

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/37233> holds various files of this Leiden University dissertation

**Author:** Tummers, Bart

**Title:** Human papillomavirus targets crossroads in immune signaling

**Issue Date:** 2016-01-21

# ADDENDUM

*Frequently used abbreviations*

*Curriculum Vitae*

*List of Publications*

*Acknowledgements*



## FREQUENTLY USED ABBREVIATIONS

<b>CCL2</b>	Chemokine (c-c motif) ligand 2
<b>CD40</b>	Cluster of differentiation 40
<b>CXCL9</b>	Chemokine (c-x-c motif) ligand 9
<b>E protein</b>	Early protein
<b>EC</b>	Epithelial cell
<b>EGFR</b>	Epidermal growth factor receptor
<b>hrHPV</b>	High-risk Human papillomavirus
<b>IFITM1</b>	Interferon-induced transmembrane protein 1
<b>IFN</b>	Interferon
<b>IFNAR</b>	Interferon- $\alpha/\beta$ receptor
<b>IFN<math>\gamma</math>R</b>	Interferon- $\gamma$ receptor
<b>IFRD1</b>	Interferon-related developmental regulator 1
<b>IKK</b>	Inhibitor of nuclear factor kappa-B kinase
<b>IL8</b>	Interleukin 8
<b>IRF</b>	Interferon regulatory factor
<b>ISG</b>	Interferon-stimulated gene
<b>KC</b>	Keratinocyte
<b>MIP3<math>\alpha</math></b>	Macrophage inflammatory protein 3 $\alpha$
<b>NEMO</b>	NF-kappa-B essential modulator
<b>MHC</b>	Major histocompatibility complex
<b>NF<math>\kappa</math>B</b>	Nuclear factor of kappa-light-chain-enhancer of activated B cells
<b>PRR</b>	Pattern-recognition receptor
<b>RANTES</b>	Regulated on activation, normal T cell expressed and secreted
<b>TLR</b>	Toll-like receptor
<b>TNF<math>\alpha</math></b>	Tumor necrosis factor $\alpha$
<b>TNFR</b>	Tumor necrosis factor receptor
<b>TRAF</b>	TNF receptor associated factor
<b>UCHL1</b>	Ubiquitin carboxy-terminal hydrolase L1



## CURRICULUM VITAE

Bart Tummers was born on February 23rd 1984 in IJsselstein, The Netherlands. In 2002, he graduated at the Anna van Rijn College, Nieuwegein, The Netherlands, after which he studied Biomedical Sciences at Utrecht University, Utrecht, The Netherlands, between 2002 and 2008. As part of the master program 'Immunity and Infection', he studied the pre-fusogenic form of the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) spike glycoprotein ectodomain (SED) under the supervision of Dr. Ir. B.J. Bosch in the lab of Prof. Dr. P. Rottier at Utrecht University, Faculty of Veterinary Medicine, Department of Infectious diseases and Immunity, Virology Division. He then worked in the lab of Prof Dr. Müller at the Laboratoire National de Santé - Institute d'Immunologie, Luxembourg, Luxembourg on the expression of modified Infectious Bronchitis Virus (IBV) Spike Glycoprotein domain 1 (S1) and Avian Influenza Virus (AIV) Hemagglutinin 5 Glycoprotein (H5) for anti-S1 and anti-H5 monoclonal antibody production, under the supervision of Dr. M.F. Ducatez and Dr. F.B. Bouche. At the University of Erasmus MC, Rotterdam, The Netherlands, Department of Virology he worked under the supervision of Dr. B.L. Haagmans and Dr. S.L. Smits in the lab of Prof. Dr. A.D.M.E. Osterhaus to set up an *in vitro* and *in vivo* model system for Hepatitis C virus research. For his master thesis he studied the life cycle of the spirochete *Borrelia burgdorferi*, supervised by Prof. Dr. J. van Strijp at Utrecht University, Faculty of Veterinary Medicine, Department of Infectious diseases and Immunology. In 2009 he started to work in the lab of Prof. Dr. S.H. van der Burg at the Leiden University Medical Center (LUMC), department of Clinical Oncology, Leiden, The Netherlands, where he developed a method to isolate, transduce, store and analyze CD8+ T cells for the generation of standard samples that were later distributed within a large network of laboratories involved in studying the immune response in patients with cancer. In 2010 he started his PhD thesis in the same lab, studying the immune evasion strategies of high-risk human papillomaviruses (hrHPV), which has led to this thesis. In June 2015 he started as a post-doc in the lab of Prof. Dr. D.R. Green at the St. Jude Children's Research Hospital, department of Immunology in Memphis, Tennessee, USA on the molecular mechanisms of apoptosis and necroptosis.



## LIST OF PUBLICATIONS

### **Human papillomavirus targets crossroads in immune signaling**

Tummers B, van der Burg SH.

Viruses. 2015 May 21;7(5):2485-506.

### **The interferon-related developmental regulator (IFRD1) is used by Human papillomavirus (HPV) to suppress NF-kappaB activation**

Tummers B, Goedemans R, Pelascini LPL, Jordanova ES, van Esch EMG, Meyers C, Melief CJM, Boer JM, van der Burg SH.

Nat Commun. 2015 Mar 13;6:6537.

### **CD40-mediated amplification of local immunity by epithelial cells is impaired by HPV.**

Tummers B, Goedemans R, Jha V, Meyers C, Melief CJM, van der Burg SH, Boer JM.

