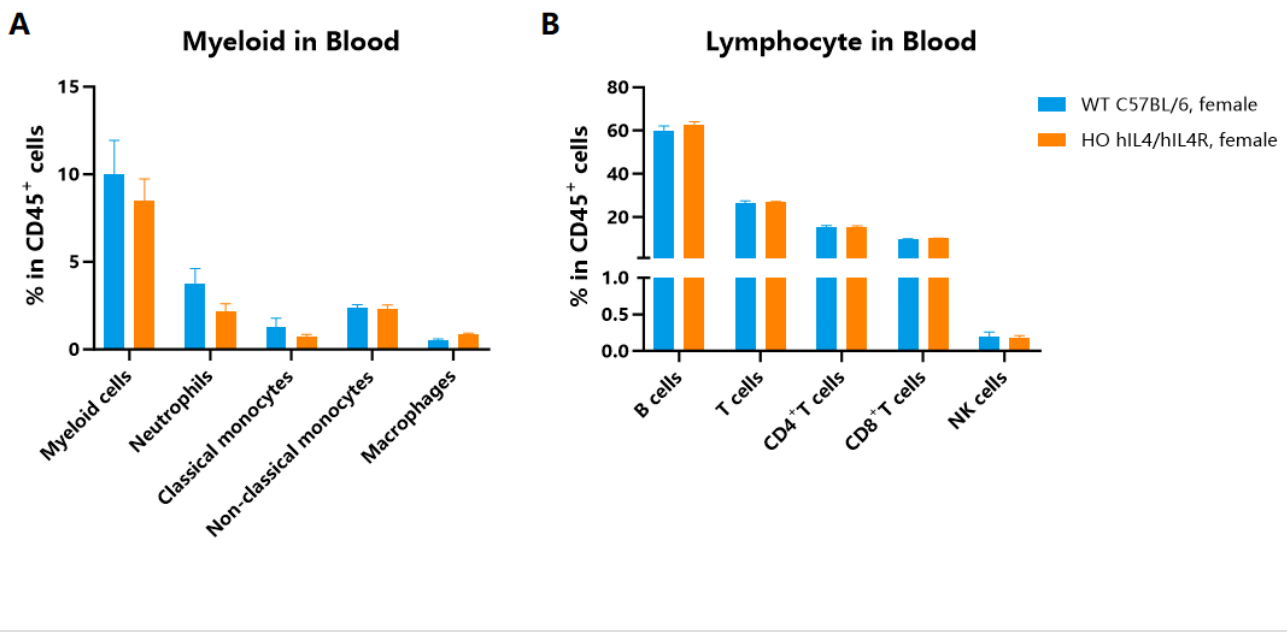


Fig. 4 Detection of myeloid (A) and lymphocyte (B) populations in the blood of hIL4/hIL4R knockin mice by FACS (n=3 in all groups, 8–10 weeks old).
Abbr. WT, wild type; HO, homozygous.

