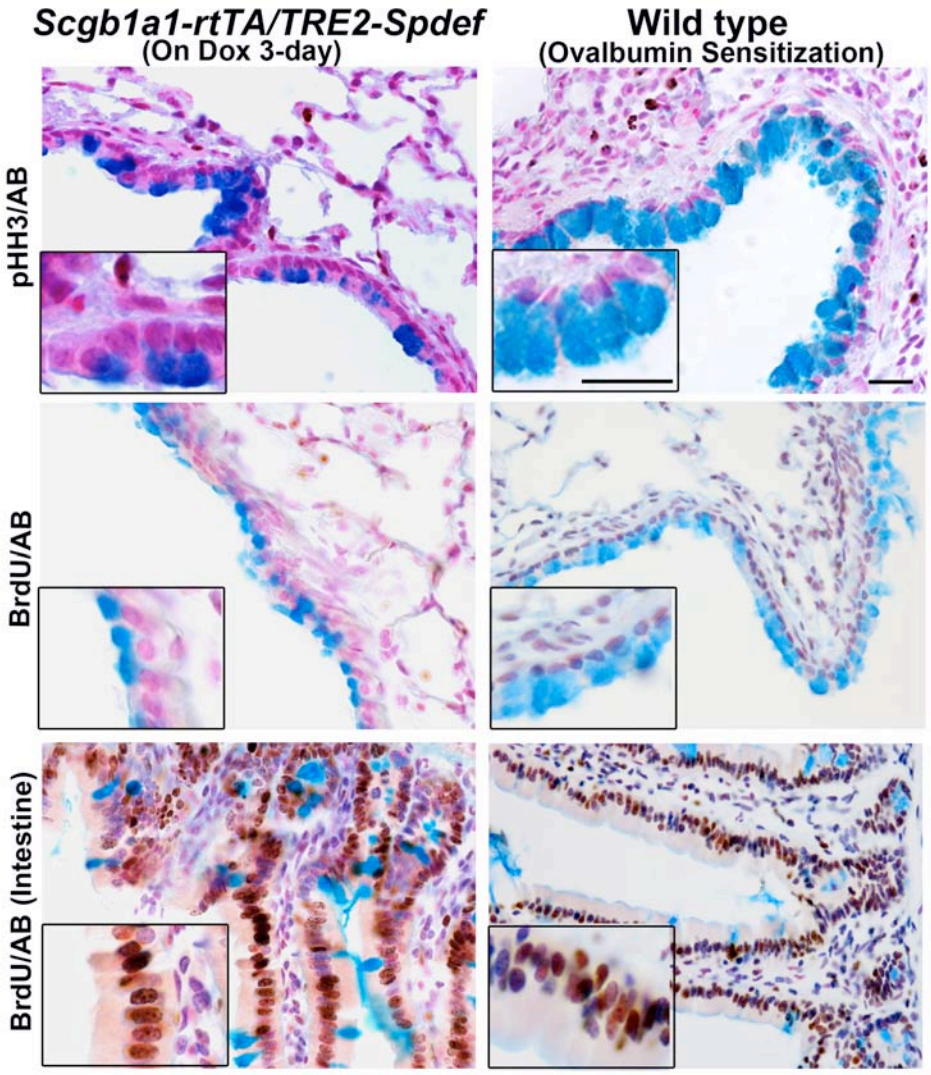
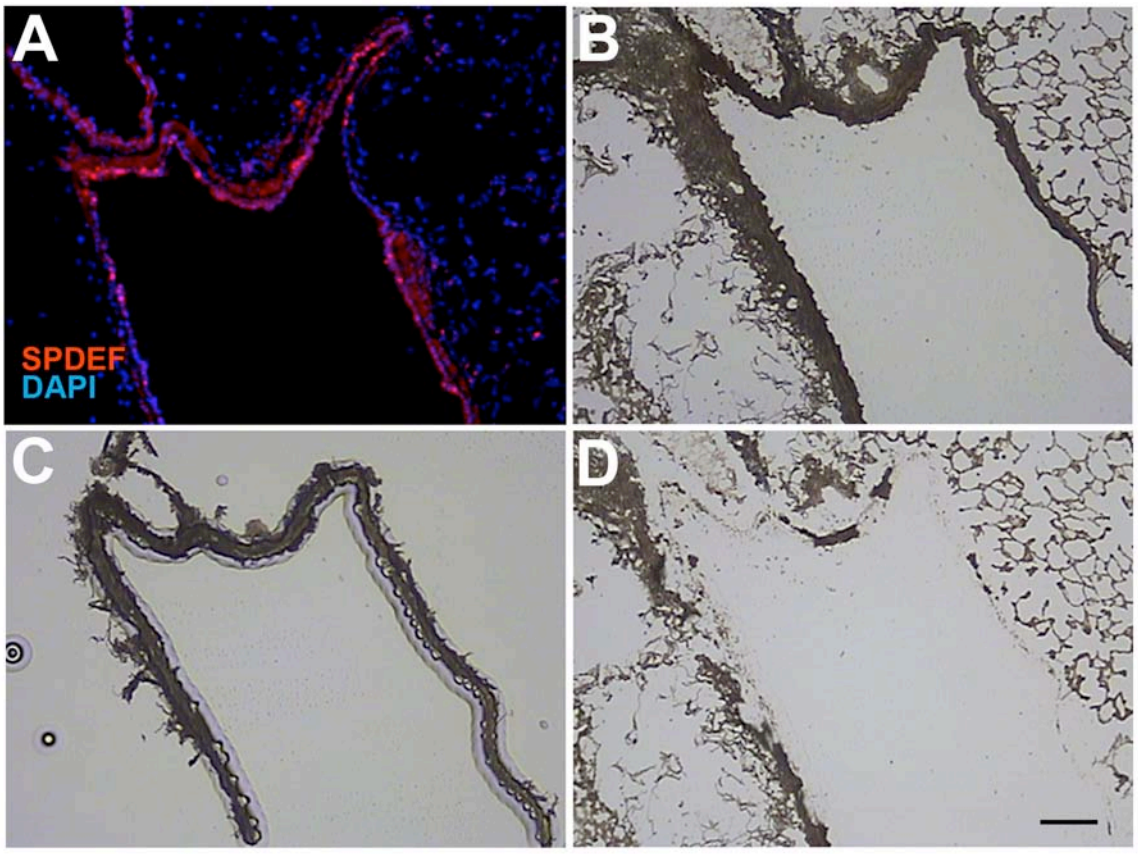


