Oral administration with diosgenin enhances the induction of intestinal T helper 1-like regulatory T cells in a murine model of food allergy

Chung-Hsiung Huang, Chia-Chi Wang, Yu-Chin Lin, Masatoshi Hori, Tong-Rong Jan
E-mail: nubirth@mail.dyu.edu.tw

ABSTRACT
Although the development of T helper (Th)1-like regulatory T (Treg) cells under Th1 inflammatory conditions has been reported, the role of Th1-like Treg cells in Th2 allergic responses remains mostly unclear. We previously demonstrated that diosgenin, the major sapogenin contained in the Chinese yam, attenuated food allergy and augmented Th1 and Treg immune responses. In this study, we hypothesized that diosgenin may enhance the induction of Th1-like Treg cells in the gut of mice with food allergy. Ovalbumin (OVA)-sensitized BALB/c mice were gavaged daily with diosgenin and received repeatedly intragastric ovalbumin challenges to induce intestinal allergic responses. The induction of Foxp3+ Treg cells co-expressing Th1-type transcription factors, cytokines and chemokines in the intestine was examined, and the mRNA expression of the chemokines corresponding to Th1-like Treg cells was measured. Diosgenin administration increased the number of Foxp3+ Treg cells co-expressing Th1 markers, including CCR5, CXCR3, IFN-γ and T-bet in the intestine, and enhanced populations of Foxp3+IFN-γ+ and Foxp3+T-bet+ cells that expressed the regulatory cytokine IL-10 in the Peyer's patches. Diosgenin also augmented the intestinal expression of CXCR3, CCL3, and CXCL10. Concordantly, diosgenin increased the number of CXCR3+Foxp3+IL-10 cells in the Peyer's patches. Our data demonstrated the enhanced induction of Th1-like Treg cells in allergic mice treated with diosgenin, providing evidence to suggest a role for Th1-like Treg cells in diosgenin-mediated anti-allergic effects against Th2-type allergy.

Keywords: Diosgenin; Food allergy; Intestine; Th1-like Treg cell; Th2-type

REFERENCES