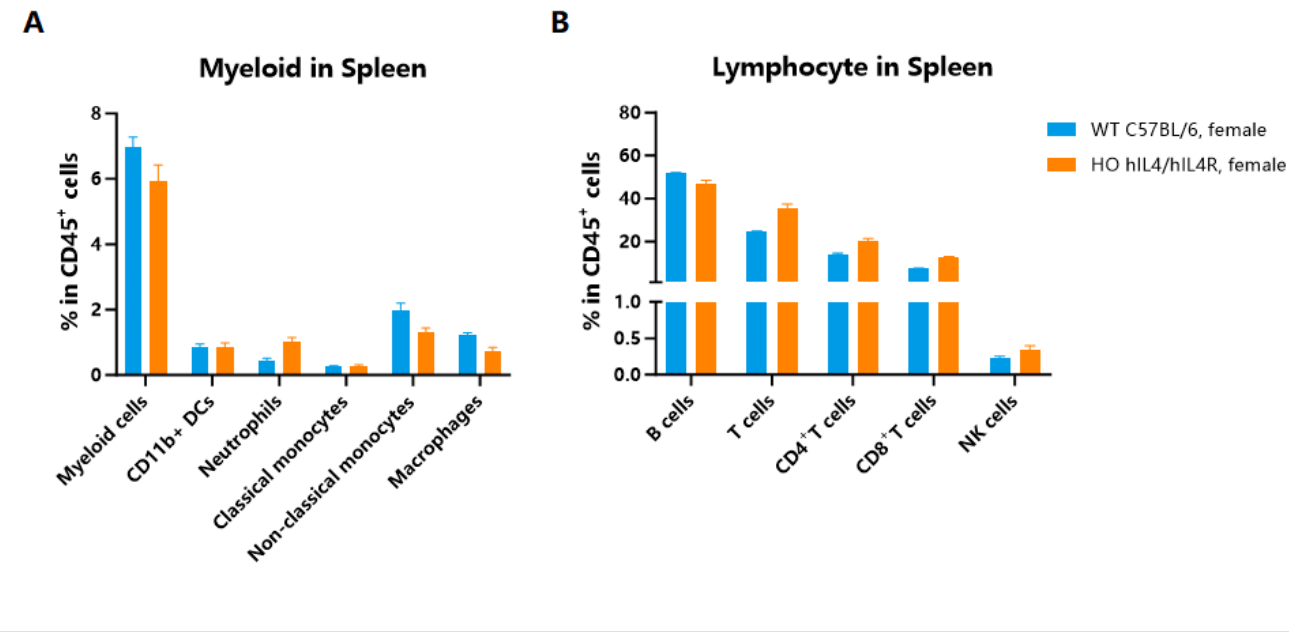


Fig. 5 Detection of myeloid (A) and lymphocyte (B) populations in the spleen of hIL4/hIL4R knockin mice by FACS (n=3 in all groups, 8–10 weeks old).
Abbr. WT, wild type; HO, homozygous.

Hematology & **Clinical Chemistry**

Parameter	Full Name	WT C57BL/6 ♂ 8-10 weeks; n=5	WT C57BL/6 ♀ 8-10 weeks; n=5	hIL4/hIL4R ♂ 8-10 weeks; n=5	hIL4/hIL4R ♀ 8-10 weeks; n=5
WBC(10^3/μL)	白细胞计数	8.30±0.53	6.05±0.37	9.18±0.81	7.70±0.46
RBC(10^6/μL)	红细胞计数	10.52±0.18	10.73±0.18	11.03±0.27	9.87±0.37
HGB(g/dL)	血红蛋白量	15.60±0.24	16.16±0.22	15.98±0.40	14.84±0.47
HCT(%)	红细胞比积	49.50±0.82	50.60±0.67	51.16±0.98	47.04±1.19
MCV(fL)	平均红细胞体积	47.04±0.35	47.18±0.27	46.40±0.28	47.76±0.73
MCH(pg)	平均红细胞血红蛋白量	14.84±0.12	15.08±0.12	14.48±0.02	15.04±0.12
MCHC(g/dL)	平均红细胞血红蛋白浓度	31.52±0.18	31.94±0.16	31.24±0.22	31.54±0.39
RDW-SD(fL)	红细胞分布宽度-标准差	25.98±0.94	23.44±0.81	20.96±0.48	23.66±1.12
RDW-CV(%)	红细胞分布宽度-变异系数	18.40±0.21	17.26±0.19	16.76±0.08	16.74±0.17
PDW(fL)	血小板分布宽度	6.54±0.10	6.60±0.06	6.44±0.04	6.50±0.08
MPV(fL)	平均血小板体积	6.54±0.07	6.48±0.04	6.44±0.05	6.58±0.09
P-LCR(%)	大血小板比率	3.30±0.25	2.90±0.43	3.02±0.30	2.90±0.29
PCT(%)	血小板比积	1.03±0.09	0.94±0.05	1.25±0.04	1.12±0.08
NRBC#(10^3/μL)	有核红细胞数	0.03±0.01	0.02±0.00	0.03±0.00	0.05±0.01
NRBC%(%)	有核红细胞百分率	0.32±0.07	0.40±0.09	0.36±0.07	0.60±0.09
NEUT#(10^3/μL)	中性粒细胞数	1.39±0.31	0.50±0.10	0.58±0.06	0.68±0.27
LYMPH#(10^3/μL)	淋巴细胞数	6.29±0.37	5.24±0.34	8.23±0.79	6.72±0.51
MONO#(10^3/μL)	单核细胞数	0.39±0.05	0.16±0.02	0.15±0.02	0.13±0.02
EO#(10^3/μL)	嗜酸性粒细胞数	0.22±0.01	0.15±0.03	0.20±0.03	0.16±0.02
BASO#(10^3/μL)	嗜碱性粒细胞数	0.01±0.00	0.01±0.00	0.01±0.00	0.01±0.00
NEUT%(%)	中性粒细胞百分率	16.24±3.24	8.12±1.46	6.48±0.72	8.78±3.43
LYMPH%(%)	淋巴细胞百分率	76.28±3.48	86.70±1.82	89.58±1.11	87.30±3.65
MONO%(%)	单核细胞百分率	4.64±0.48	2.58±0.38	1.68±0.25	1.76±0.31
EO%(%)	嗜酸性细胞百分率	2.72±0.19	2.46±0.43	2.20±0.29	2.08±0.28
BASO%(%)	嗜碱性细胞百分率	0.12±0.04	0.14±0.04	0.06±0.02	0.08±0.02
RET%(%)	网织红细胞百分率	3.35±0.32	4.26±0.39	5.10±1.14	9.05±2.29
RET#(10^6/μL)	网织红细胞数	0.35±0.03	0.46±0.04	0.55±0.11	0.87±0.19
IRF(%)	未成熟网织红细胞分数	58.16±2.40	53.38±0.77	54.18±3.44	60.28±3.98
LFR(%)	低荧光网织红细胞比率	41.84±2.40	46.62±0.77	45.82±3.44	39.72±3.98
MFR(%)	中荧光网织红细胞比率	12.36±0.43	16.86±0.41	16.10±0.38	15.72±0.75
HFR(%)	高荧光网织红细胞比率	45.80±2.71	36.52±0.48	38.08±3.44	44.56±4.54
RET-He(pg)	网织红细胞血红蛋白含量	17.66±0.11	17.76±0.13	16.96±0.09	17.06±0.15
IPF(%)	未成熟血小板比例	0.16±0.02	0.10±0.00	0.10±0.00	0.10±0.00
PLT-F(10^3/μL)	血小板计数-光学法	1173.40±63.64	1096.40±52.65	1420.60±42.17	1291.40±47.61
EO#(10^3/μL)	嗜酸性粒细胞数	0.22±0.01	0.15±0.03	0.20±0.03	0.16±0.02
BASO#(10^3/μL)	嗜碱性粒细胞数	0.01±0.00	0.01±0.00	0.01±0.00	0.01±0.00

