Synopsis of Original Research Paper

Identification of innate immune receptors that sense allergic compounds for the development of novel assay systems to evaluate allergenicity

Hiromitsu Hara

Kagoshima University Graduate School of Medical and Dental Sciences

A variety of small reactive organic compounds, called haptens, induce allergic contact dermatitis (ACD), which is caused by T cells reactive to haptens. In the previous study, we identified that IL-1 secretion through immunoreceptor tyrosine-based activation motif (ITAM)-Syk-CARD9 signal activation is essential for dendritic cells to prime hapten-reactive T cells during the sensitization of contact hypersensitivity (CHS), an experimental model of ACD in mice. This finding implicates the presence of ITAM-coupled innate immune receptors that sense haptens. In this study, we sought to identify ITAM-coupled receptors expressed on myeloid cells that are responsible for CHS sensitization. We have identified two candidate receptors, IgSFR2 and IgSFR6, by screening for hapten-binding capacity using receptor-Ig fusion proteins and for ITAM-NFAT signal-activating capacity using receptor-expressing NFAT-GFP reporter cells. To evaluate the requirement of IgSFR2 and IgSFR6 for the induction of CHS, we performed TNCB-induced CHS using mice deficient for either IgSFR2 or IgSFR6, or both. However, deficiencies of these receptors did not affect the induction and severity of CHS as compared to wild-type mice. These results suggested that innate immune activation through IgSFR2 and IgSFR6 is not sufficient for CHS sensitization and other relevant ITAM-coupled receptors might exist and cooperatively act for hapten recognition and CHS sensitization together with IgSFR2 and IgSFR6.