

Mechanisms for nonmitotic activation of Aurora-A at cilia

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Abstract

© 2017 The Author(s). Overexpression of the Aurora kinase A (AURKA) is oncogenic in many tumors. Many studies of AURKA have focused on activities of this kinase in mitosis, and elucidated the mechanisms by which AURKA activity is induced at the G2/M boundary through interactions with proteins such as TPX2 and NEDD9. These studies have informed the development of small molecule inhibitors of AURKA, of which a number are currently under preclinical and clinical assessment. While the first activities defined for AURKA were its control of centrosomal maturation and organization of the mitotic spindle, an increasing number of studies over the past decade have recognized a separate biological function of AURKA, in controlling disassembly of the primary cilium, a small organelle protruding from the cell surface that serves as a signaling platform. Importantly, these activities require activation of AURKA in early G1, and the mechanisms of activation are much less well defined than those in mitosis. A better understanding of the control of AURKA activity and the role of AURKA at cilia are both important in optimizing the efficacy and interpreting potential downstream consequences of AURKA inhibitors in the clinic. We here provide a current overview of proteins and mechanisms that have been defined as activating AURKA in G1, based on the study of ciliary disassembly.

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