University of Groningen

The interplay between CD4 T cells and tumor cells in Hodgkin lymphoma

Veldman, Johanna

DOI:
[10.33612/diss.191061669](https://doi.org/10.33612/diss.191061669)

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):

Veldman, J. (2021). *The interplay between CD4 T cells and tumor cells in Hodgkin lymphoma: interactions and immune checkpoint blockade*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen. <https://doi.org/10.33612/diss.191061669>

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.

The interplay between CD4 T cells and tumor cells in Hodgkin lymphoma

Interactions and immune checkpoint blockade

Johanna Veldman

Printing of this thesis was financially supported by the University of Groningen and the Graduate School of Medical Sciences, University of Groningen.

This PhD project was financially supported by the Graduate School of Medical Sciences, University of Groningen and the Jan Kornelis de Cock Foundation.

Cover: Nynke Veldman and Johanna Veldman
Lay-out: Johanna Veldman
Printed by: Gildeprint – www.gildeprint.nl

© **Johanna Veldman, 2021**

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

**rijksuniversiteit
 groningen**

The interplay between CD4 T cells and tumor cells in Hodgkin lymphoma

Interactions and immune checkpoint blockade

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

woensdag 8 december 2021 om 11.00 uur

door

Johanna Veldman

geboren op 14 juni 1994
te Leeuwarden

Promotores

Dr. A. Diepstra

Prof. dr. J.H.M. van den Berg

Copromotor

Dr. A. Visser

Beoordelingscommissie

Prof. dr. W. Klapper

Prof. dr. C.A.H.H. Daemen

Prof. dr. P. Heeringa

Paranimfen

Nynke Veldman

Lotteke Ziel-Swier

Contents

Chapter 1	Introduction and Scope of the thesis	9
Chapter 2	Rosetting T cells in Hodgkin lymphoma are activated by immunological synapse components HLA class II and CD58 <i>Blood, November 2020</i>	39
Chapter 3	CD4+ T cells in classical Hodgkin lymphoma express exhaustion associated transcription factors TOX and TOX2 <i>Submitted</i>	65
Chapter 4	Primary and acquired resistance mechanisms to immune checkpoint inhibition in Hodgkin lymphoma <i>Cancer Treatment Reviews, January 2020</i>	97
Chapter 5	Soluble PD-L1 is a promising disease biomarker but does not reflect tissue expression in classical Hodgkin lymphoma <i>British Journal of Haematology, May 2021</i>	119
Chapter 6	A long-term <i>in vitro</i> model to study the effect of immune checkpoint blockade in Hodgkin lymphoma <i>In Progress</i>	139
Chapter 7	Summary, discussion and future perspectives	165
Appendices		
	Author affiliations	187
	Dutch summary	188
	Acknowledgements	193
	About the author	197
	List of publications	199