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Elastic tethers extend between the telomeres of separating anaphase chromosomes in a broad range of animal cells.

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“Tethers”, originally described in crane-fly spermatocytes, are elastic components that extend between separating telomeres in anaphase. They exert force on chromosome arms opposite to the direction the anaphase chromosomes move. Our experiments using laser microbeam irradiation of anaphase cells to cut chromosome arms and to cut the tethers themselves show that tethers exist in a broad range of animal cells from Turbellarian flatworms to humans. Thus they are previously unrecognised components of general mitotic mechanisms. They extend between separating telomeres until late anaphase and cause the arms of the chromosomes to be stretched by about 10%, as indicated by shortening of arms when their tethers are cut. Tethers need to be accounted for in general models of mitosis in terms of forces on chromosomes and in terms of what their roles might be.