FEEDING IN SYRUP: HOW FLAGELLATED PROTISTS FEED.

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Many aquatic unicellular protists are equipped with flagella that facilitate not only their motility but also – maybe more important – their feeding on bacteria. Their fundamental problem is that viscosity impedes predator-prey contact at low Re. The flagella creates a flow of water past the cell, somehow facilitating predator-prey contact. These flows, however, also make the cells susceptible to flow sensing predators, and there is, therefore, a conflict – a trade-off - between resource acquisition and survival. The number and arrangement of flagella as well as flagella beat patterns and kinematics must have evolved to optimize the trade-off between resource acquisition (near field flow) and survival (far field flow). Using direct observations (high speed video microscopy), flow visualization, and simple and CFD models I will show examples of how flagellates have overcome the problem of viscosity in encountering prey, how some forms have evolved stealth behavior, and how foraging efficiency trades of against predation risk.