

Team 11

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Enhanced actin polymerization by overexpression of Rac1A

The SCAR/WAVE complex links upstream Rac1 signaling to the activation of the conserved ARP2/3 complex in different organisms including *Dictyostelium* amoebae, and SCAR/WAVE-induced and ARP2/3-complex-mediated actin nucleation beneath the plasma membrane is crucial for the assembly of actin in protruding lamellipodia/pseudopodia to drive cell migration [1]. Consistently, we have previously shown that overexpression of Rac1 isoforms such as Rac1A or Rac1C in vegetative cells boosts random cell migration. Therefore, we reasoned that overexpression of Rac1A in early development should be suitable to promote migration of cells chemotaxing towards cAMP in the maze.

Rac1 belongs to the Ras superfamily of GTP-binding proteins that cycle between an active GTP-bound form and an inactive GDP-bound form. Since we knew from our previous work that Rac1 has to be allowed to cycle between these two states to drive motility, we used the wild-type form of Rac1A. We further used the contact site A (csA) promoter with a similar expression profile as the cAMP receptor cAR1 to ensure most abundant expression of the small GTPase in early development.

References:

1. Dumontier M, Hocht P, Mintert U, Faix J. Rac1 GTPases control filopodia formation, cell motility, endocytosis, cytokinesis and development in *Dictyostelium*. *J Cell Sci.* 2000;113 (Pt 12):2253-65. PubMed PMID: 10825297.