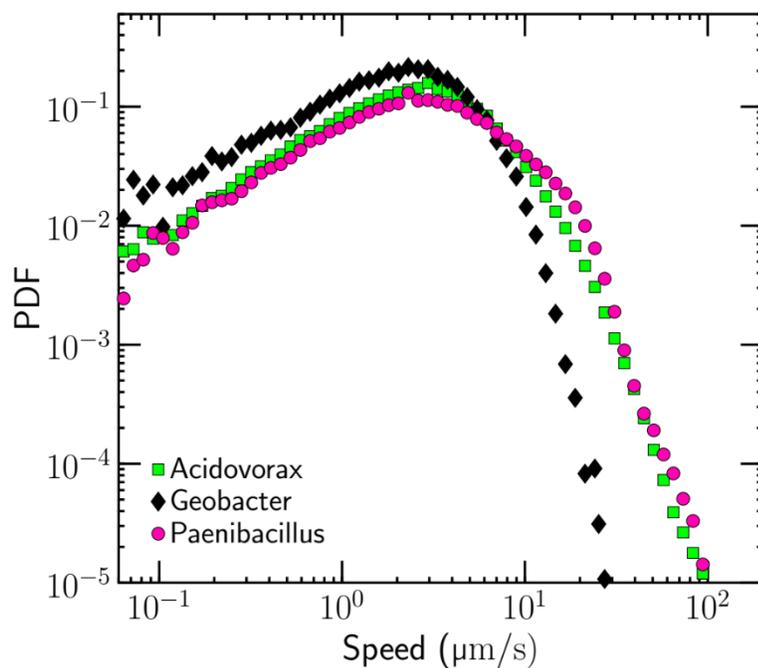


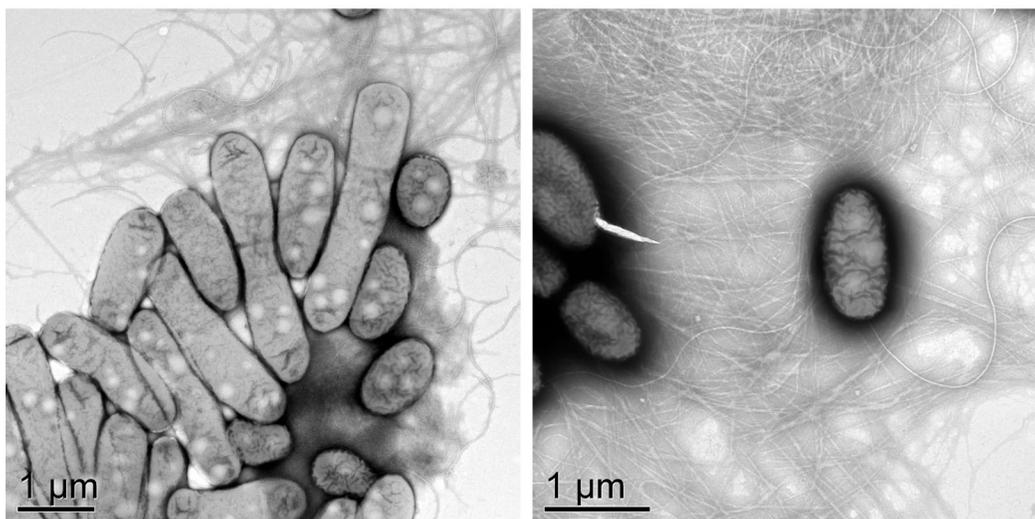
## 1 Supplementary Figures

2



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