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Biofilms suck: how bacteria beat the diffusion limit THOMAS ANGELINI, WENBO ZHANG, STEVEN ZEHNDER, JOLIE BREAUX, University of Florida — Multicellular behavior in bacterial biofilms is intimately tied to the production of an extracellular polysaccharide (EPS) matrix that encases the cells and provides physical integrity to the colony as a whole. Recent work in *Bacillus subtilis* biofilms shows that a sudden increase in EPS production generates osmotic stresses that cause the biofilm to expand. Moreover, EPS production is triggered by a nutrient depletion gradient that develops in the biofilm due to diffusive mass transport limitations. These polymer physics based biofilm behaviors suggest that EPS production may have evolved in biofilms to beat the diffusion limit of nutrient transport into the colony, though no direct observation of nutrient transport has been observed previously. Here we measure the rate of nutrient transport into *b. subtilis* biofilms and find that when EPS production is up-regulated, the polymer sucks fluid into the colony with a characteristic time dependence like that of pressure driven flow. Preliminary data and analysis will be presented.

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