Table 1 Blood routine test results of homozygous hIL4/hIL4R mice (data presented as mean ± SEM).

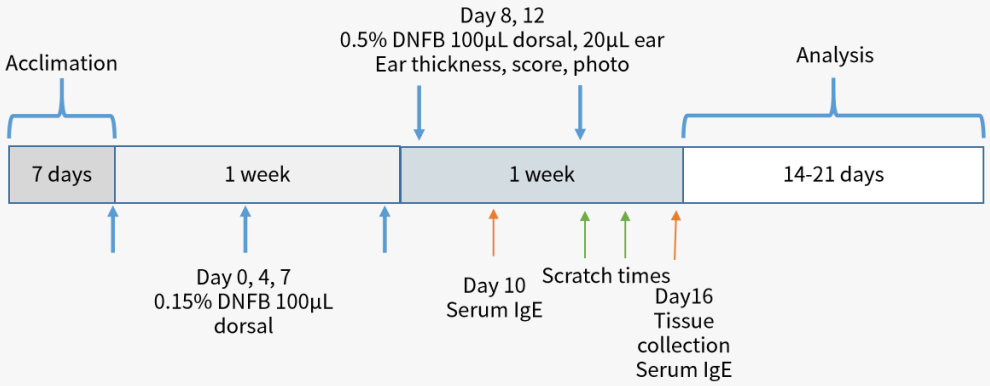
Parameter	WT C57BL/6 ♂ 8-10 weeks; n=5	WT C57BL/6 ♀ 8-10 weeks; n=5	hIL4/hIL4R ♂ 8-10 weeks; n=5	hIL4/hIL4R ♀ 8-10 weeks; n=5
ALT(U/L)	27.23±2.18	28.66±2.77	25.17±3.96	27.62±1.54
ALP(U/L)	242.04±7.40	182.50±4.75	198.20±17.45	168.12±7.38
TP(g/L)	61.21±1.83	57.19±1.04	59.03±1.10	61.44±0.38
ALB(g/L)	32.29±1.16	26.59±0.65	30.60±0.62	29.23±0.25
CHE(U/L)	7018.65±332.28	4887.72±167.34	6208.64±121.30	5427.08±165.97
TBIL(μmol/L)	2.25±0.45	2.07±0.38	1.95±0.49	2.20±0.33
UREA(mmol/L)	8.78±0.92	8.08±0.48	8.35±0.47	9.40±0.63
CREA(μmol/L)	26.43±2.79	24.18±0.52	24.72±1.00	23.94±0.59
TG(mmol/L)	1.51±0.17	1.97±0.20	1.55±0.20	3.07±0.28
T-CHO(mmol/L)	2.36±0.13	2.72±0.15	2.40±0.12	2.92±0.09
HDL-C(mmol/L)	1.22±0.11	1.42±0.10	1.14±0.06	1.43±0.06
CK(U/L)	1003.23±194.11	1213.88±94.72	1263.04±226.76	1901.17±296.52
LDH(U/L)	438.15±46.50	482.12±24.22	442.61±107.41	457.26±17.60
P(mmol/L)	2.34±0.04	2.64±0.11	2.94±0.12	3.11±0.08
Fe(μmol/L)	40.73±2.83	23.91±0.78	31.76±2.05	27.63±1.59
GLU(mmol/L)	8.55±0.29	10.13±0.86	8.72±0.62	9.06±0.28

Table 2 Biochemistry examination results of homozygous hIL4/hIL4R mice (data presented as mean ± SEM).

