ENVIGO

Genetically engineered models (GEMS)

CFTR knockout rat

Model	CFTR knockout rat
Strain	HsdSage:SD-*Cftr*^{tm1sage}
Location	U.S.
Availability	Cryopreserved

Characteristics:

Homozygotes exhibit multiple phenotypes involving intestinal, respiratory, and reproductive phenotypes (see Description).

Zygosity genotype

+ Cryopreserved as a mix of Heterozygous & WT embryos

Research use

+ Cystic Fibrosis
+ Chloride transport
+ Thiocyanide transport

Origin

The CAR KO rat model was originally created at SAGE Labs, Inc. in St. Louis, MO and distributed out of the Boyertown, PA facility. The line continues to be maintained through the original SAGE Labs animal inventory acquired by Envigo.

Description

CFTR knockout rats possess a 16 bp deletion in exon 3 of the Cystic Fibrosis transmembrane conductance regulator (CFTR), resulting in loss of protein expression.

CFTR knockout rats lack CFTR protein as demonstrated by western blot. CFTR KO rats develop intestinal obstructions shortly after weaning leading to weight loss and mortality. CFTR KO rats also exhibit decreased trachea circumference as well as submucosal gland volume. Stored nasal mucus volume is increased. Abnormal dentition is observed, and the vas deferens is absent in male CFTR knockout rats.

Citations

29321377 Birket SE, Davis JM, Fernandez CM, Tuggle KL, Oden AM, Chu KK, Tearney GJ, Fanucchi MV, Sorscher EJ, Rowe SM. Development of an airway mucus defect in the cystic fibrosis rat. JCI Insight. 2018 Jan 11;3(1). pii: 97199

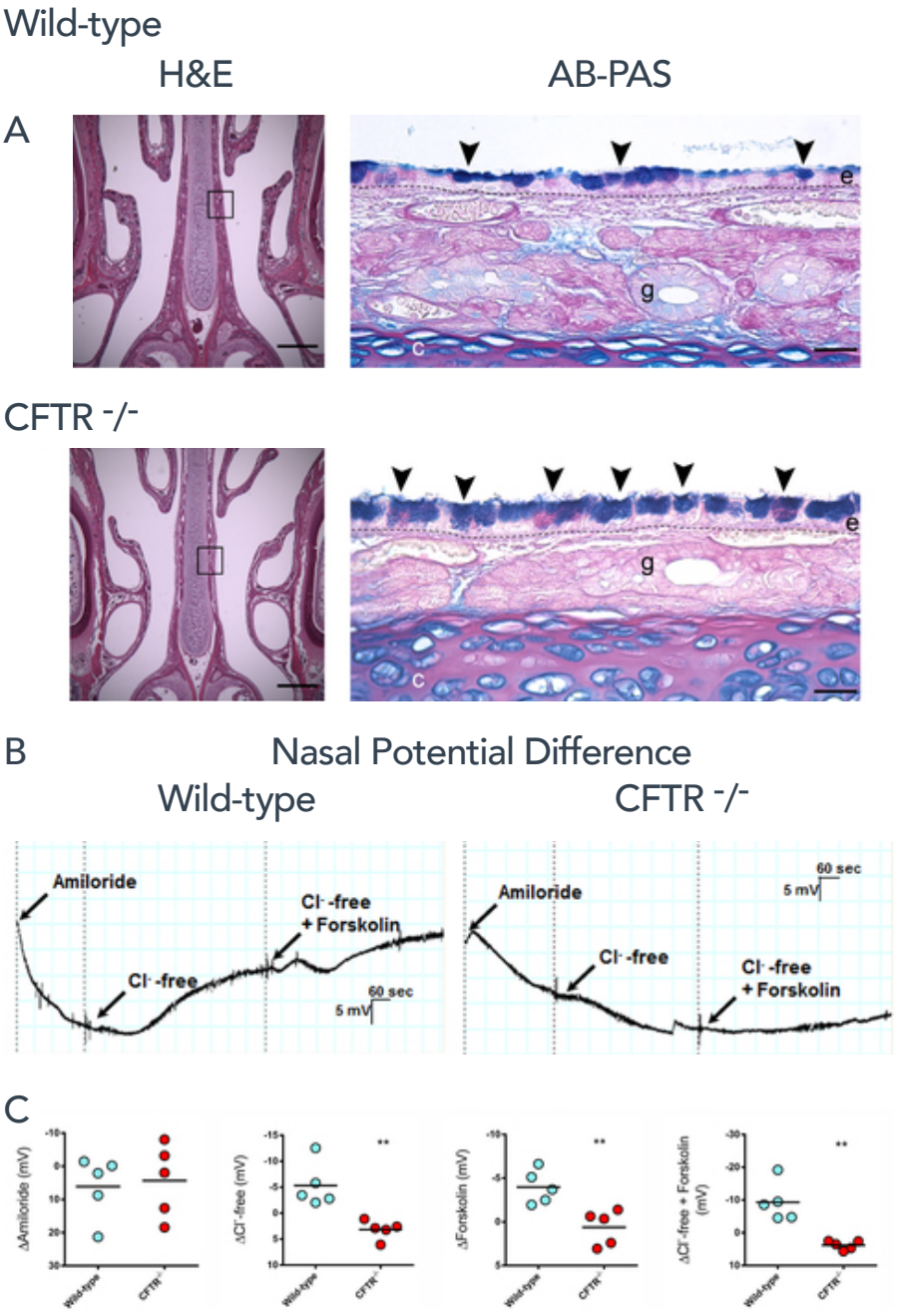
28597597 Grayson J, Tipirneni KE, Skinner DF, Fort M, Cho DY, Zhang S, Prince AC, Lim DJ, Mackey C, Woodworth BA. Sinus hypoplasia in the cystic fibrosis rat resolves in the absence of chronic infection. Int Forum Allergy Rhinol. 2017 Sep;7(9):904-909

