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Capture of antigen in the respiratory tract by monoclonal antibody Fab fragments suppresses asthmatic responses in mice antigen-specifically

Shin Yoshino
Kobe Pharmaceutical University, Japan

Abstract

Fab fragments (Fabs) maintain the ability to bind to specific antigens but lack effector functions due to the absence of the Fc portion. In the present study, we tested whether Fabs of an antigen-specific monoclonal antibody (mAb) was able to regulate asthmatic responses in mice. Asthmatic responses were induced in BALB/c miceby passive sensitization with anti-OVA polyclonal antibodies (pAbs) (day 0) and by active sensitization with OVA (days 0 and 14) followed by intratracheal (i.t.) challenge with OVA on day 1 and days 28, 29, 30, and 35, respectively. Fabs prepared by the digestion of an anti-OVA IgG1 (O1-10) mAb with papain were i.t. administered only once 30 min before antigenic challenge on day 1 or day 35. The results showed that i.t. administration of O1-10 Fabs with OVA markedly suppressed the early and/or late phases of asthmatic responses causedby passive and active sensitization. Similar results were obtained when Fabs of anti-OVA IgG2b mAb (O2B-3) were i.t. administered. In contrast, neither i.t. injection of intact 01-10/O2B-3 nor systemic injection of O1-10 Fabssuppressed the asthmatic responses. In vitro studies revealed that the capture of OVA by O1-10 Fabsprevented the subsequent binding of intact anti-OVA pAbs to the captured OVA. These results suggest that asthmatic responses may be downregulated by the i.t. exposure to Fabs of an antigen-specific mAb via a mechanism involving the capture of antigen by Fabs in therespiratory tract before the interaction of intact antibody and antigen essential for the induction of asthmatic responses.

Biography

Shin Yoshino completed his Ph.D. from the Faculty of Pharmaceutical Sciences, Tohoku University, Japan. He worked as a postdoctoral fellow in the Department of Microbiology and Immunology, School of Medicine, University of North Carolina at Chapel Hill. He is currently a Professor of Pharmacology at Kobe Pharmaceutical University. He has published more than 100 papers in reputed peer review journals. His work focuses on antigen-specific regulation of immune diseases including allergic and autoimmune disorders.