University of Groningen

More than meets the eye: exploring Sonic Hedgehog medulloblastoma from a neurodevelopmental perspective

Armandari, Inna

DOI:

[10.33612/diss.181266262](https://doi.org/10.33612/diss.181266262)

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:

2021

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

Citation for published version (APA):

Armandari, I. (2021). *More than meets the eye: exploring Sonic Hedgehog medulloblastoma from a neurodevelopmental perspective*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen. <https://doi.org/10.33612/diss.181266262>

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.

More Than Meets the Eye:

Exploring Sonic Hedgehog Medulloblastoma
From a Neurodevelopmental Perspective

Inna Armandari

The research presented in this thesis was performed at Department of Pediatric Oncology and Hematology/Pediatrics and the European Research Institute for the Biology of Ageing (ERIBA), University Medical Centre Groningen, University of Groningen, the Netherlands.

Cover & Layout Design by Thya Basmar (thyambasmar@gmail.com)

Printing by ProefschriftMaken

This PhD project was funded by the Indonesia Endowment Fund for Education (LPDP), Ministry of Finance, Republic of Indonesia. Financial support for printing of this thesis was kindly provided by Graduate School of Medical Science and University of Groningen.

© 2021 Inna Armandari

For articles published or accepted for publication, the copyright has been transferred to the respective publisher. No part of this thesis may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the permission of the author, or when appropriate, the publisher of the manuscript.

university of
 groningen

More than meets the eye: exploring Sonic Hedgehog medulloblastoma from a neurodevelopmental perspective

PhD thesis

to obtain the degree of PhD at the
University of Groningen
on the authority of the
Rector Magnificus Prof. C. Wijmenga
and in accordance with
the decision by the College of Deans.

This thesis will be defended in public on

Tuesday 12 October 2021 at 11.00 hours

by

Inna Armandari

born on 27 January 1988
in Magelang, Indonesia

Supervisor

Prof. E.S.J.M. de Bont

Co-supervisor

Dr. S.W.M. Bruggeman

Assessment Committee

Prof. F.A.E. Kruyt

Prof. D.S. Verbeek

Prof. S. Mubarika Haryana

فَبِأَيِّ آلَاءِ رَبِّكُمَا تُكَذِّبَانِ

So which of the favors of your Lord would you deny?

(The Qur'an 55:13)

Table of Content

Chapter 1

General Introduction	1
Growth Dysregulation: Bridging Cerebellar Development and Pediatric Medulloblastoma	

Chapter 2

The Developmental Stage of the Medulloblastoma	29
Cell-of-Origin Restricts Hedgehog Pathway Usage and Drug Sensitivity <i>Manuscript submitted at Journal of Cell Science</i>	

Chapter 3

CREB Signaling Activity Correlates with Differentiation and Survival in Medulloblastoma <i>Scientific Reports, August 2021</i>	61
--	----

Chapter 4

The Role of Histone Modifier KMT2D in Medulloblastoma <i>Unpublished chapter</i>	89
---	----

Chapter 5

Establishing Primary Pediatric Brain Tumor Cell Cultures <i>Unpublished chapter</i>	109
--	-----

Chapter 6

General Discussion	131
--------------------	-----

Appendices

Summary	144
Nederlandse Samenvatting	147
List of Publications	150
Acknowledgement	151
About the Author	156