

## LS19-001 - Elucidating the mechanics of mitotic chromosome assembly by light-, electron-, and atomic force microscopy

### Abstract

Our research investigated how human chromosomes are organized and physically stabilized during cell division, a process essential for accurate distribution of genetic material. By combining advanced imaging technologies such as super-resolution light microscopy and electron tomography, we uncovered how chromosomes acquire specific material properties that prevent them from being penetrated or disrupted by the dynamic fibers (microtubules) that move them. We discovered that chemical changes on histone proteins, specifically the removal of acetyl groups, allow chromosomes to condense into compact, resistant structures. These structural properties act as a protective barrier and ensure faithful segregation of DNA into daughter cells. Beyond deepening our understanding of cell division, these findings may inform strategies to prevent chromosome missegregation, which is a hallmark of cancer and developmental disorders.

Scientific disciplines:

Cell biology (70%) | Biophysics (30%)

Keywords:

Chromosomes, mitosis, cell division, microscopy, biophysics

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Further links to the persons involved and to the project can be found under

<https://www.wwtf.at/jpeto2.brunner.at/funding/programmes/ls/LS19-001/>