

Publication

Saturation effects on T-cell activation in a model of a multi-stage pathogen

Book Item (Buchkapitel, Lexikonartikel, jur. Kommentierung, Beiträge in Sammelbänden)**ID** 4479189**Author(s)** Shapiro, Michael; Delgado-Eckert, Edgar**Author(s) at UniBasel** [Delgado-Eckert, Edgar](#) ;**Year** 2013**Title** Saturation effects on T-cell activation in a model of a multi-stage pathogen**Editor(s)** Mondaini, Rubem P.**Book title** BIOMAT 2012**Publisher** WORLD SCIENTIFIC**Place of publication** Singapore**Pages** 148-164**ISSN/ISBN** 978-981-4520-81-2**Series title** International Symposium on Mathematical and Computational Biology

In Delgado-Eckert, E. & Shapiro, M. J. Math. Biol. (2011) 63: 201. <https://doi.org/10.1007/s00285-010-0365-5>, we studied host response to a pathogen which uses a cycle of immunologically distinct stages to establish and maintain infection. We showed that for generic parameter values, the system has a unique biologically meaningful stable fixed point. That paper used a simplified model of T-cell activation, making proliferation depend linearly on antigen-T-cell encounters. Here we generalize the way in which T-cell proliferation depends on the sizes of the antigenic populations. In particular, we allow this response to become saturated at high levels of antigen. We show that this family of generalized models shares the same steady-state behavior properties with the simpler model contemplated in Delgado-Eckert, E. & Shapiro, M. J. Math. Biol. (2011) 63: 201. <https://doi.org/10.1007/s00285-010-0365-5>, while offering a new mathematical explanation of post-transplant lympho-proliferative disorder.

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