

Active torque generation by the actomyosin cell cortex for chiral symmetry breaking

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Abstract

Many developmental processes break left/right symmetry with a consistent handedness. However, the nature of the underlying chirally asymmetric cellular processes has remained elusive in many cases. Here we report that the actomyosin cell cortex generates active chiral torques to facilitate chiral symmetry breaking of the polarizing *Caenorhabditis elegans* zygote. Active torques drive chiral counter-rotating cortical flow, depend on myosin activity, and can be specifically altered through changes in Rho and Wnt signaling. At a later stage, actomyosin-based active torques participate in the establishment of the *C. elegans* left/right body axis, suggesting that they provide a fundamental mechanism for chiral morphogenesis in development.