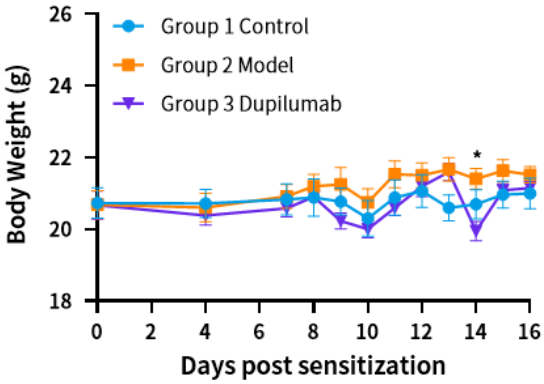
Anti-IL4RA mAb in a **DNFB Atopic Dermatitis** Model

In vivo efficacy of an anti-human IL4RA monoclonal antibody (dupilumab) in the DNFB-induced atopic dermatitis model built on hIL4/hIL4R mice.

STUDY DESIGN



Schema DNFB sensitization and challenge schedule with dupilumab dosing, scoring, and tissue collection timepoints.



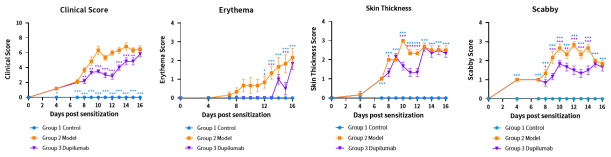


Fig. 1–2 **(1)** Body weight of DNFB-induced AD model hIL4/hIL4R mice treated with dupilumab (*P<0.05). **(2)** Dupilumab ameliorates overall atopic dermatitis activity (*P<0.05, **P<0.01, ***P<0.001).

IgE, Scratching & **Skin Histopathology**

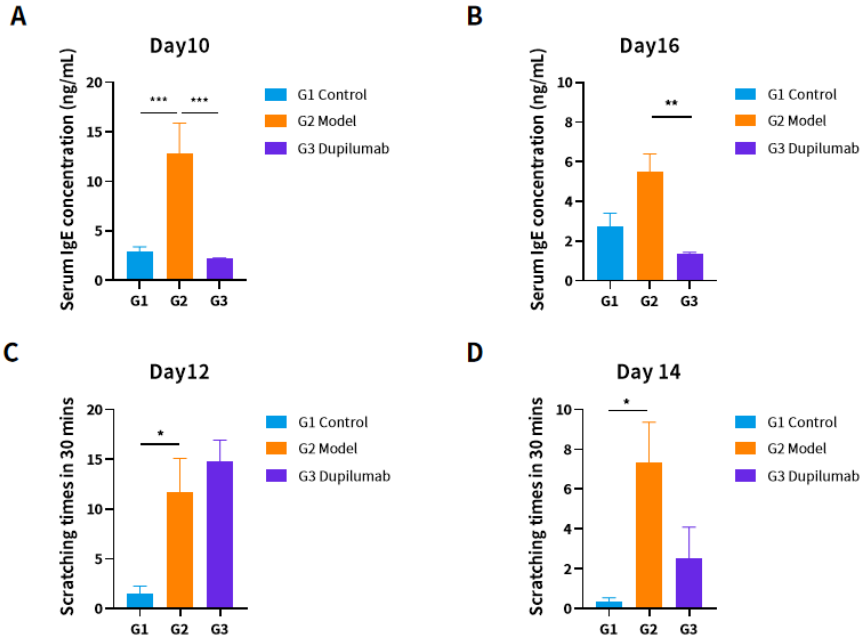


Fig. 3 Dupilumab significantly reduced serum IgE levels and scratching frequency. (A) Day 10 serum IgE; (B) Day 16 serum IgE; (C) scratch times on Day 12; (D) scratch times on Day 14 (*P<0.05, **P<0.01, ***P<0.001).