29190650 Stalvey MS, Havasi V, Tuggle KL, Wang D, Birket S, Rowe SM, Sorscher EJ. Reduced bone length, growth plate thickness, bone content, and IGF-I as a model for poor growth in the CFTR-deficient rat. PLoS One. 2017 Nov 30;12(11):e0188497.

28771736 Tipirneni KE, Cho DY, Skinner DF, Zhang S, Mackey C, Lim DJ, Woodworth BA. Characterization of primary rat nasal epithelial cultures in CFTR knockout rats as a model for CF sinus disease. Laryngoscope. 2017 Nov;127(11):E384-E391.

24608905 Tuggle KL, Birket SE, Cui X, Hong J, Warren J, Reid L, Chambers A, Ji D, Gamber K, Chu KK, Tearney G, Tang LP, Fortenberry JA, Du M, Cadillac JM, Bedwell DM, Rowe SM, Sorscher EJ, Fanucchi MV. Characterization of Defects in Ion Transport and Tissue Development in Cystic Fibrosis Transmembrane Conductance Regulator (CFTR)-Knockout Rats. PLoS ONE. 2014 Mar 7; 9(3): e91253

Figure 1: Proximal nasal histology and nasal potential difference measurements in CFTR knockout rats. (A) Low power magnification (4×) H&E stained sections from the proximal nasal passages bar = 500 µm. 20× images of ABPAS stained nasal septa from boxed areas bar = 25 µm. Arrowheads, cells swollen with intracellular mucus; e, respiratory epithelium; g, submucosal gland; dashed line (–), basement membrane (n = 4 animals/group) (B) NPD tracings from wild-type and CFTR-/- rats. | Summary data from NPD measurements for: amiloride, Cl--free Ringers, forksolin, and Cl-/-free Ringers+forskolin. (n = 5 animals/group) **p=0.01. Tuggle KL, et al. (2014) PLoS ONE 9(3): e91253.



Contact us

North America 800.793.7287 gemsorders@envigo.com
Envigo, 8520 Allison Pointe Blvd., Suite 400, Indianapolis, IN 46250, United States