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Evaluation of leukocyte activity to construct immunobiomarker-based personalized chemotherapy

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Abstract

Leukocytes play important roles in immune response and have been known to influence drug activity. Basophils, one of the leukocytes, mediate many specific kinds of allergic reactions. Upon stimulation with specific allergens that cross-link IgE bound to its high-affinity receptor (FcεR1), basophils rapidly express surface molecules such as CD203c. Flow cytometry-based tests using peripheral blood basophils can presumably represent their *in vivo* activity for drug allergies. We reported that carboplatin, one of the platinum agents, developed severe anaphylaxis in more than 20% of gynecologic cancer patients after repeated dose of the drug (*Cancer Chemother. Pharm.*2011). In addition, CD203c positive basophils after *in vitro* exposure to carboplatin were significantly higher in patients with a history of anaphylaxis (n=11, mean fluorescent intensity: MFI 9.0) compared with those without history (n=19, MFI 0.4). All of the five patients who developed grade 2-4 anaphylaxis during the study period had high CD203c positive basophils on the day before anaphylaxis (*Biol Pharm Bull.* 2012). We further analyzed the characteristics of activated basophils and revealed that average FcεR1 level located on basophil surface was significantly higher in 5 patients with a history of anaphylaxis than that in 8 patients without anaphylaxis. As described, morphological changes of basophils including receptor expressions should be a useful marker to prevent severe anaphylaxis. These results should provide important sight to understand inter- and intraindividual variability in pharmacodynamics.

Biography

Takuya Iwamoto has completed his Ph.D at the age of 33 years from Mie University. He has also received a title of board certified oncology pharmacy specialist at the age of 36 years. He is an associate professor and vice director of hospital pharmacy in Mie University. He has published more than 30 papers in reputed journals. His present areas of major activities and interests are clinical pharmacokinetics and pharmacodynamics with regard to personalized medicine.

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