



Universiteit
Leiden

The Netherlands

SUMO unchained: molecular mechanisms of ubiquitin-like signal transduction in cell cycle progression

Jansen, N.S.

Citation

Jansen, N. S. (2024, June 19). *SUMO unchained: molecular mechanisms of ubiquitin-like signal transduction in cell cycle progression*. Retrieved from <https://hdl.handle.net/1887/3764181>

Version: Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/3764181>

Note: To cite this publication please use the final published version (if applicable).

SUMO Unchained; Molecular Mechanisms of Ubiquitin-
like Signal Transduction in Cell Cycle Progression

Nicolette Sophie Jansen

Colophon

ISBN: 978-94-6506-044-6

Author: Nicolette S. Jansen

Cover design: Nicolette S. Jansen x Dalle2. Chromosome spread of U2OS cells treated with Calyculin A, imaged on the Leica SP8.

Chapter cartoons: Dorith D. A. Graef.

Printing: Ridderprint

Copyright © Nicolette S. Jansen, 2024.

All rights are reserved. No part of this book may be reproduced, stored or transmitted in any form or by any means without prior permission of the author.

SUMO Unchained; Molecular Mechanisms of Ubiquitin-like Signal Transduction in Cell Cycle Progression

Proefschrift

ter verkrijging van

de graad van doctor aan de Universiteit Leiden,

op gezag van rector magnificus prof. dr. ir. H. Bijl,

volgens besluit van het college voor promoties

te verdedigen op woensdag 19 juni 2024

klokke 13:45 uur

door

Nicolette Sophie Jansen

geboren te Oosterhout

in 1992

Promotor: Prof. Dr. A. C. O. Vertegaal

Copromotor: Prof. Dr. P. ten Dijke

Leden promotiecommissie:

Prof. Dr. M. J. T. H. Goumans

Dr. A. G. van der Veen

Prof. Dr. R. A. Wevers

Radboud UMC

Dr. J. A. A. Demmers

Erasmus MC

The research described in this thesis was mostly performed at Leiden University Medical Center (LUMC), department of Cell and Chemical Biology (CCB), Leiden, NL. This research was supported by the Dutch Research Council (NWO; grant 724.016.003).

'A famous explorer once said that the extraordinary is in
what we do, not who we are'

- Lara Croft

Voor mijn moeder

Table of contents

| | | |
|------------------|---|-----|
| Chapter 1 | General introduction | 10 |
| <hr/> | | |
| Chapter 2 | A Chain of Events: Regulating Target Proteins by SUMO Polymers | 20 |
| <hr/> | | |
| Chapter 3 | The Poly-SUMO2/3 Protease SENP6 Enables Assembly of the Constitutive Centromere-associated Network by Group deSUMOylation | 40 |
| <hr/> | | |
| Chapter 4 | Exome Sequencing Links the SUMO Protease SENP7 with Fetal Arthrogryposis Multiplex Congenita, Early Respiratory Failure and Neutropenia | 90 |
| <hr/> | | |
| Chapter 5 | SUMO and Ubiquitin Dynamics During Prometaphase of the Cell Cycle Uncover Condensin Complex I Modification | 120 |
| <hr/> | | |
| Chapter 6 | General Discussion and Prospects | 158 |
| <hr/> | | |
| Appendix | Nederlandse Samenvatting | 170 |
| | List of publications | |
| | Curriculum Vitae | |
| | Acknowledgements | |