MICROBIOLOGIE, INFECTIOLOGIE ET IMMUNOLOGIE

Université de Montréal

CONFÉRENCE

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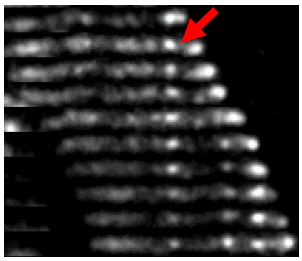

Integrin-like tethering of motility complexes at bacterial focal adhesions

Directed surface motility of cells involves dynamic cell–substratum interactions. In metazoans, as well as protozoan parasites (e.g. *Toxoplasma*, *Plasmodium*), this involves engagement of the eukaryotic extracellular matrix by surface-exposed integrin adhesins, directionally transported by molecular motors via integrin coupling to the internal cytoskeleton. Integrin nucleation leads to the formation of large multi-protein eukaryotic focal adhesions that remain fixed-in-space to the substratum relative to a translocating cell. The Gram-negative social predatory bacterium *Myxococcus xanthus*, long known to "glide" on surfaces in the absence of flagella or type IV pili, was recently shown to use a helically-trafficked bacterial motor assembly at sites of bacterial focal adhesion to power single-cell motility; however, the mechanisms of gliding machinery–substratum coupling and mechanotransmission of force between the motors and the substratum were unknown.

Optical trap-based bead transport and TIRF microscopy analyses identified CglB as the essential substratum-coupling adhesin. 3D modelling combined with evolutionarily-coupled amino acid analysis and site-directed mutagenesis revealed an integrin-like structure for CglB. Protein denaturation and protease surface-accessibility experiments revealed various known-but-uncharacterized outer-membrane components of the gliding motility complex to serve as (i) a disulphide-based folding chaperone for CglB similar to protozoan adhesin chaperones, (ii) a metazoan tenascin-like CglB sequestration factor, and (iii) a TonB-dependent CglB display platform that inhibits protozoan-like premature proteolysis of the adhesin from the cell surface while gliding. Together, these data reveal another exciting parallel between prokaryotic and eukaryotic cell biology and speak to the fundamental question of the development of multicellularity in higher organisms.

Jeudi 18 avril 2019 à 11h30
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