Type 1 regulatory T (Tr1) cells increased by sublingual immunotherapy (SLIT) suppressed allergic inflammation

Masaya Matsuda[1], Tetsuya Terada[2], Miki Inaba[1], Junpei Hamaguchi[1], Naoki Takemoto[1], Kazuyuki Kitatani[1], Ryo Kawata[2], Takeshi Nabe[1]

[1]Lab. of Immunopharmacol., Fac. of Pharm. Sci., Setsunan Univ., [2]Dept. Otorhinolaryngol. Head & Neck Surg., Osaka Med. Col.

Allergen-specific sublingual immunotherapy (SLIT) is clinically effective for allergic diseases such as Japanese cedar pollinosis, whereas mechanisms of the effectiveness have not been fully elucidated. The purpose of this study was to elucidate whether a subset of Treg cells, Tr1 cells play roles in the effectiveness of SLIT. SLIT treatment was started in Japanese cedar pollinosis patients in 2014 or 2015, and had been continued until May 2019. In May 2017 and May 2019, peripheral blood mononuclear cells (PBMCs) were collected from the patients, and analyzed by flow cytometer. Numbers of Tr1-like cells (IL-10-producing $Foxp3^-$ $CD4^+$ T cells) as well as $Foxp3^+$ Treg cells in PBMC collected in 2019 were significantly larger than those in 2017. Visual analogue scale score, a parameter of clinical effects for nasal symptoms in 2019 was significantly improved in comparison with that in 2017. In another experiment of mice, Tr1-like cells were induced in vitro by culture of splenocytes of ovalbumin (OVA)-sensitized mice with OVA and cytokines, and adoptively transferred to OVA-induced asthmatic mice. The adoptive transfer of Tr1-like cells significantly suppressed the development of airway hyperresponsiveness, and increases in IL-5 and eosinophils in the lung. In conclusion, Tr1 cells could play roles in clinical effectiveness of SLIT.