

## **Primary Constriction**

Historically, and from a cytological point of view, the centromere was defined as a primary constriction. There are two components to the definition of the primary constriction: (1) sisters are not resolved at that chromosomal region, i.e. a single chromatin thread is observed; (2) each chromatid (folded chromonema) is thinner at the primary constriction than along the rest of its length. These two components have usually been described as synonymous since the sister centromeres resolve and segregate rapidly at the start of anaphase. Recently, however, several situations have arisen in which sister centromeres can be resolved while segregation of sisters cannot take place. As a consequence, chromatid constriction and sister centromere resolution have been seen to be distinct processes. Chromatid constriction is normally maintained through mitosis, presumably a consequence of the heterochromatic nature of the centromere, whereas centromere resolution takes place at anaphase in control cells. Although sister kinetochores are usually resolved in late prophase, the chromatin fibers at the primary constriction remain closely apposed until anaphase in control cells. In sharp contrast, following Cdc20, Apc2, or Sgo1 RNAi, centromere resolution at the time of anaphase onset is made more apparent by the delayed arm separation caused by absence of these proteins (Giménez-Abián et al. 2005). Similar chromosome morphologies are seen after, Plk1 RNAi, Sgo1 RNAi, Sgo1 RNAi plus Apc2 RNAi, in the presence of nocodazole (Giménez-Abián et al. 2005).

### Reference:

Giménez-Abián, J.F., Díaz-Martínez, L.A., Wirth, K.G., Andrews, C.A., Giménez-Martín, G., and Clarke, D.J. 2005. Regulated Separation of Sister Centromeres depends on the Spindle Assembly Checkpoint but not on the Anaphase Promoting Complex/Cyclosome. *Cell Cycle* 4(11): 1561-1575.