Glue inside the cell

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The acquired immune response is triggered after specific engagement of foreign peptides (antigens) by receptor molecules on white blood cell (lymphocytes). Cellular signaling pathways are responsible for the activation of lymphocytes. Krappmann and co-workers present evidence, that in T cells, which constitute a subgroup of lymphocytes, ubiquitin is attached to the Malt1 protein in response to antigen stimulation.

Malt1 is part of the CBM (Carma1-Bcl10-Malt1) complex that constitutes a crucial switch for the activation of the immune defense. Using biochemical, molecular and genetic techniques the scientists could prove that this novel Malt1 ubiquitination is an essential step in the regulation of T cell activation.

'Mechanistically, ubiquitin is virtually acting as all-purpose glue that links different protein components inside the cell', Krappmann explains. 'However, ubiquitination provides an important advantage compared to conventional adhesives: It is reversible, meaning that the associations can be resolved'.

This process of de-ubiquitination is constantly happening in cells and it could contribute to prevent an over-shooting activation of T cells. Unopposed lymphocyte activity is responsible for many chronic diseases, autoimmunity or even lymphoma development. Future work must address the status of Malt1 ubiquitination under pathological conditions, for instance in Malt1 dependent lymphomas. By this the scientists hope to demonstrate the potential of targeting the ubiquitin system for the development of novel therapeutic approaches.

Source: GSF - National Research Center for Environment and Health