WHAT'S THE FUZZ ABOUT MICROBIAL SLIME?

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Microbes secrete polysaccharides that play multiple roles in biology, such as increasing viscosity, enhancing water-holding capacity, masking identity, forming biofilms, and potentially many more. These polysaccharides, which exhibit tremendous structural variation, are associated with microbial cell walls. Although many microbial exopolysaccharides and cell wall polysaccharides have been documented, their immense structural variation remains largely undiscovered.

Notably, the production of these carbohydrates is costly for microbes, requiring 10+ proteins to synthesize. Since most microbes live in complex communities, it is likely that some form of recycling occurs, where various community members utilize these polysaccharides as carbon sources. However, very little is known about how microbes degrade and catabolize exo- and cell wall- polysaccharides.

I will present examples of novel, unpublished, bacterial exopolysaccharides and cell wall polysaccharides, discuss strategies related to their production, purification, and analysis, and identify key challenges in understanding the polysaccharide utilization systems that bacteria use for specific degradation.

Some microbial polysaccharides are already used in a number of applications, but with the structural variation present, microbial polysaccharides have a large untapped potential. Relevant applications include viscosity modifications, prebiotics, and their use as elicitors in biological systems and immune stimulants.