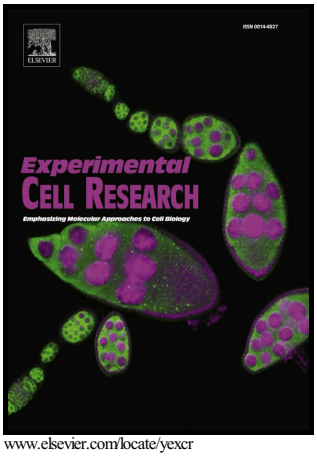

www.elsevier.com/locate/yexcr

Altered nuclear envelope structure and proteasome function of micronuclei

Kendra K. Maass, Fabian Rosing, Paolo Ronchi, Karolin V. Willmund, Frauke Devens, Michaela Hergt, Harald Herrmann, Peter Lichter, Aurélie Ernst

PII: S0014-4827(18)30514-7
DOI: https://doi.org/10.1016/j.yexcr.2018.08.029
Reference: YEXCR11180

To appear in: *Experimental Cell Research*

Received date: 16 July 2018
Revised date: 15 August 2018
Accepted date: 23 August 2018

Cite this article as: Kendra K. Maass, Fabian Rosing, Paolo Ronchi, Karolin V. Willmund, Frauke Devens, Michaela Hergt, Harald Herrmann, Peter Lichter and Aurélie Ernst, Altered nuclear envelope structure and proteasome function of micronuclei, *Experimental Cell Research,* https://doi.org/10.1016/j.yexcr.2018.08.029

Altered nuclear envelope structure and proteasome function of micronuclei

Kendra K. Maass[1,2], Fabian Rosing[1], Paolo Ronchi[3], Karolin V. Willmund[1], Frauke Devens[1], Michaela Hergt[1], Harald Herrmann[1,4], Peter Lichter[1], Aurélie Ernst[1]

[1]Division of Molecular Genetics, German Cancer Consortium (DKTK), German Cancer Research Center (DKFZ), Heidelberg, Germany

[2]Faculty of Biosciences, Heidelberg University

[3]Cell Biology and Biophysics Unit, European Molecular Biology Laboratory (EMBL), Heidelberg, Germany

[4]Institute of Neuropathology, University Hospital Erlangen, Erlangen, Germany

Abstract

Micronuclei are extra-nuclear bodies containing whole chromosomes that were not incorporated into the nucleus after cell division or damaged chromosome fragments. Even though the link between micronuclei and DNA damage is described for a long time, little is known about the functional organization of micronuclei and their contribution to tumorigenesis. We showed fusions between micronuclear membranes and lysosomes by electron microscopy and linked lysosome function to DNA damage levels in micronuclei. In addition, micronuclei drastically differ from primary nuclei in nuclear envelope composition, with a significant increase in the relative amount of nuclear envelope proteins LBR and emerin and a decrease in nuclear pore proteins. Strikingly, micronuclei lack active proteasomes, as the processing subunits and other factors of the ubiquitin proteasome system. Moreover, micronuclear chromatin shows a higher degree of compaction as compared to primary nuclei. The specific aberrations identified in micronuclei and the potential functional consequences of