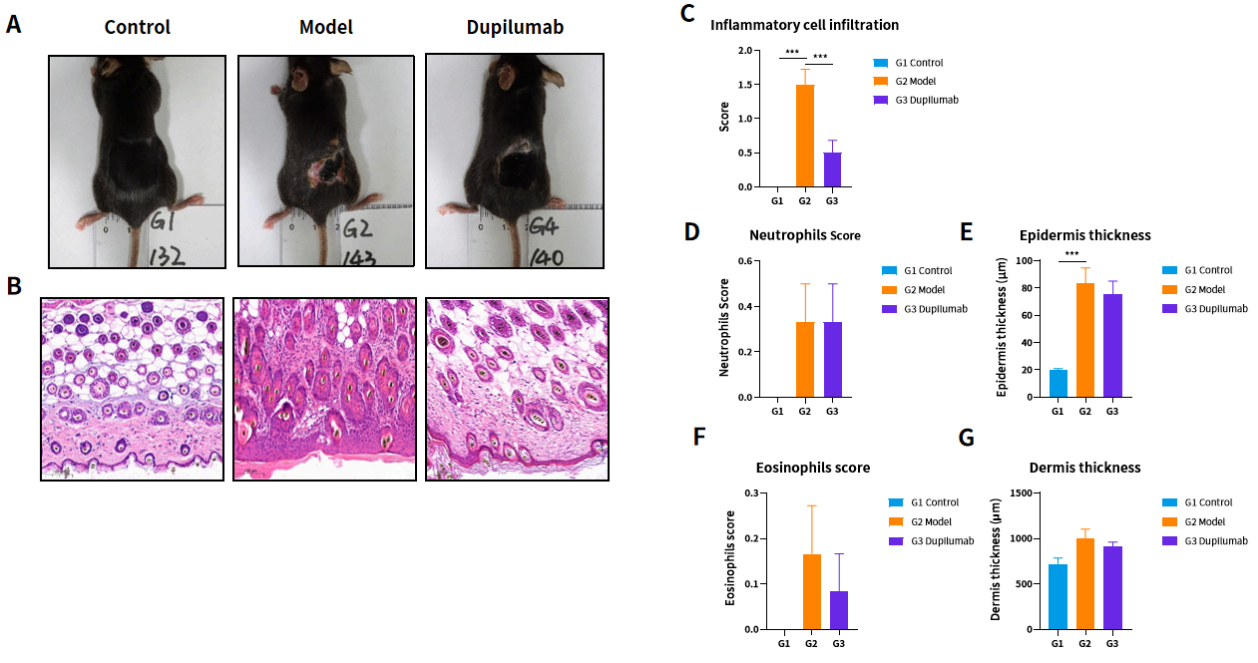


Fig. 4 Dupilumab significantly mitigates inflammatory cell infiltration in lesioned skin on Day 14. (A) dorsal image Day 14; (B) representative pathology images; (C) inflammatory cell infiltration score; (D) neutrophil score; (E) eosinophil score; (F) epidermis thickness; (G) dermis thickness (*P<0.05, **P<0.01, ***P<0.001).

05 APPLICATION CASE 2

Anti-IL4RA mAb in an **OXA Atopic Dermatitis** Model

In vivo efficacy of an anti-human IL4RA monoclonal antibody in the oxazolone (OXA)-induced atopic dermatitis model built on hIL4/hIL4R mice.

