"The role of regulatory T cells in producing a robust immune response and maintaining immunodominance"

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James A. Haslam II Bus. Building (HBB) 102

Several theories exist concerning primary T cell responses, the most prevalent being that T cells follow developmental programs. We propose the alternative hypothesis that the response is governed by a feedback loop between conventional and adaptive regulatory T cells (iTregs). By developing a mathematical model, we show that the regulated response is robust to a variety of parameters and propose that T cell responses may be governed by emergent group dynamics rather than by autonomous programs. We extend this model to show how T cell regulation may apply to immunodominance, which refers to the phenomenon in which simultaneous T cell responses organize themselves into clear hierarchies. We extend our model of T cell regulation to consider multiple, concurrent T cell responses. Using our model, we show that iTreg-mediated regulation leads to a hierarchical expansion of T cell responses as observed in the phenomenon of immunodominance.

Dr. Kim is a Candidate for the NIMBioS Faculty Position in Mathematics for Biology at Below-organism Level