



Universiteit  
Leiden  
The Netherlands

## **Selective autophagy in host defense against mycobacterial infection**

Zhang, R.

### **Citation**

Zhang, R. (2018, November 8). *Selective autophagy in host defense against mycobacterial infection*. Retrieved from <https://hdl.handle.net/1887/66789>

Version: Not Applicable (or Unknown)

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

Downloaded from: <https://hdl.handle.net/1887/66789>

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

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/66789> holds various files of this Leiden University dissertation.

**Author:** Zhang, R.

**Title:** Selective autophagy in host defense against mycobacterial infection

**Issue Date:** 2018-11-08

# **Selective autophagy in host defense against mycobacterial infection**

**Rui Zhang**

---

PhD thesis with summary in Dutch

©2018 Rui Zhang. All rights reserved. No part of this thesis may be reproduced or transmitted in any form or by any means without written permission of the author.

**Cover (front):** Confocal micrograph showing co-localization of the GFP-Lc3 autophagy marker (Green) with clusters of *Mycobacterium marinum* bacteria (Red) in infected zebrafish larvae at 3 days post infection (dpi).

**Cover (back):** Principle of CRISPR/Cas9 mutagenesis: The guide RNA forms a complex with Cas9 and directs this enzyme to cut the genomic DNA at the target site complementary to the guide RNA.

Cover design: Rui Zhang

Printed by: IPSKAMP printing, The Netherlands

ISBN:

# **Selective autophagy in host defense against mycobacterial infection**

**Proefschrift**

ter verkrijging van  
de graad van Doctor aan de Universiteit Leiden,  
op gezag van Rector Magnificus prof.mr. C.J.J.M. Stolker,  
volgens besluit van het College voor Promoties  
te verdedigen op donderdag 8 november 2018  
klokke 16.15 uur

door

**Rui Zhang**

geboren te Inner Mongolia, China  
op 7 Juni 1987

Promotor: Prof. dr. Annemarie H. Meijer

Co-promotores: Dr. Michiel van der Vaart and Dr. Monica Varela

Promotiecommissie: Prof. dr. Herman P. Spaink

Prof. dr. B. Ewa Snaar-Jagalska

Prof. dr. Tom H.M. Ottenhoff (Leiden University Medical Center)

Dr. Philip M. Elks (University of Sheffield)

**To my lovely parents, my brother and my wife! For always being there!**

**Despite the 7681 and 8652 km**





# Table of contents

<b>Chapter 1: Introduction and outline of the thesis .....</b>	<b>1</b>
<b>Chapter 2: Dram1 deficiency leads to increased susceptibility of zebrafish to mycobacterial infection due to activation of pyroptotic cell death in infected macrophages.....</b>	<b>39</b>
<b>Chapter 3: Deficiency of the autophagy modulator Dram1 affects the transcriptional regulation of metabolic and immune response pathways during mycobacterial infection .....</b>	<b>83</b>
<b>Chapter 4: The selective autophagy receptors Optineurin and p62 are both required for innate host defense against mycobacterial infection.....</b>	<b>115</b>
<b>Chapter 5: Summary and discussion .....</b>	<b>161</b>
<b>Nederlandse samenvatting .....</b>	<b>175</b>
<b>Curriculum vitae .....</b>	<b>179</b>
<b>List of publications.....</b>	<b>181</b>