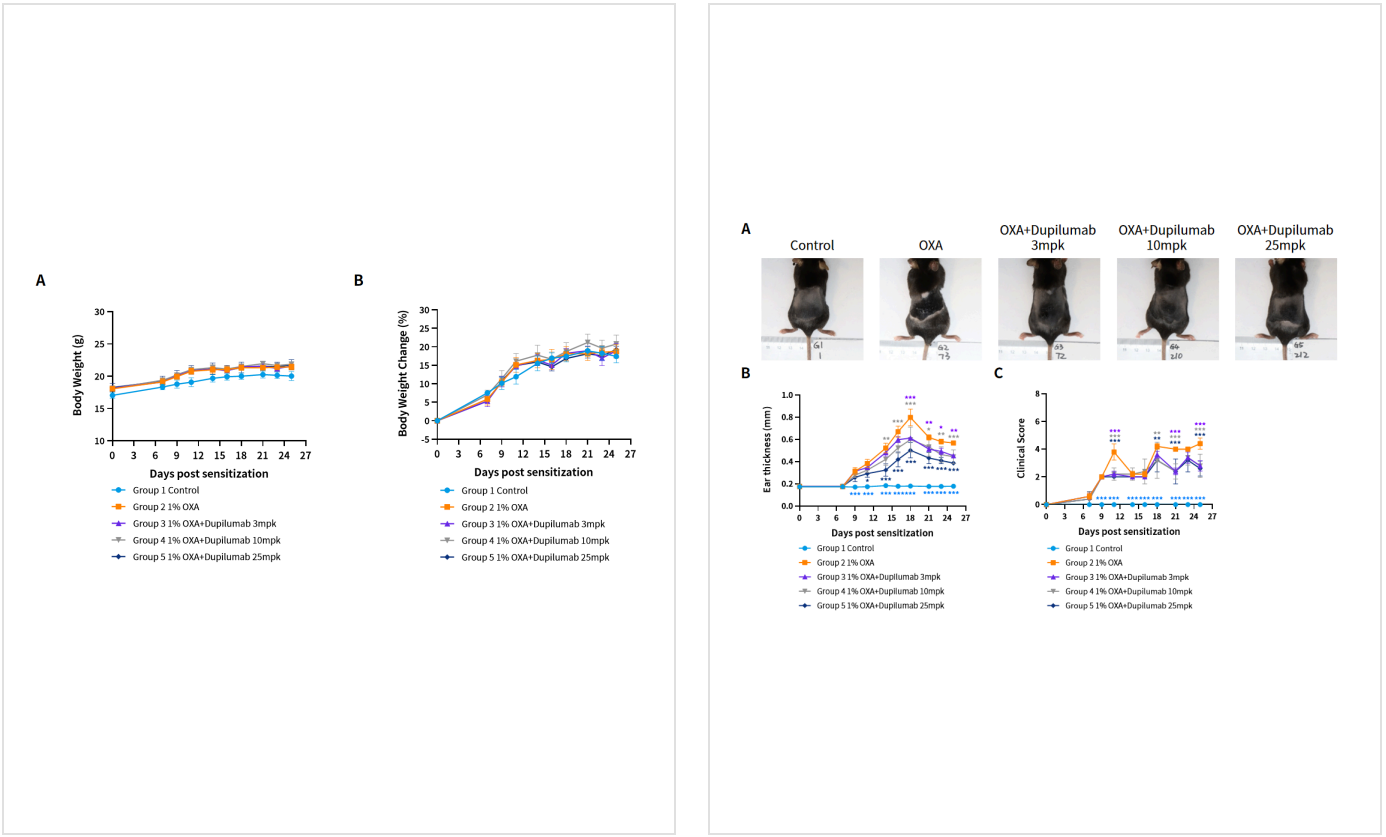


Fig. 1–2 **(1)** OXA-induced AD model — (A) body weight; (B) body weight change (n=6, Mean ± SEM). **(2)** (A) gross observation on Day 21; (B) ear thickness; (C) clinical skin score.

Serum IgE & **Skin Pathology**

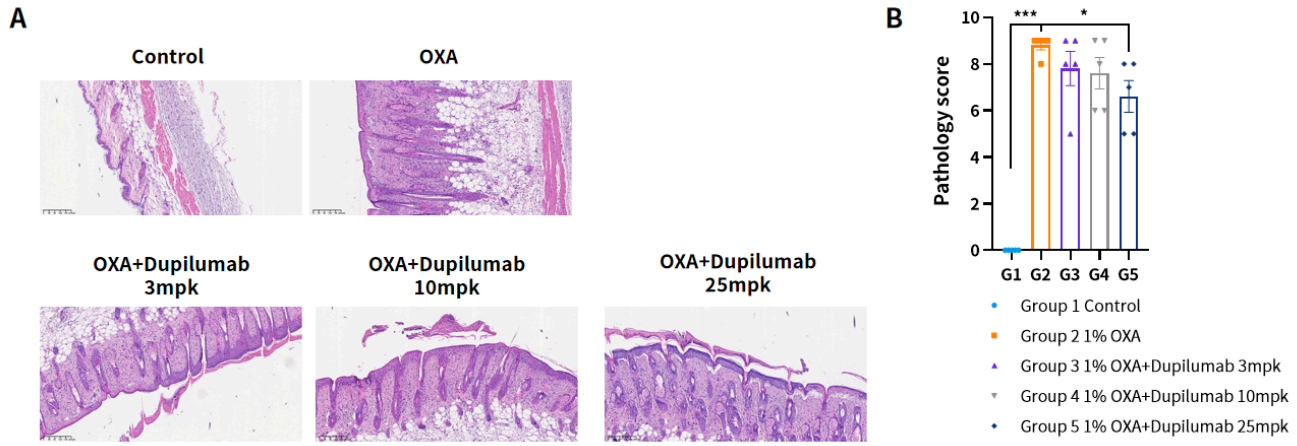


Fig. 3 OXA-induced AD model in hIL4/hIL4R mice. (A) serum IgE; (B) spleen weight.

