The rat takes the cheese: a novel model of CFTR-dependent chronic bacterial airway infection

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Shareable abstract (@ERSpublications)
CF rats are a novel *in vivo* model to study CF-like chronic bacterial airway infection.
https://bit.ly/3KBhKMr

Cite this article as: Livraghi-Butrico A, Franklin TB, Wolfgang MC. The rat takes the cheese: a novel model of CFTR-dependent chronic bacterial airway infection. *Eur Respir J* 2022; 60: 2200832 [DOI: 10.1183/13993003.00832-2022].

Received: 21 April 2021
Accepted: 23 April 2022

In cystic fibrosis (CF), the absence of cystic fibrosis transmembrane conductance regulator (CFTR)-mediated Cl^- secretion, which normally drives airway surface hydration, results in hyperconcentrated and stagnant mucus, which becomes a niche for bacterial infection. Desirable features of a CF model of infection would be a host that exhibits the main pathophysiological feature of human CF lung disease, *i.e.* airway mucus hyperconcentration and consequent reduced mucus clearance. While currently available large CF animal models appear to recapitulate these aspects of human disease, they also present significant animal husbandry challenges, have limited availability and are cost prohibitive for routine experimentation [1]. Rodent models are usually the preferred preclinical testing platform to understand disease pathology and therapeutic efficacy. So far, modelling of CF-like chronic bacterial infection has been attempted in mice using bacteria embedded in agar beads [2–5], and although this model has proven useful to study mechanism of host and bacterial adaptation, it has not shown robust differences in the establishment of chronic infection between wildtype (WT) and CF mice [6, 7], suggesting that the CF murine models tested failed to fully recapitulate the human phenotype. CF rats, on the other hand, appear to have more relevant features to become the next best candidate to establish a model of CF-like chronic infection, including robust CFTR expression, and possibly reliance on control airway surface hydration, in large and small airways [8], coupled to age-dependent abnormalities in airway mucus secretion and clearance [9, 10].