

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/19776> holds various files of this Leiden University dissertation.

Author: Runtuwene, Vincent Jimmy

Title: Functional characterization of protein-tyrosine phosphatases in zebrafish development using image analysis

Date: 2012-09-12

Functional Characterization of Protein-Tyrosine Phosphatases in Zebrafish Development using Image Analysis

Vincent Jimmy Runtuwene

ISBN: 978-94-6190-134-7

Cover: Vincent Runtuwene, 'Infinite stitched repeat of confocal image of zebrafish pre-somitic mesoderm tagged with mCherry-H2B and YFP-CAAX'

Printing: AB Copie, Sint-Genesius-Rode

Copyright © 2012 by Vincent Runtuwene. All rights reserved. No part of this book may be reproduced, stored in a retrieval system or transmitted in any form or by any means, without prior permission of the author.

To Elise Johanna, Ade and my parents

Functional Characterization of Protein-Tyrosine Phosphatases in Zebrafish Development using Image Analysis

Functionele Karakterisering van Proteïne-Tyrosine Fosfatasen in Zebrafish Ontwikkeling gebruik makend van Beeldanalyse
(met samenvatting in het Nederlands)

PROEFSCHRIFT
ter verkrijging van
de graad van Doctor aan de Universiteit Leiden,
op gezag van Rector Magnificus Prof. mr. dr. Paul F. van der Heijden
volgens besluit van het College voor Promoties
te verdedigen op woensdag 12 september 2012
klokke 16u15

door
Vincent Jimmy Runtuwene
Geboren te Leuven (België)
in 1982

Promotiecommissie

Promotor:

Prof. Dr. Jeroen den Hertog

Overige leden:

Prof. Dr. Herman P. Spaink (lid manuscriptcommissie, secretaris) verbonden aan FWN, Leiden

Prof. Dr. Michael K. Richardson (lid manuscriptcommissie) verbonden aan FWN, Leiden

Prof. Dr. Johan Memelink (lid manuscriptcommissie) verbonden aan FWN, Leiden

Dr. Wiljan Hendriks (lid manuscriptcommissie) verbonden aan Radboud Universiteit, Nijmegen

Dr. Ewa Snaar-Jagalska verbonden aan FWN, Leiden

Dr. Erik Danen verbonden aan FWN, Leiden

The research described in this thesis was performed at the Hubrecht Institute for developmental biology and Stem Cell Research, part of the Royal Dutch Academy of the Arts and Sciences (KNAW), within the framework of the Graduate School of Cancer, Genomics and Developmental Biology (CGDB) in Utrecht, the Netherlands and Leiden University Graduate School of Science in Leiden, the Netherlands. This work was in part supported by a Marie Curie Research Training Network Grant (PTPNET/MRTN-CT-2006-035830).

Table of contents

CHAPTER 1	Introduction	9
CHAPTER 2	RPTP α and PTP ϵ Signaling via Fyn/Yes and RhoA is essential for Zebrafish Convergence and Extension Cell Movements during Gastrulation	31
CHAPTER 3	Pair-Wise Regulation of Convergence and Extension Cell Movements by Four Phosphatases via RhoA	65
CHAPTER 4	Noonan Syndrome Gain-of-Function Mutations in NRAS cause Zebrafish Gastrulation Defects	99
CHAPTER 5	Cell Outliner and Cell Roses: New tools for Automated Cell Membrane Detection and Determination of Cell Polarity	119
CHAPTER 6	The Protein-Tyrosine Phosphatase Family in Gastrulation Cell Movements in Zebrafish	139
CHAPTER 7	Summarizing Discussion	161
Addendum	Samenvatting in het Nederlands	171
	Summary	173
	List of Publications	175
	Curriculum vitae	176

