Title:	The dynein adaptor Hook2 plays essential roles in mitotic progression and cytokinesis
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Keywords:	Hook proteins Evolutionarily Conserved Dynein adaptors
Issue Date:	2019
Publisher:	Rockefeller University Press
Citation:	Journal of Cell Biology, 218(3),pp.871-894.
Abstract:	Hook proteins are evolutionarily conserved dynein adaptors that promote assembly of highly processive dynein–dynactin motor complexes. Mammals express three Hook paralogs, namely Hook1, Hook2, and Hook3, that have distinct subcellular localizations and expectedly, distinct cellular functions. Here we demonstrate that Hook2 binds to and promotes dynein–dynactin assembly specifically during mitosis. During the late G2 phase, Hook2 mediates dynein–dynactin localization at the nuclear envelope (NE), which is required for centrosome anchoring to the NE. Independent of its binding to dynein, Hook2 regulates microtubule nucleation at the centrosome; accordingly, Hook2-depleted cells have reduced astral microtubules and spindle positioning defects. Besides the centrosome, Hook2 localizes to and recruits dynactin and dynein to the central spindle. Dynactin-dependent targeting of centralspindlin complex to the midzone is abrogated upon Hook2 depletion; accordingly, Hook2 depletion results in cytokinesis failure. We find that the zebrafish Hook2 homologue promotes dynein–dynactin association and was essential for zebrafish early development. Together, these results suggest that Hook2 mediates assembly of the dynein–dynactin complex and regulates mitotic progression and cytokinesis.
Description:	Only IISERM authors are available in the record.
URI:	https://rupress.org/jcb/article/218/3/871/120821/The-dynein-adaptor-Hook2-plays-essential-roles-in (https://rupress.org/jcb/article/218/3/871/120821/The-dynein-adaptor-Hook2-plays-essential-roles-in) http://hdl.handle.net/123456789/2196 (http://hdl.handle.net/123456789/2196)
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