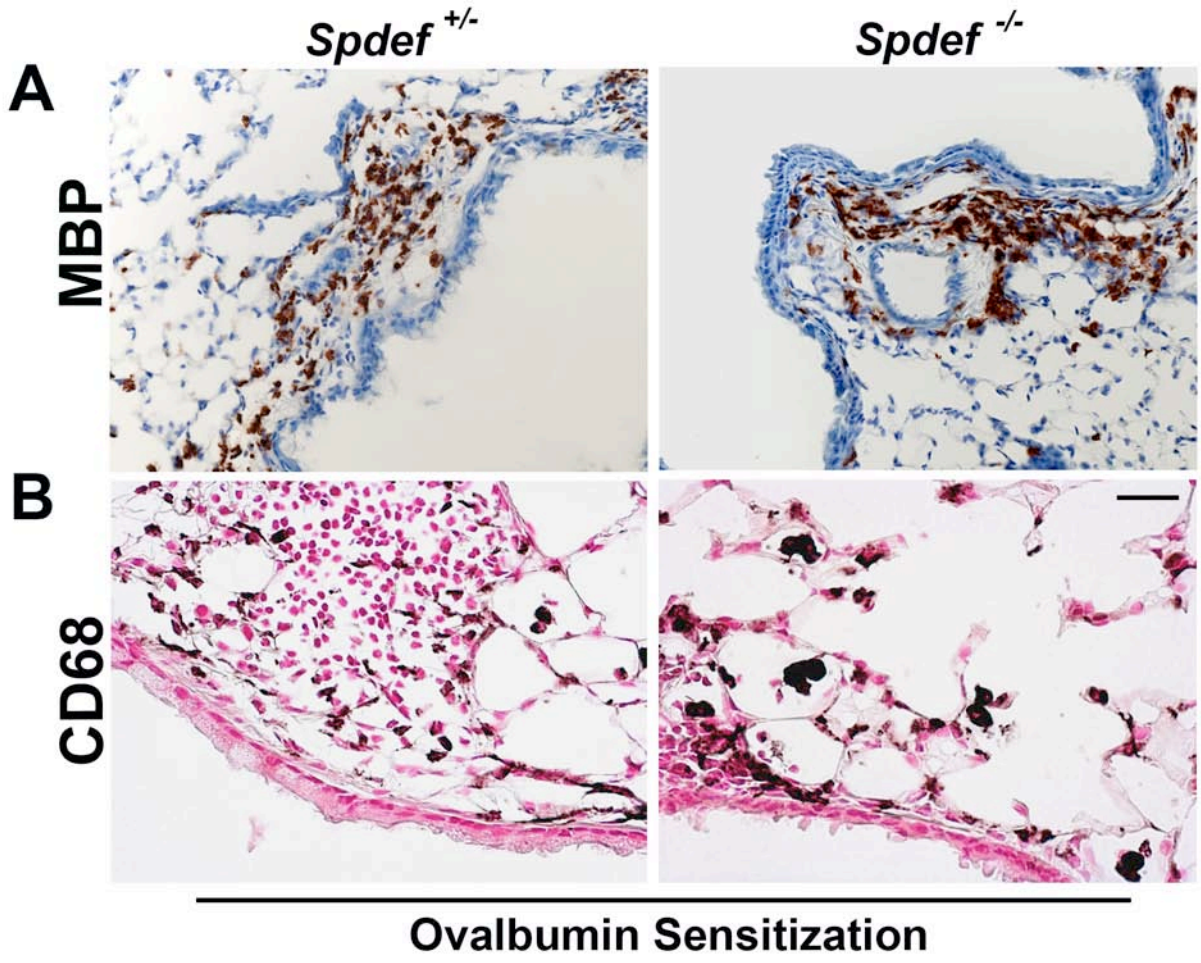
Supplementary Figure 1

Absence of proliferation during goblet cell hyperplasia induced by SPDEF or ovalbumin sensitization. *Scgb1a1-rtTA/TRE2-Spdef* mice were treated with doxycycline for 3 days, as described in Figure 1D. Wild type mice were sensitized with ovalbumin. Cell proliferation was assayed by detection of BrdU uptake. BrdU was administered daily by i.p. injection during treatment with doxycycline and nasal sensitization with ovalbumin (day 24 through day 29, Figure 1B). Goblet cell differentiation indicated by Alcian blue staining was induced in both models. Neither SPDEF nor ovalbumin sensitization increased phosphohistone H3 (pHH3) or BrdU staining in goblet cells. Intestinal tissue collected from the same animal receiving BrdU substrate served as a positive control for proliferation (lower panels). All scale bars: 25 μm.



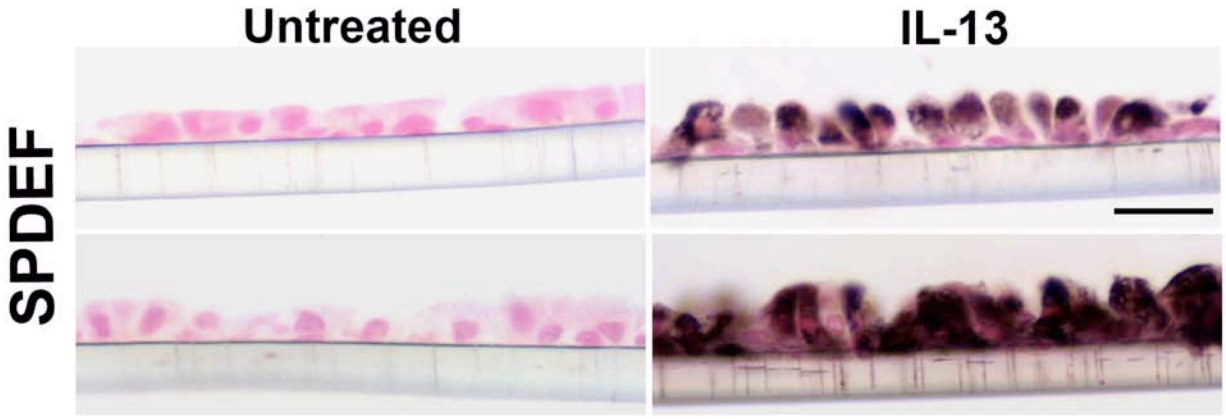
Supplementary Figure 2

Isolation of bronchiolar cells using laser capture microdissection (LCM). Immunofluorescence staining of SPDEF (red in A) in bronchiolar epithelial cells is shown after the *Scgb1a1-rtTA/TRE2-Spdef* transgenic mice were treated with doxycycline for 3 days (A). Tissue was counterstained with