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## **Mechanisms of cell motility in bacteria: The *Myxococcus xanthus* surface motility complex and its evolution from a new class of bacterial cell division motors**

Bacteria move smoothly on surfaces by a mysterious process called « gliding motility » in the absence of extracellular organelles. Over the last 10 years, we have made important progress in elucidating this motility mechanism in the social bacterium, *Myxococcus xanthus*. Using high-resolution single cell approaches, we have identified the motility complex and found that an intracellular motor moves directionally in helical trajectories from the bacterial leading cell pole to the lagging cell pole. When the motor becomes attached to the surface by interaction with OM adhesins, it propels the forward rational movement of the cell. Comparative genomics track the evolutionary origins of this complex back to an ancient process of bacterial cell division.

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