

Preface

Regulatory Signal Networks of the B Cell Antigen Receptor

B lymphocytes recognize pathogens by virtue of their cognate B cell antigen receptor (BCR) on the cell surface. BCR ligation is a critical step for antibody-mediated immune responses as it triggers a series of converging processes, resulting in the generation of memory B cells or antibody-forming plasma cells. The existence of the BCR was first postulated by Paul Ehrlich in his famous ‘Side Chain Theory’ of antibody formation more than 125 years ago. The idea was developed further by Burnet and Talmage in their clonal selection hypothesis which predicted that the diversity of the immune response is due to selection and expansion of B lymphocytes. Although originally invoked to account for the proposed antigen-specific activation of B cell clones, it is clear that the BCR plays a central role in determining the fate of B cells even before it encounters antigen. For instance, progression through the pre-B cell stage of differentiation depends on the presence of the pre-BCR, which is composed of functional heavy chains and surrogate light chains with their signaling subunits, Ig α and Ig β .

The outcomes of these developmental responses as well as antigen-specific responses are mediated by signal transduction through the BCR. Transmembrane signaling is further regulated or fine-tuned by an array of cytoplasmic signal transduction mechanisms. This volume of *Current Topics in Microbiology and Immunology* is aimed at reviewing the recent progress regarding how the BCR undergoes activation and endocytosis, and how such stimulation evokes cytoplasmic and subsequent nuclear signaling events. Leading Experts in these various aspects including Hassan Jumaa, Michael Reth, Pavel Tolar, and colleagues have contributed chapters on specific aspects of initiation of pre-BCR and BCR, while Rudi Hendricks, Jürgen Wienands, Klaus Okkenhaug, Yoshihiro Baba, and

colleagues describe the cytoplasmic signaling networks. Lastly, Yoshiteru Sasaki, Tomoharu Yasuda, and colleagues discuss intermediate events between cytoplasmic and nuclear signaling.

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B Cell Receptor Signaling

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