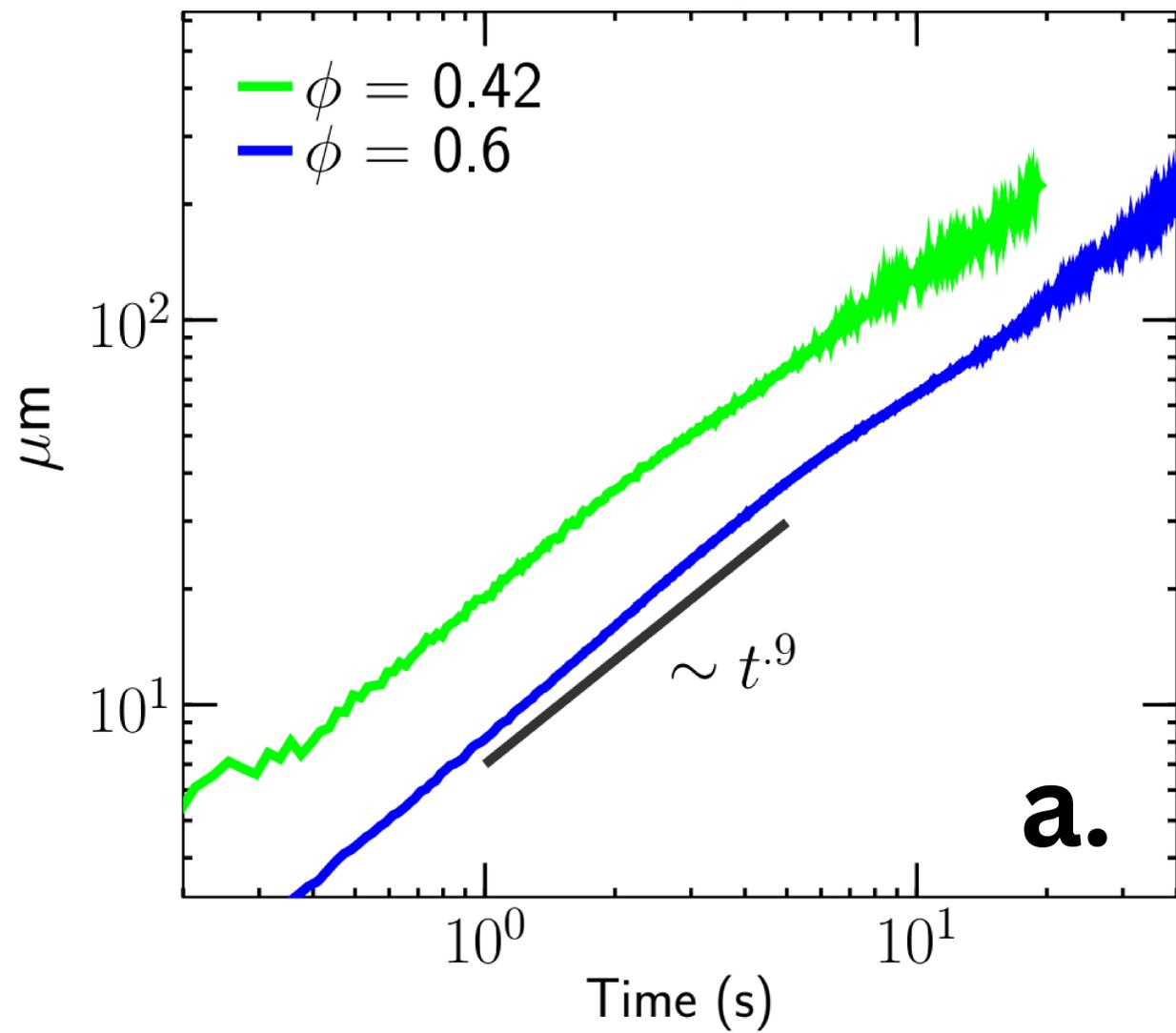
4 **Supplementary Figure 1.** Speed PDF for no-flow experiments in the high porosity geometry (grain diameter = 40  
5 μm, pore length = 20 μm).



