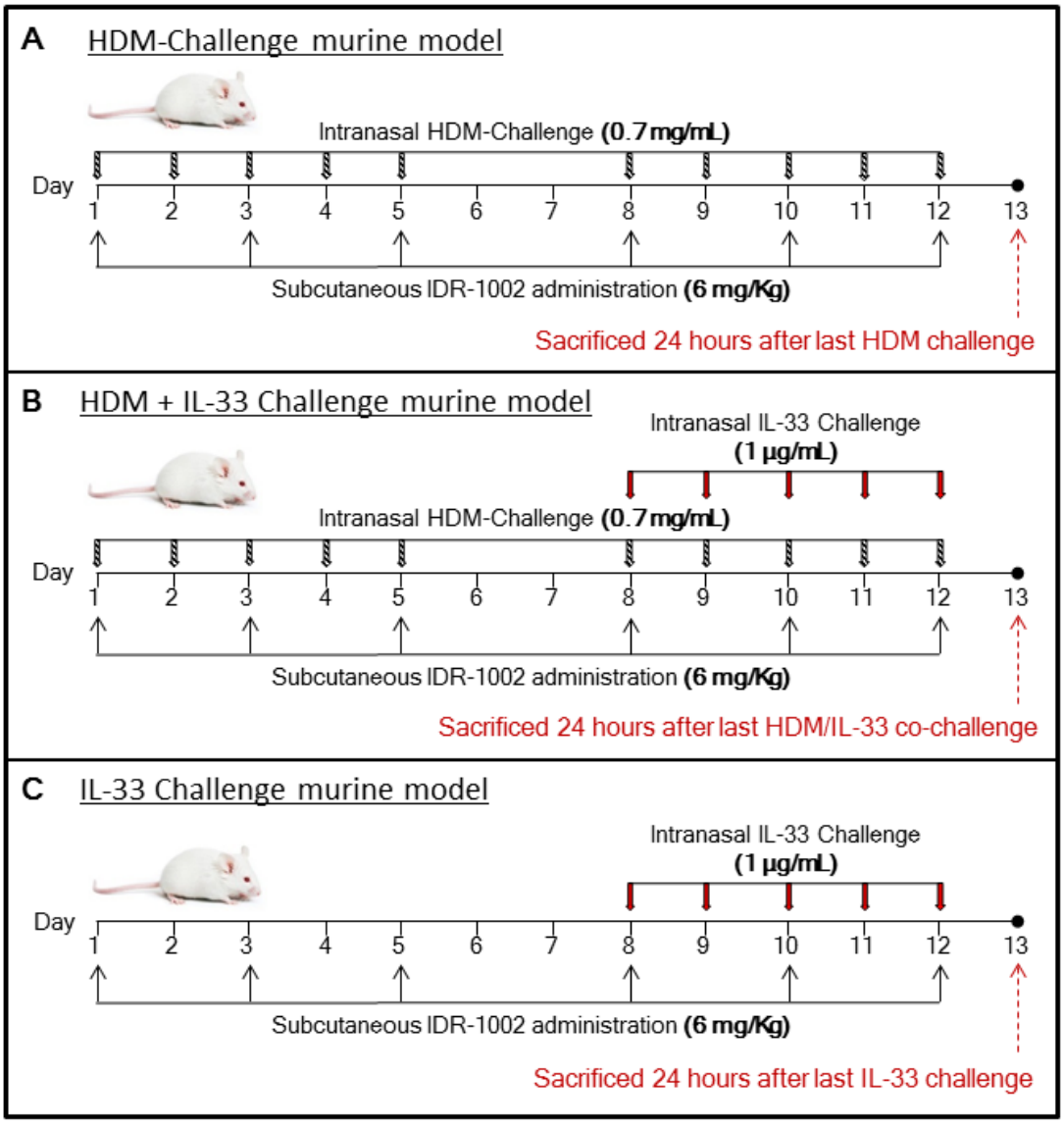
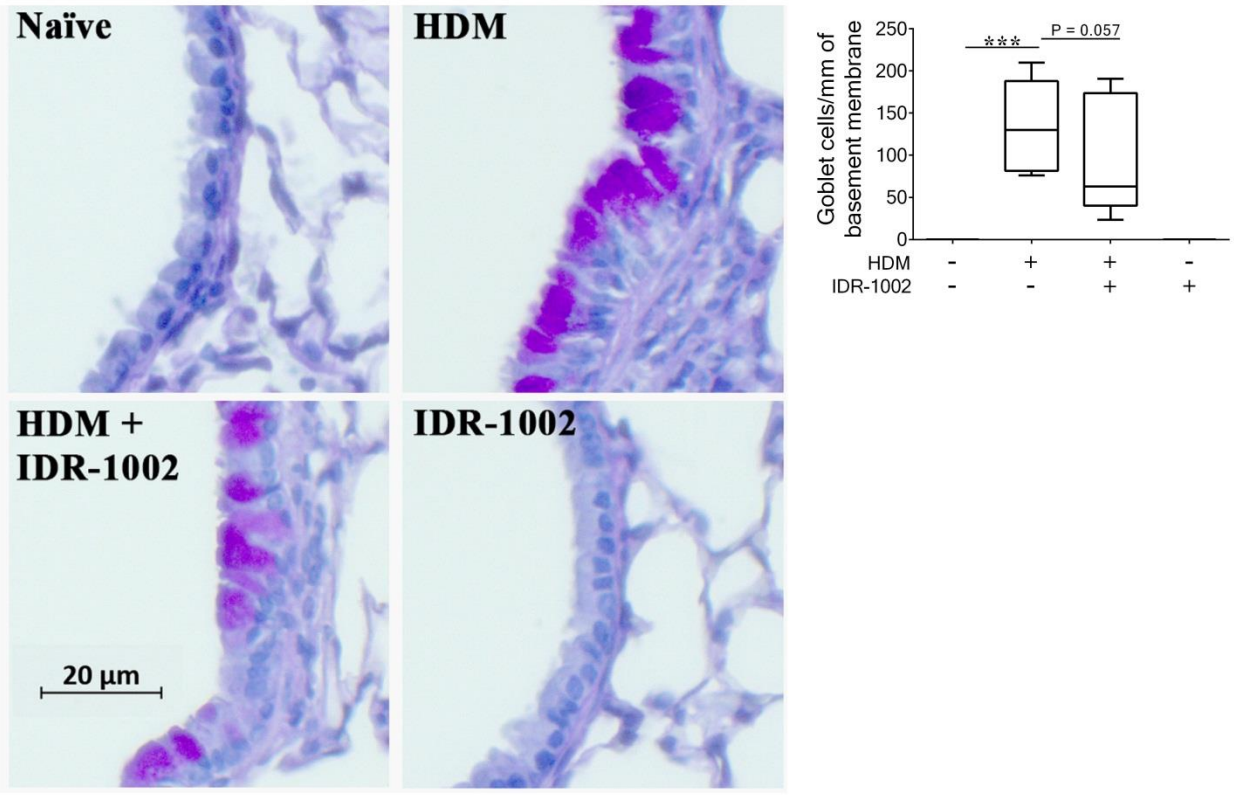
SUPPLEMENTARY INFORMATION

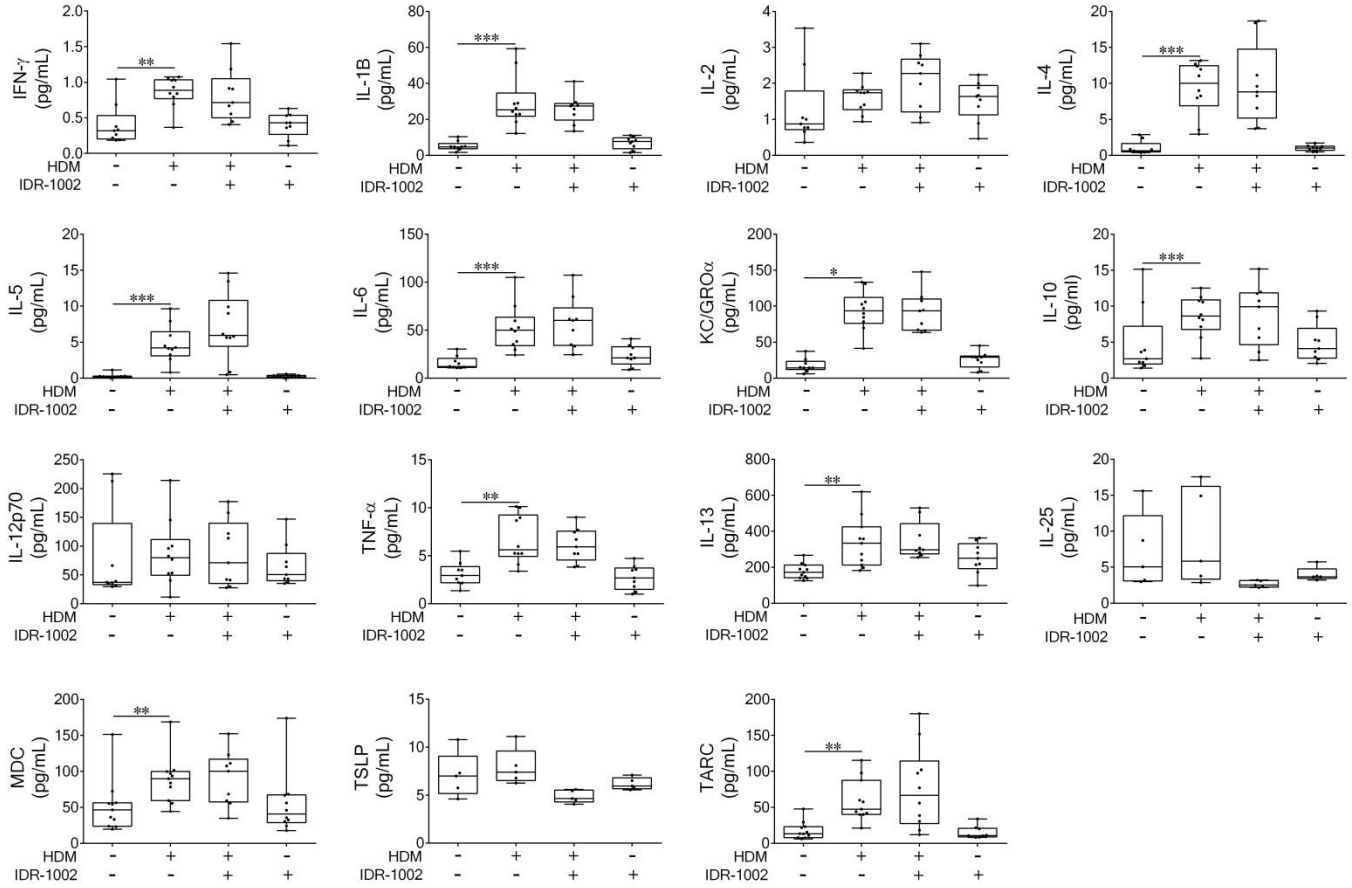
Supplementary Figure 1: Murine models. (**A**) HDM model; female BALB/c (8-10 wks) mice were challenged with 35 µl of whole HDM extract (0.7 mg/mL) in saline intranasal (i.n.), for 2 weeks. IDR-1002 was administered subcutaneously (6 mg/kg) 3 times a week. **(B)** HDM + IL-33 co-challenge model; female BALB/c (8-10 wks) mice were challenged with 35 µl of whole HDM extract (0.7 mg/mL) in saline intranasal (i.n.), for 2 weeks. 1 ug of IL-33 was administered i.n. on days 8-12. IDR-1002 was administered subcutaneously 3 times a week at 6 mg/kg. (**C**) IL-33 model; female BALB/c (8-10 wks) mice received IDR-1002 administered subcutaneously (6 mg/kg) 3 times a week for 2 weeks, recombinant IL-33 (1 µg per mouse) was administered (i.n.) on days 8-12.



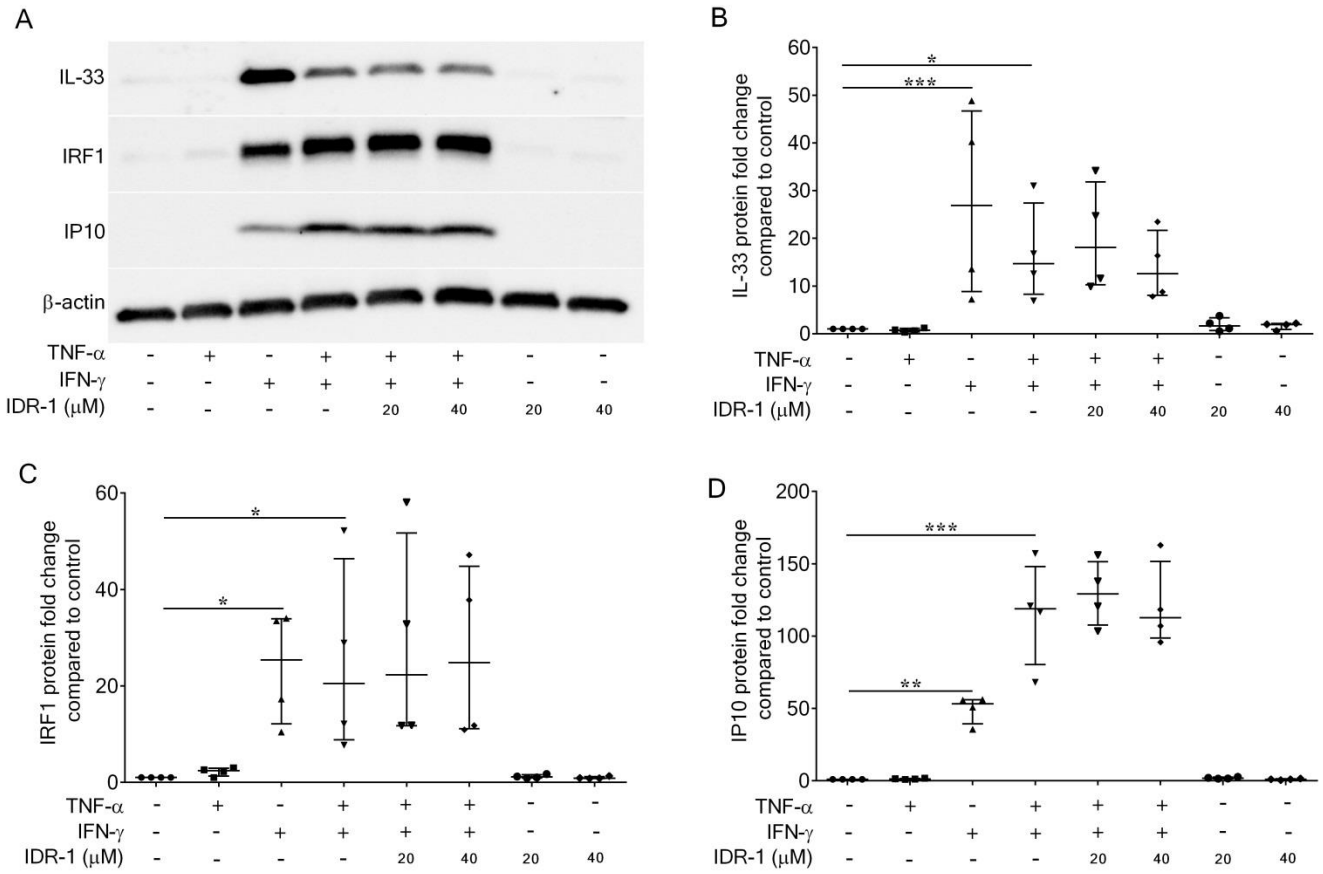