DAPI to detect nuclei (blue in A). Adjacent lung sections were used for LCM as shown in (B-D). After dehydration of the 10 μm frozen sections (B), bronchiolar cells were isolated on the laser caps (C). Tissue remaining after removal of airway cells by LCM is shown in (D). Scale bar 50 μm.



Supplementary Figure 3

Pulmonary ovalbumin sensitization caused pulmonary inflammation in the presence or absence of SPDEF. (A) Eosinophil infiltration was observed in both *Spdef* $^{+/-}$ and *Spdef* $^{-/-}$ mice as revealed by Major Basic Protein (MBP) staining, a eosinophil specific marker. Goblet cell differentiation was observed in *Spdef* $^{+/-}$ but not in *Spdef* $^{-/-}$ mice. (B) Monocytes and macrophages were recruited to the lungs of both *Spdef* $^{+/-}$ and *Spdef* $^{-/-}$ mice, as indicated by CD68 staining. Scale bar: 25 μm.



Supplementary Figure 4

IL-13 induces SPDEF in primary mouse tracheal epithelial cells in vitro. Immunohistochemical staining of SPDEF in primary mouse tracheal epithelial cells cultured under air-liquid interface (ALI) condition in the presence or absence of IL-13 (10 ng/ml). Expression of SPDEF was detected after 3 days (upper panel) and 7 days (lower panel) after ALI culture. Scale bar: 25 μm.