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The adaptation model of immunity and outcomes of immune responses

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The Self Non-Self (SNS) model of immunity suggests that foreign antigens induce alloreactive immune responses, resulting in graft rejection whereas tolerance towards self-antigens expressed by malignant cells facilitates cancer development. Also, breakage of immunological tolerance towards self-antigens results in autoimmune diseases. Accordingly, immune suppression is recommended for the management of autoimmune diseases, allergy and organ transplantation while immune inducers are used for the treatment of cancers. Nevertheless, a cure for immune-related diseases remains elusive. This is in large part due to applying the SNS model in the areas that are beyond its realm. Here, I discuss the adaptation model of immunity to explain the decision-making process by activated T cells. According to this model, all somatic cells express Adaptation Receptors (AdRs) to tolerate ongoing immune responses by engaging with their nominal Adaptation Ligands (AdLs) expressed on activated T cells. The AdR/AdL axis establishes signal IV for orchestrating the primary function of the immune response, which is to support cellular integrity and homeostasis. Any loss or alterations in the expression of tissue-specific AdRs result in immune intolerance or autoimmune diseases as well as graft rejection. Up-regulation or down-regulation of the AdRs by tumor cells could also dictate the outcomes of tumor-reactive immune responses. Therefore, novel therapeutics should focus on the discovery and targeting of the AdRs for the treatment of immune-related diseases and cancer.