J Invest Dermatol. 2014 Dec;134(12):2918-27.

### **Alterations in classical and nonclassical HLA expression in recurrent and progressive HPV-induced usual vulvar intraepithelial neoplasia and implications for immunotherapy.**

van Esch EM, Tummers B, Baartmans V, Osse EM, Ter Haar N, Trietsch MD, Hellebrekers BW, Holleboom CA, Nagel HT, Tan LT, Fleuren GJ, van Poelgeest MI, van der Burg SH, Jordanova ES.

Int J Cancer. 2014 Aug 15;135(4):830-42.

### **Human papillomavirus (HPV) upregulates the cellular deubiquitinase UCHL1 to suppress the keratinocyte's innate immune response.**

Tummers B, Karim R, Meyers C, Biryukov JL, Alam S, Backendorf C, Jha V, Offringa R, van Ommen GJ, Melief CJ, Guardavaccaro D, Boer JM, van der Burg SH.

PLoS Pathog. 2013;9(5):e1003384.



**Chemotherapy alters monocyte differentiation to favor generation of cancer-supporting M2 macrophages in the tumor microenvironment.**

Dijkgraaf EM, Heusinkveld M, Tummers B, Vogelpoel LT, Goedemans R, Jha V, Nortier JW, Welters MJ, Kroep JR, van der Burg SH.  
Cancer Res. 2013 Apr 15;73(8):2480-92.

**The development of standard samples with a defined number of antigen-specific T cells to harmonize T cell assays: a proof-of-principle study.**

Singh SK, Tummers B, Schumacher TN, Gomez R, Franken KL, Verdegaal EM, Laske K, Gouttefangeas C, Ottensmeier C, Welters MJ, Britten CM, van der Burg SH.  
Cancer Immunol Immunother. 2013 Mar;62(3):489-501.





## ACKNOWLEDGEMENTS

This thesis could not have been realized without the help of many. I am grateful to anyone who, directly or indirectly, helped me with this thesis.

Sjoerd, heel erg bedankt voor je mentorschap. Je hebt me enorm veel geleerd en daar ben ik je heel dankbaar voor. We hebben een aantal mooie papers gemaakt en daarmee de immuun evasie mechanismen van HPV goed op de kaart gezet. Bedankt voor de congressen in Berlijn, Whistler en Seattle.

Judith, ik heb heel veel van je geleerd. Heel erg bedankt, vooral voor je motivatie en geduld. Het was heel fijn om met je samen te werken.

Kees, bedankt voor de waardevolle discussies elke maandagmorgen, de papers zijn er een stuk beter van geworden.

Lien, zonder jou geen lab Klinische Oncologie. Gelukkig is onze reflectie tijdens mijn solliciteren nooit uitgekomen. Dank je voor alles, in alle talen van de wereld.

Renske and Veena, thank you so much for the countless hours you helped me with the projects. Veena, without you I would still be pipetting all the samples for the microarray and PCRs. You are great, thank you so much. Renske, you just are the best. Zonder jou geen boekje. Heel erg bedankt voor alles wat je gedaan hebt.

Roser and Sofia, thanks for all the great work you have done. The whole of chapter 5 would not exist without you ladies. Roser, muchos gracias! Sofia, grazie mille!

Special thanks to the Clinical Oncology lab; Lien, Sjoerd, Marij, Els, Thorbald, Satwinder, Valeria, Saskia, Sara, Sytse, Elien, Koen, Moniek, Eleni, Wenbo, Edith, Evelyne, Peggy, Rezaul, Margit, Ursula, Claudia, Renske, Zohara, Marjolein, Marten, Bianca, Vanessa, Nikki and Linda. Many thanks for all your help in the lab and 'gezelligheid' at the B@Fjes and lab days out.

Thanks to everyone of the Tumor Immunology lab for their collaboration.

Thanks to all the collaborators for their contributions to this work. Claude

Backendorf, Michelle Osse, Katja Jordanova, thanks for all your help. Laetitia Pelascini, thanks for your big influence, input and collaboration to this thesis. Edith en Evelyne, dank voor onze goede samenwerking, we hebben mooie papers gemaakt.

Dr. Craig Meyers, thank you for your collaboration and kind welcome to your lab. Jen, Eric, Rachel, Janice and Samina, you guys are great, thank you so much for your warm welcome during my stay and all the help with the experiments.

Wilco en Renske, ik kan me geen betere paranimfen wensen. Jullie zijn geweldig.

Lieve vriend(innet)jes van Dury Lane, de allerbeste vriendengroep die ik me kan wensen. Dank voor de afgelopen 13 jaar, we weten allemaal dat er nog heel veel jaren gaan volgen.

Mijn proefschrift is beïnvloed door heel veel mensen. Mijn lieve zus Marjolein, Kevin en Max, Hessel, Kirsten, Hessel en Jorick, Marvin, Natasa, Han, Ria, André, Roy, Riet, en op de ereplaats, natuurlijk, Pierre.

To all of you: Heel erg bedankt, Thanks, Gracias, Obrigado, Danke, Grazie, Merci, مرسى, आभारीहूँ, ευχαριστώ.

Pap en mam, dit proefschrift is voor jullie. Dankzij jullie weet ik dat stelling 12 alles zegt.

