

Abstract Submitted
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Organization of an optimal adaptive immune system. ALEKSANDRA WALCZAK, CNRS and ENS, ANDREAS MAYER, ENS, VIJAY BALASUBRAMANIAN, University of Pennsylvania, THIERRY MORA, CNRS and ENS — The repertoire of lymphocyte receptors in the adaptive immune system protects organisms from a diverse set of pathogens. A well-adapted repertoire should be tuned to the pathogenic environment to reduce the cost of infections. I will discuss a general framework for predicting the optimal repertoire that minimizes the cost of infections contracted from a given distribution of pathogens. The theory predicts that the immune system will have more receptors for rare antigens than expected from the frequency of encounters and individuals exposed to the same infections will have sparse repertoires that are largely different, but nevertheless exploit cross-reactivity to provide the same coverage of antigens. I will show that the optimal repertoires can be reached by dynamics that describes the competitive binding of antigens by receptors, and selective amplification of stimulated receptors.

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