Modelling the role of cytotoxic T lymphocytes in tumour regression

Beck, R.J.

Curriculum Vitae

Richard Beck was born in Whitehaven, England on February 2nd 1993. In 2011, he began his studies in Engineering Science at the University of Oxford. At Oxford, Richard specialised in biomedical engineering and during his Masters he developed mathematical models of the acid-sensing ion channel. He graduated with the degree Master of Engineering in 2015, whereupon he immediately began his PhD at the Leiden Academic Centre for Drug Reseach, on the project: “Modelling the role of cytotoxic T lymphocytes in tumour regression”. The research was conducted under the supervision of Prof. Bob van de Water and Dr. Joost B.Beltman. From August 2021 Richard will begin a postdoctoral position at the department of integrated mathematical oncology at the Moffit cancer center in Florida.

List of publications

Beck, Richard J., Maarten Slagter, and Joost B. Beltman. "Contact-dependent killing by cytotoxic T lymphocytes is insufficient for EL4 tumor regression in vivo." *Cancer research* 79, no. 13 (2019): 3406-3416.

Cazaux, Marine, Capucine L. Grandjean, Fabrice Lemaître, Zacarias Garcia, **Richard J. Beck**, Idan Milo, Jérémy Postat, Joost B. Beltman, Eleanor J. Cheadle, and Philippe Bousso. "Single-cell imaging of CAR T cell activity in vivo reveals extensive functional and anatomical heterogeneity." *Journal of Experimental Medicine* 216, no. 5 (2019): 1038-1049.

Beck, Richard J., Dario I. Bijker, and Joost B. Beltman. "Heterogeneous, delayed-onset killing by multiple-hitting T cells: Stochastic simulations to assess methods for analysis of imaging data." *PLoS computational biology* 16, no. 7 (2020): e1007972.

Beck, Richard J., Bettina Weigelin, and Joost B. Beltman. "Mathematical modelling based on in vivo imaging suggests CD137-stimulated cytotoxic T lymphocytes exert superior tumour control due to an enhanced antimitotic effect" Cancers, in press.

Acknowledgements

I am most grateful for the help and support of numerous others, without whom this thesis would not have been possible.

First and foremost Joost, my supervisor and co-promotor. Your patience, support, and wisdom have been invaluable over these past five years. I have learned so much from you about how to approach research in a critical and methodical manner. You were always available to help me when I needed it. I could not have asked for a better supervisor.

To Bob, my promotor. I am grateful to have had the opportunity to work in your department. Your relentless drive and hunger for science is awesome. Thank you for inspiring me and for keeping me on my toes.

To Bettina W., Loic D., Kazu K., and Philippe B.. Thank you for sharing the experimental data which made this research possible. I am most grateful for all the emails and skype discussions where you answered my questions and helped me understand your data.

To my computational colleagues Margriet, Gerhard, Isoude, Huan, and Muriel. Thank you for all the feedback and the different perspectives you gave on my research these past few years. Margriet and Gerhard, you were always happy to help answer my questions about computers and coding. I'm grateful that you were both so generous with your time, I would never have made it through without you!

To all my colleagues in DDS2, thank you for the support, the fun times, and for making me feel welcome in the department. To Esmee, Bas, Britt, Luc, Linda, Matthijs, Johannes, Nanette & Muriel - it was great to participate in all the different sporty activities with you, whether it was swimming, cycling, football or skiing! Steven W. - our triathlon battles were truly epic. You were the ultimate competitor and you really showed me how to push past my limits.

To my family, thank you for the unwavering support and encouragement you have given me all these years. Mam, dad, and nana - your pride and interest in my work has been amazing. Mam and dad - you are both fantastic role models and I would be nowhere without you.