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Coordinated Beating of Algal Flagella is Mediated by Basal Coupling KIRSTY WAN, RAYMOND GOLDSTEIN, Univ of Cambridge — Cilia or flagella often exhibit synchronized behavior. This includes phase-locking, as seen in *Chlamydomonas*, and metachronal wave formation in the respiratory cilia of higher organisms. Since the observations by Gray and Rothschild of phase synchrony of nearby swimming spermatozoa, it has been a working hypothesis that synchrony arises from hydrodynamic interactions between beating filaments. Recent work on the dynamics of physically separated pairs of flagella isolated from the multicellular alga *Volvox* has shown that hydrodynamic coupling alone is sufficient for synchrony. However, the situation is more complex when considering multiple flagella on a single cell. We suggest that a mechanism, internal to the cell, provides an additional flagellar coupling. For instance, flagella of *Chlamydomonas* mutants deficient in filamentary connections between basal bodies are found to display markedly different synchronization from the wildtype. Diverse flagellar coordination strategies found in quadri-, octo- and hexadecaflagellates reveal further evidence that intracellular couplings between flagellar basal bodies compete with hydrodynamic interactions to determine the precise form of flagellar synchronization in unicellular algae.

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