Kinetochore capture of astral microtubules

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Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

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Literature references

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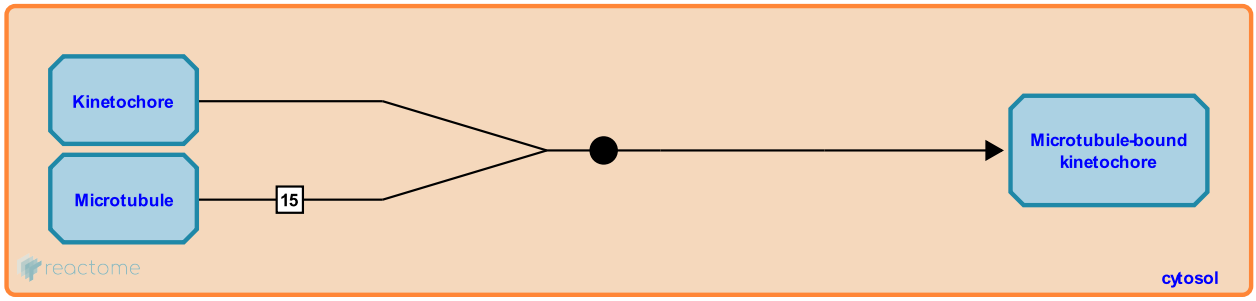
Stable identifier: R-HSA-375302

Type: binding

Compartments: cytosol



The human kinetochore, is a complex proteinaceous structure that assembles on centromeric DNA and mediates the association of mitotic chromosomes with spindle microtubules in prometaphase. The molecular composition of the human kinetochore is reviewed in detail in Cheeseman et al., 2008. This complex structure is composed of numerous protein complexes and networks including: the constitutive centromere-associated network (CCAN) containing several sub-networks such as (CENP-H, I, K), (CENP-50/U, O, P, Q, R), the KMN network (containing KNL1, the Mis12 complex, and the Ndc80 complex), the chromosomal passenger complex, the mitotic checkpoint complex, the nucleoporin 107-160 complex and the RZZ complex.
At prometaphase, following breakdown of the nuclear envelope, the kinetochores of condensed chromosomes begin to interact with spindle microtubules. In humans, 15-20 microtubules are bound to each kinetochore (McEwen et al., 2001), and the attachment of 15 microtubules to the kinetochore is shown in this reaction. Recently, it was found that the core kinetochore-microtubule attachment site is within the KMN network and is likely to be formed by two closely apposed low-affinity microtubule-binding sites, one in the Ndc80 complex and a second in KNL1 (Cheeseman et al., 2006).

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Editions

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