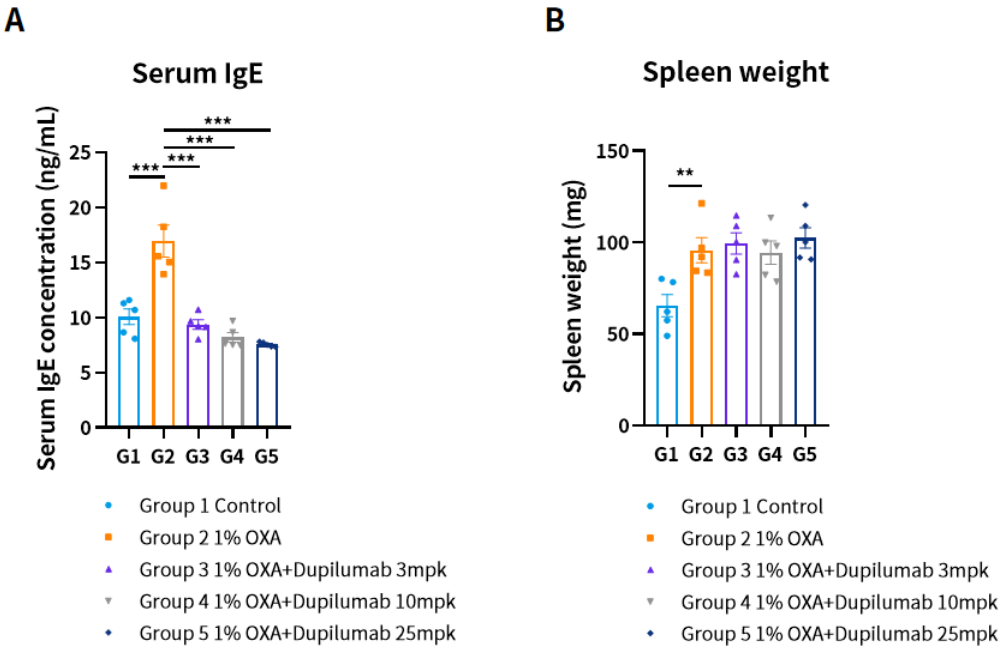


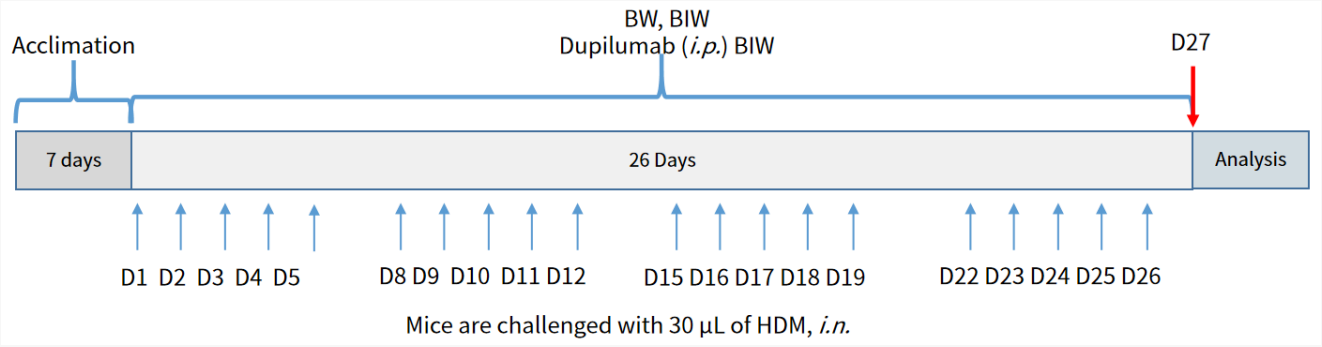
Fig. 4 OXA-induced AD model in hIL4/hIL4R mice. (A) pathology photographs; (B) pathology score.

06 APPLICATION CASE 3

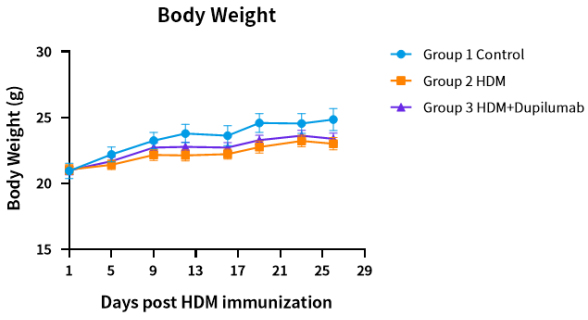
Anti-IL4RA mAb in an **HDM Asthma** Model

In vivo efficacy of an anti-human IL4RA monoclonal antibody (dupilumab) in the house dust mite (HDM)-induced asthma model built on hIL4/hIL4R mice.

STUDY DESIGN



Schema HDM challenge and dupilumab (i.p.) dosing schedule across 27 days, with body-weight monitoring and Day-27 analysis.



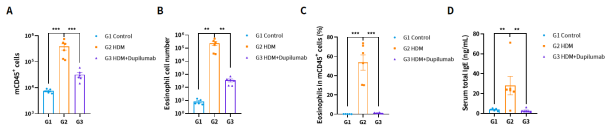


Fig. 1–2 **(1)** Body weight of HDM-induced asthma model treated with dupilumab (n=6, Mean ± SEM). **(2)** Dupilumab ameliorates overall asthma activity — (A) inflammatory cell number in BALF; (B) eosinophil number in BALF; (C) eosinophil percentage; (D) serum total IgE (**P<0.01, ***P<0.001).

