Spatio-temporal dynamics of the cystic fibrosis airway microbiome

**Abstract**

**Introduction**

**Methodology**

The full model can be written as

This system can be nondimensionalized by introducing the scaled quantities , , , , and and scaled parameters , , , , , and . Dropping the \*’s, the scaled system is

where and represent the derivate and Laplacian with respect to the scaled time and space variables, respectively.

**Results**

**Critical domain**

**Analytical**

**1D**

**2D**

**Traveling wave solution**

A traveling wave solution is a function that satisfies a PDE while maintaining its shape in time (1-3).

**Analytical**

**1D**

**Discussion**

1. A. N. Kolmogoroff, I. G. Petrovsky, N. Piscounoff (1988) Study of the Diffusion Equation with Growth of the Quantity of Matter and its Application to a Biology Problem.

2. S. Trofimchuk, V. Volpert, Traveling waves in delayed reaction-diffusion equations in biology. *Mathematical Biosciences and Engineering* **17**, 6487-6514 (2020).

3. A. V. Narla, J. Cremer, T. Hwa, A traveling-wave solution for bacterial chemotaxis with growth. *Proceedings of the National Academy of Sciences* **118**, e2105138118 (2021).