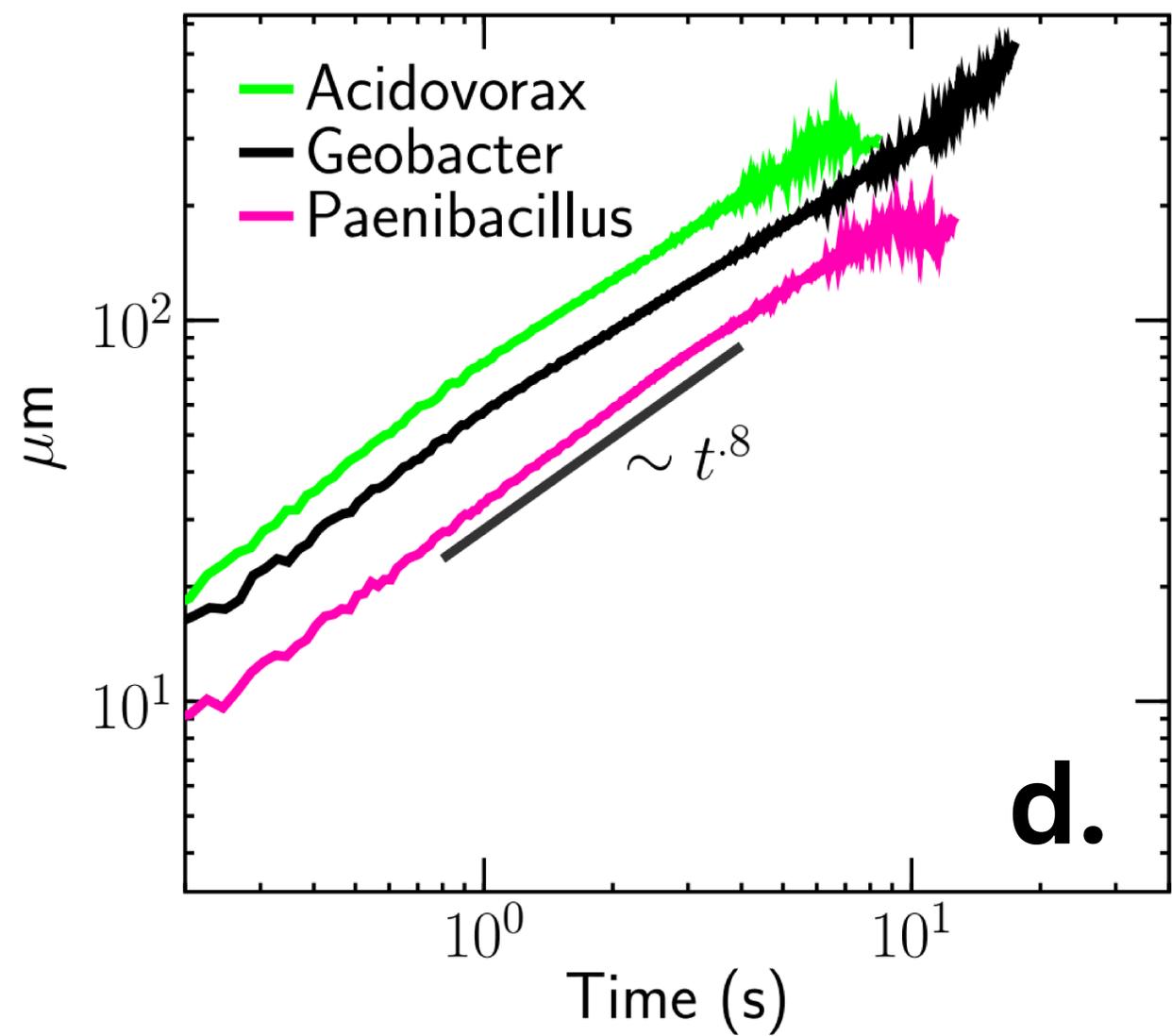
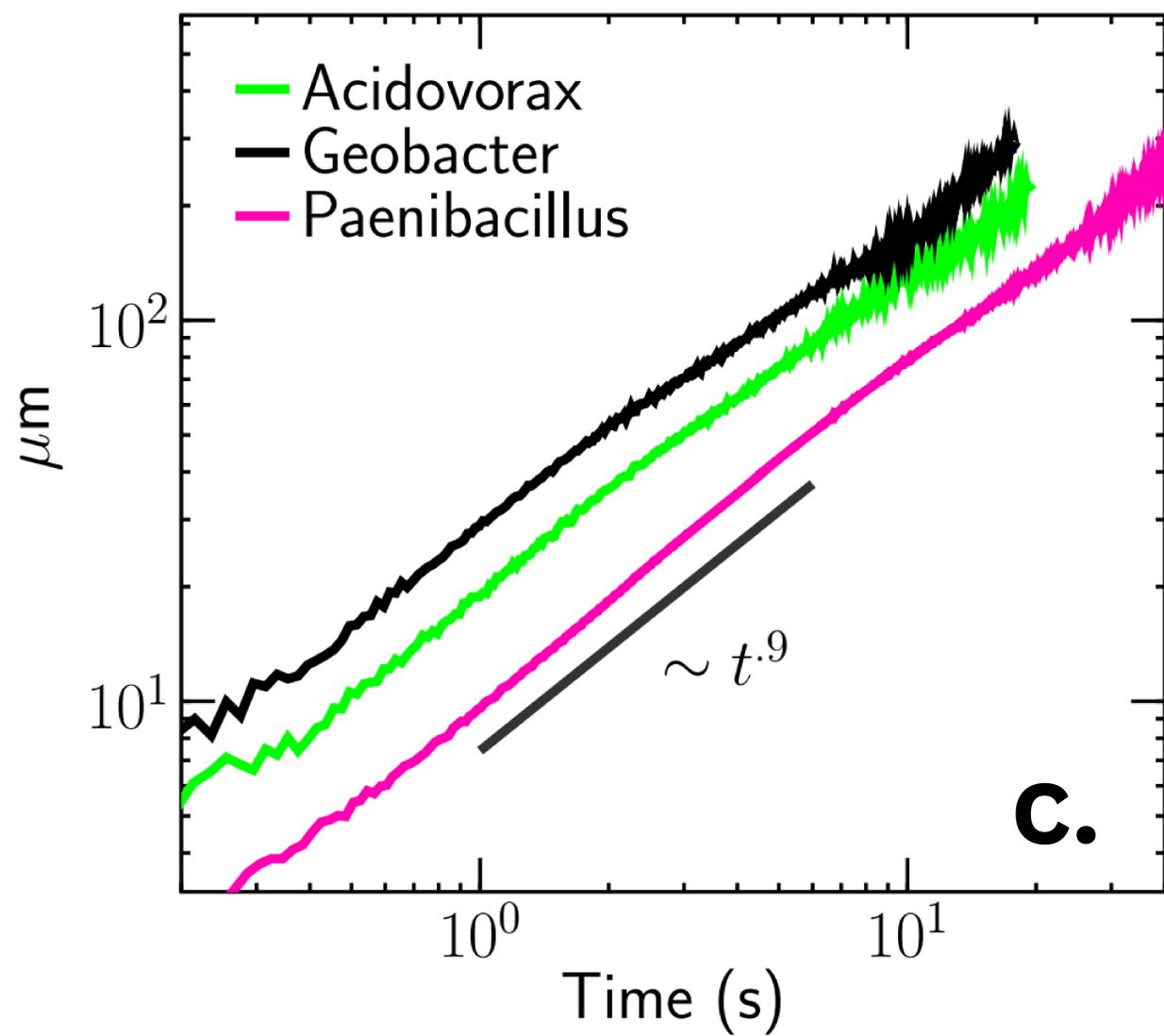
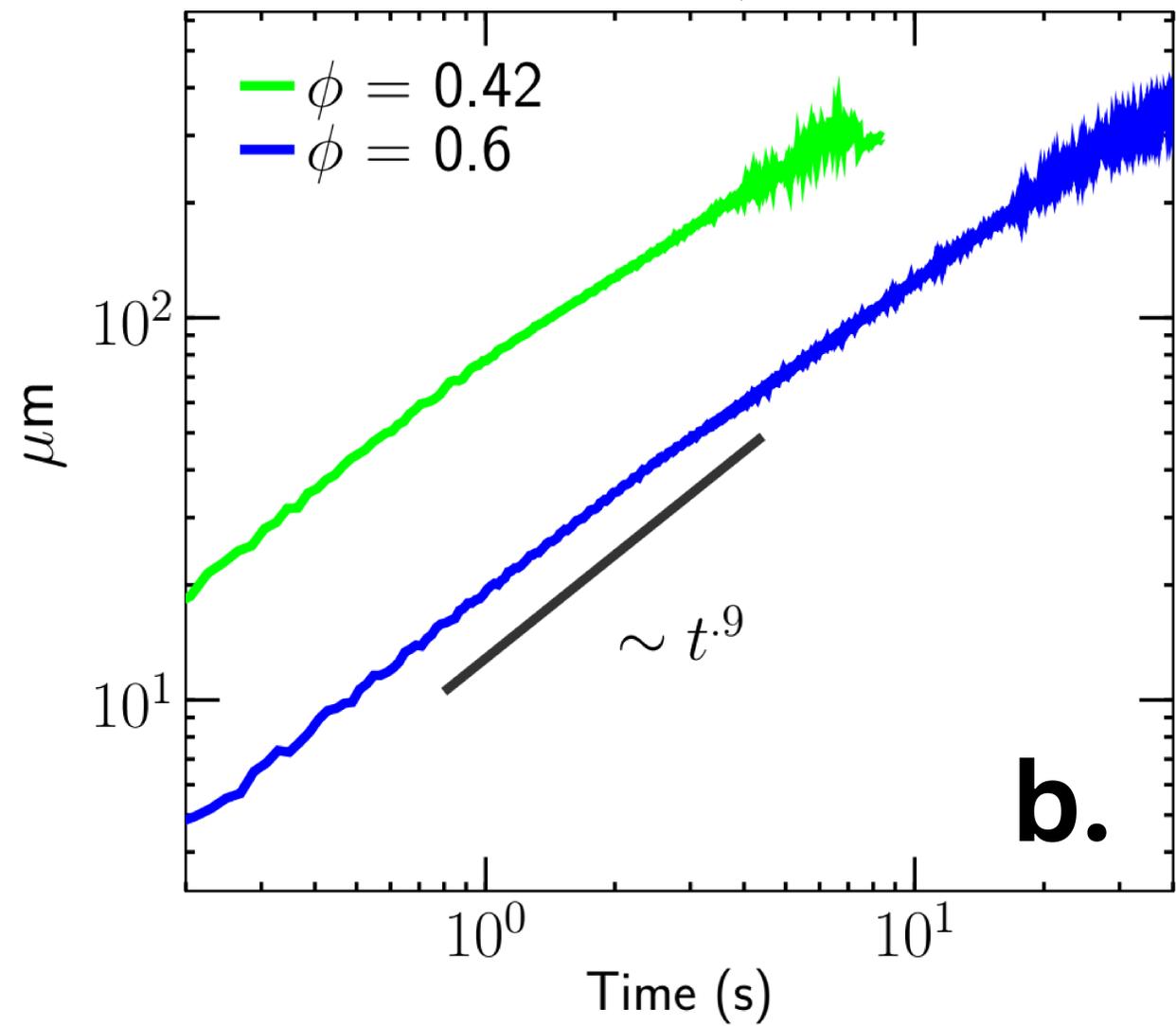
6

7 **Supplementary Figure 2.** Whole-mount transmission electron microscopy (TEM) images of *Acidovorax* JHL-9  
8 (unpublished images from [22], courtesy of Alice Dohnalkova). The whole-mount images were prepared by adding  
9 JHL-9 liquid culture to a copper electron microscopy grid and examining by TEM at 200 kV using a JEOL 2010 high-  
10 resolution TEM.

$Q = 1 \mu\text{l}/h$



$Q = 5 \mu\text{l}/h$



**Supplementary Figure 3.** Mean average displacements (MADs) at different porosities and flow rates for three different species of bacteria. **(a)** MADs for *Acidovorax* for  $\phi = 0.60$  and  $\phi = 0.42$  at a flow rate of 1  $\mu\text{L/h}$  (mean fluid speed of 11.6  $\mu\text{m/s}$  and 16.5  $\mu\text{m/s}$  respectively). **(b)** MADs for *Acidovorax* for  $\phi = 0.60$  and  $\phi = 0.42$  at a flow rate of 5  $\mu\text{L/h}$  (mean fluid speeds of 57.9  $\mu\text{m/s}$  and 82.7  $\mu\text{m/s}$  respectively). **(c)** MADs for all species for  $\phi = 0.42$  at a flow rate of 1  $\mu\text{L/h}$ . **(d)** MADs for all species for  $\phi = 0.42$  at a flow rate of 5  $\mu\text{L/h}$ . These figures show an increase in the impact of differential advection (value of the MAD) for motile bacteria as the flow rate increases.