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Direct visualization of a molecular handshake that governs kin recognition and tissue formation in myxobacteria

Pengbo Cao & Daniel Wall *Nature Communications* **10**, Article number: 3073 (2019)**2457** Accesses | **8** Citations | **31** Altmetric | [Metrics](#)

Abstract

Many organisms regulate their social life through kin recognition, but the underlying mechanisms are poorly understood. Here, we use a social bacterium, *Myxococcus xanthus*, to investigate kin recognition at the molecular level. By direct visualization of a cell surface receptor, TraA, we show how these myxobacteria identify kin and transition towards multicellularity. TraA is fluid on the cell surface, and homotypic interactions between TraA from juxtaposed cells trigger the receptors to coalesce, representing a ‘molecular handshake’. Polymorphisms within TraA govern social recognition such that receptors cluster only between individuals bearing compatible alleles. TraA clusters, which resemble eukaryotic gap junctions, direct the robust exchange of cellular goods that allows heterogeneous populations to transition towards homeostasis. This work provides a conceptual framework for how microbes use a fluid outer membrane receptor to recognize and assemble kin cells into a cooperative multicellular community that resembles a tissue.

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Competing interests

The authors declare no competing interests.

Additional information

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