Supplemental Figure Legends:

Supplemental Figure 1. Doxycycline and transgene dependency of the Keratin (K) 5-rtA/TRE-H2B:GFP model: Dual immunofluorescence analysis of GFP (green) and K5 (red) in monotransgenic (K5rtA-/TRE-H2B:GFP+) that were fed standard chow (A) or doxycycline chow (B). (n = 3 tracheas).

Supplemental Figure 2. Mitotic index of tracheal basal cells after naphthalene (NA) injury: **(**A-F) Dual immunofluorescence analysis of BrdU (red) and K5 (green) in control (A), and on post-NA recovery days 1-40 (B-F). Arrows: BrdU+ cells. Representative of 3 tracheas. (G) Mitotic index in control mice and as a function of time after injury. Mean ± SEM (n= 3).

Supplemental Figure 3. The Histone 2B:GFP (H2B:GFP) chromatin labeling recapitulates the BrdU-label retention system: (A) Experimental design. dox-doxycycline; NA-naphthalene. (B)

Dual immunofluorescence analysis of H2B:GFP (green) and BrdU (red) in the tracheal epithelium. Nuclei are counterstained with DAPI (blue). Arrows: green-GFP+ nucleus; yellow-BrdU+/GFP+ nucleus. (n=6 tracheas). (C) Quantification of BrdU+ (white bar) and BrdU+/GFP+ (hatched bar) nuclei as percent of total nuclei. Mean ± SEM (n=6).

Supplemental Figure 4. Titration of the anti-GFP antibody: Analysis of endogenous (A) and immunofluorescence detection of H2B:GFP (B) in a frozen tracheal tissue sections. Representative of 4 tracheas.

Supplemental Figure 5. Localization of Histone 2B:GFP positive (H2B:GFP+) cells in the mouse trachea: Immunofluorescence analysis of tracheal sections showing GFP+ cells in the surface epithelium (green arrow). Submucosal glands (SMG) or gland ducts (SMGD) did not contain H2B:GFP+ cells. Representative of n=6 tracheas.

Supplemental Figure 6. Gene expression in GFP^{dim} and GFP^{bright} cells: Quantitative RT-PCR analysis of CCSP (A), and FoxJ1 (B) mRNA abundance in GFP^{dim} (small checked bar) and GFP^{bright} (large checked bar) cells. Mean ± SEM (n=3).

Supplemental Figure 7. Identification of rim clone-derived cells in air-liquid-interface cultures. GFP^{bright} and GFP^{dim} cells were recovered from Keratin5-rTA/TRE H2B:GFP mice that were fed dox chow, treated with naphthalene, and recovered 40 days. These cells were used to generate passage 0 rim-clones. Rim clone cells were recovered, mixed with tracheal 'filler' cells derived from C57/Bl6 congenic animals, and used to generate air-liquid-interface cultures. Dual immunofluorescence analysis of H2B:GFP (green) and nuclei (DAPI, blue) in cell cultures that were doxycycline-free (A) or dox-containing (B). Representative of 6 transwells.

Supplemental Figure 8. Confocal microscopic analysis of H2B:GFP^{bright} cell differentiation. (A, B) Confocal analysis of a transwell membrane stained with CCSP (red), GFP (green), and DAPI

(blue). A single Z-plane showing a cell that was further evaluated using an orthogonal view in (B). X, Y, and Z indicate the axes represented in each image (arrow). (C, D). Confocal analysis of a transwell membrane stained with ACT (red) and GFP (green). A single Z-plane showing a cell that was further evaluated using an orthogonal view in (D). X, Y, and Z indicate the axes represented in each image. Representative of 10 cells.

Supplemental Figure 9. Differential expression of *Wnt/β-catenin pathway genes:* (A) TSC were isolated from TOPGal (C57Bl/6 congenic) animals by FLOW cytometry, cultured under rim clone forming conditions, and stained for β-galactosidase activity using the X-gal reaction. (B-G) Quantitative RT-PCR analysis showing the mRNA levels for β-catenin pathway genes that are not differentially-expressed in the GFP^{bright} and GFP^{dim} populations.