Cytokine mRNA & **Lung Histopathology**

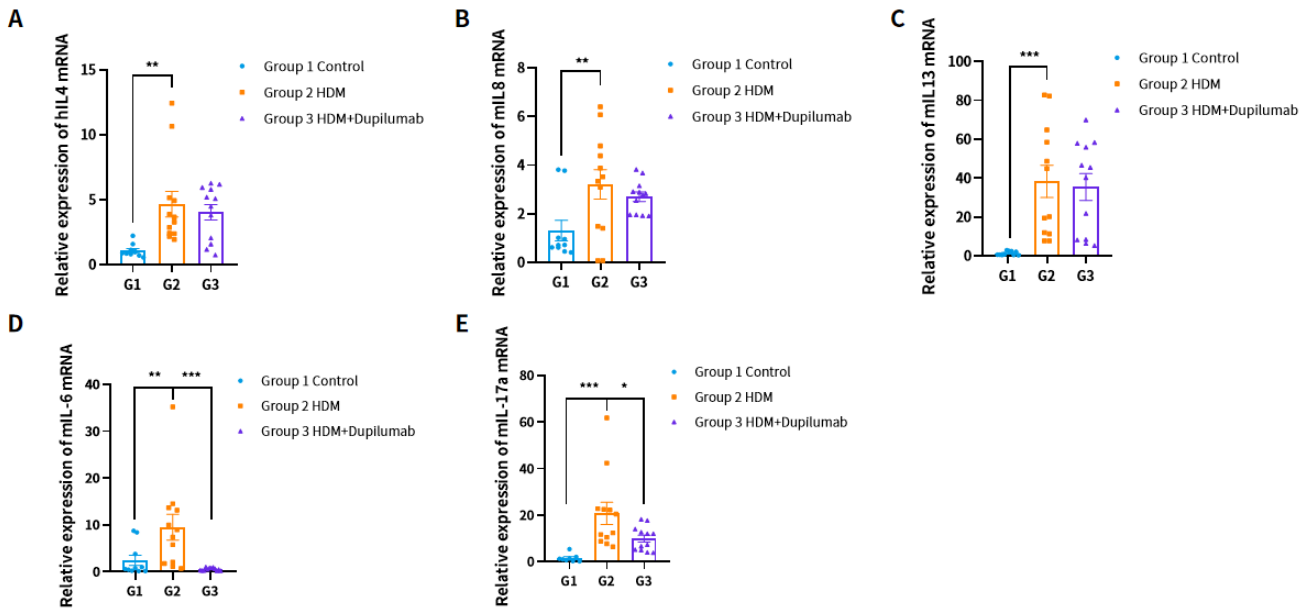
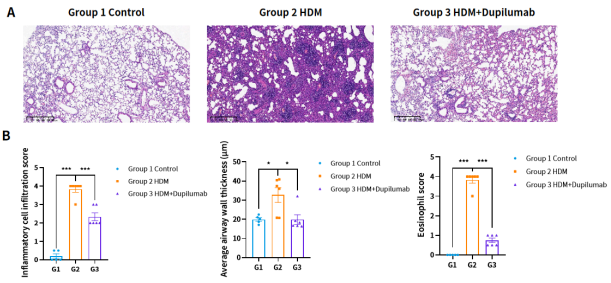


Fig. 3 HDM-induced asthma model. mRNA expression of (A) hIL-4; (B) mIL-8; (C) mIL-13; (D) mIL-6; (E) mIL-17a (*P<0.05, **P<0.01, ***P<0.001).



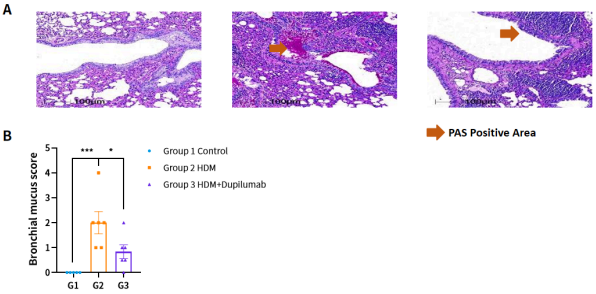


Fig. 4–5 **(4)** Dupilumab mitigates asthma symptoms in lung — (A) H&E staining; (B) pathology score. Magnification ×5. **(5)** (A) PAS staining; (B) mucus score. Magnification ×10 (*P<0.05, **P<0.01, ***P<0.001).

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