Format: Abstract

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New insights into the formation and the function of lamellipodia and ruffles in mesenchymal cell migration.

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Abstract

Lamellipodia and ruffles are veil-shaped cell protrusions composed by a highly branched actin filament meshwork assembled by the Arp2/3 complex. They not only hallmark the leading edge of cells adopting the adhesion-based mesenchymal mode of migration but are also thought to drive cell movement. Although regarded as textbook knowledge, the mechanism of formation of **lamellipodia** and ruffles has been revisited in the last years leveraging new technologies. Furthermore, recent observations have also challenged our current view of the function of **lamellipodia** and ruffles in mesenchymal cell migration. Here, I review this literature and compare it with older studies to highlight the controversies and the outstanding open issues in the field. Moreover, I outline simple and plausible explanations to reconcile conflicting results and conclusions. Finally, I integrate the mechanisms regulating actin-based protrusion in a unifying model that accounts for random and ballistic mesenchymal cell migration.

KEYWORDS: Arp2/3 complex; actin; cancer; cell migration; formins; **lamellipodia**; ruffles

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