University of Groningen

Regulation of G-proteins during chemotaxis in space and time

Kamp, Marjon

DOI:
[10.33612/diss.102042787](https://doi.org/10.33612/diss.102042787)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2019

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):
Kamp, M. (2019). *Regulation of G-proteins during chemotaxis in space and time*. [Thesis fully internal (DIV), University of Groningen]. Rijksuniversiteit Groningen. <https://doi.org/10.33612/diss.102042787>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Regulation of G-proteins during chemotaxis in space and time

Marjon Kamp

**university of
 groningen**

**faculty of science
 and engineering**

The research described in this thesis was carried out at the Department of Cell Biochemistry of the Groningen Biomolecular Sciences and Biotechnology institute (GBB) of the University of Groningen.

Cover design and lay-out: Marjon Kamp

About the cover: This picture shows the aggregation pattern of the social amoeba *Dictyostelium*, which upon starvation form swirls of migrating cells. For this picture both wildtype and LrrA knock-out cells were mixed in a 80:20 ratio. The knock-out cells contain a red florescent marker in their cytoplasm, while their cytoskeleton (actin) is stained with a green fluoresent marker. The wildtype cells are unstained and not visible in this image. Made with a Zeiss confocal microscope.

Printed by: Proefschriftmaken.nl

Printing of this thesis was financially supported by the University of Groningen.

This thesis has been printed on FSC certified paper.

ISBN (printed): 978-94-034-2152-0

ISBN (digital): 978-94-034-2151-3

© Copyright 2019, Marjon Kamp

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

rijksuniversiteit
 groningen

Regulation of G-proteins during chemotaxis in space and time

Proefschrift

ter verkrijging van de graad van doctor aan de
Rijksuniversiteit Groningen
op gezag van de
rector magnificus prof. dr. C. Wijmenga
en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op

vrijdag 29 november 2019 om 12.45 uur

door

Marjon Elisabeth Kamp

geboren op 1 augustus 1991
te Groenlo

Promotores

Prof. dr. P.J.M. van Haastert

Prof. dr. A. Kortholt

Beoordelingscommissie

Prof. dr. R.A. Firtel

Prof. dr. B.J.L. Eggen

Prof. dr. G. van den Bogaart

Table of contents

Chapter 1	Introduction: Function and regulation of heterotrimeric G-Proteins during chemotaxis	7
Chapter 2	LrrA is a scaffold that connects and coordinates heterotrimeric and monomeric G-protein signaling during <i>Dictyostelium</i> chemotaxis and development	29
Chapter 3	Four RapGEFs for multiple cellular functions during the <i>Dictyostelium</i> life cycle	55
Chapter 4	Filamentous actin regulates Rap1 activity by inhibiting the Rap1 and GbpD positive feedback loop	81
Chapter 5	Summary and discussion	101
Chapter 6	Chapter 6	113
	English summary	114
	Nederlandse samenvatting	117
	Acknowledgements / Dankwoord	120
	Curriculum vitae	123