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Identified: Switch that turns on allergic disease in people

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A new study in human cells has singled out a molecule that specifically directs immune cells to develop the capability to produce an allergic response. The signaling molecule, called thymic stromal lymphopoietin (TSLP), is key to the development of allergic diseases such as asthma, atopic dermatitis (eczema) and food allergy.

The study team, led by Yong-Jun Liu, M.D., Ph.D., at the University of Texas M.D. Anderson Cancer Center, Houston, focused on dendritic cells, immune cells that initiate the primary immune response. Dendritic cells come into contact with other immune cells known as T cells, causing them to develop into different subsets of T cells, including helper 1 (Th1) and helper 2 (Th2) cells. These T-cell subsets are involved in protective immune responses, but the Th2 cells can also drive an allergic response. Until now, it was not known how dendritic cells induced T cells to become Th2 cells.

The investigators used dendritic cells isolated from the blood of healthy donors and found that the binding of TSLP to these cells activates a distinct set of signaling pathways within the cells. As a result, the dendritic cells produce messenger molecules that act on the T cells, causing them to develop into Th2 cells.

The study identifies TSLP as a switch that causes the development of the allergic response in people and suggests that this molecule may be a potential therapeutic target to treat and prevent allergic diseases.

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More information: K Arima et al. Distinct signal codes generate dendritic cell functional plasticity. Science Signaling. DOI:10.1126/scisignal.2000567