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WASp and WAVE proteins: From structure, through function, to clinical aspects

Mira Barda-Saad, Barak Reicher, Orly Perl and Omri Matalon
The Mina and Everard Goodman Faculty of Life Sciences, Bar-Ilan University, Israel

T cells play a pivotal role in adoptive immunity, both in cell mediated cytotoxicity and in the activation of the humeral immune response. In order to perform their effector function, T cells undergo dramatic morphological changes upon activation. These changes enable their binding to and extravasation through the vascular endothelium into the neighboring tissue, the formation of an immunological synapse (IS) with an antigen-presenting cell (APC), and subsequently, the polarized secretion of cytokines and/or cytolytic granules, leading to the execution of effector functions.

The actin cytoskeleton is directly involved in all these processes. Thus, it is crucial for T cell mediated immune responses, providing a dynamic and flexible platform for signal transduction, cellular and subcellular remodeling, and for driving effector functions. The actin-regulatory proteins, Wiskott-Aldrich syndrome protein (WASp) and WASp family Verprolin-homologous protein (WAVE) play key roles in T cell biology. In this review, we will focus on these two proteins, describing their structure, recruitment, activation and function. Finally, we will address pathological aspects related to defects in these actin regulators.

Mira.Barda-Saad@biu.ac.il