Supplementary Figure 2: Subcutaneous administration of IDR-1002 markedly decreases goblet cell hyperplasia. Female BALB/c (8-10 wks) mice (n=2-4 mice per group) were challenged with 35 **µl** of whole HDM extract (0.7 mg/mL) in saline intranasal (i.n.), for 2 weeks. IDR-1002 was administered subcutaneously at a dose of 6 mg/Kg per mouse three times per week. Lung sections (6 µm) were stained with PAS staining. **(A)** Representative images of PAS staining of the lung tissue. **(B)** Number of goblet cells per mm of basement membrane length. Each dot represents individual airways. Statistical significance was determined by one-way ANOVA with Tukey's multiple comparisons test



Supplementary Figure 3. Cytokine expression profile in lung homogenates of HDM-challenged mice, in the presence and absence of IDR-1002. Female BALB/c (8-10 wks) mice (n=9-10 mice per group) were challenged with 35 μl of whole HDM extract (0.7 mg/mL) in saline intranasal (i.n.), for 2 weeks. IDR-1002 was administered subcutaneously at a dose of 6 mg/Kg per mouse three times per week. Lung tissue homogenates were monitored for a panel of cytokines, 24 hr after the last HDM challenge. Production of IFN-γ, IL-1β, IL-10, IL-12 p70, IL-2, IL-4, IL-5, IL-6, KC, TNF-α, IL-33, TSLP, IL-25, MDC and TARC were monitored by the multiplex Meso Scale Discovery (MSD) platform or ELISA. Bar's shows median and interquartile range, whiskers show min and max points. One-way ANOVA with Tukey's multiple comparisons test was used to assess statistical significance (*$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$).



Supplementary Figure 4: Peptide IDR-1 does not alter IL-33 production in human primary bronchial epithelial cells (PBECs). Human Primary Bronchial Epithelial cells obtained from 4 donors were stimulated with TNFα (20 ng/mL) and IFNγ (30 ng/mL), in the presence and absence of IDR-1 (20 and 40 μM). IL-33, IRF1 and IP10 abundance was monitored in cytoplasmic fractions of the cell lysates by western blots, 24 hr post-stimulation. Protein abundance was quantified by densitometry. **(A)** A representative immunoblot for all proteins, and densitometry analysis (n=4) for **(B)** IL-33, **(C)** IRF1 and **(D)** IP-10 are shown. Protein fold change shown in the graphs represents relative band intensity compared to that in unstimulated cells normalized to 1, after normalization with β-actin for protein input. Each dot represents an individual donor, and bars show the median and interquartile range. RM one-way ANOVA with Fisher's LSD test was used for statistical analyses (*$p \leq 0.05$, **$p \leq 0.01$).



Supplementary Table 1: Demographics of donors of human PBECs used in this study.

Donor #	Gender	Age	Height	Weight	BMI	Current smoker	Ex-Smoker	Pack years	Oral Steroids	Inhaled Steroids
BR384	Female	55	168	90	31.9	No	Yes	unknown	Yes	No
BR390	Female	68	162	61	23.24	No	Yes	55	No	No
BR421	Male	56	181	83	25.3	No	Yes	unknown	unknown	unknown
BR448	Male	74	160	68	27	No	No	0	No	No