Usefulness of serum-levels of histamine, tryptase, Cys-LTs and 9α11β-PGF2 during oral food challenge
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Introduction: Food Allergy (FA) is a common disease and it is estimated prevalence world-wide ranges between 2-10% with an increasing trend. Peanuts and tree nuts are frequent causes of FA and may albeit rare result in fatal reactions.

The diagnosis of FA is based on the personal history, in vivo skin-testing (e.g. SPT), in vitro IgE-testing and oral challenges. The double-blind placebo controlled food challenge (DBPCFC) is the gold standard for diagnosing and categorizing FA. DBPCFC’s are time consuming and bear a risk for the patient. Moreover, sometimes the interpretation of test reactions is difficult. The aim of this study was to analyze mast cell mediators like histamine, tryptase, cys-LTs and 9α11β-PGF2 in serum samples from patients who underwent oral food challenges (OFC) and correlate these parameters with the reaction-severity.

Methods: 32 patients from the Allergy-Center with a history of FA to peanuts or tree nuts were recruited. 40 OFCs were performed. Reaction severity was determined by using the grading according to Ring&Messmer. Severe reactions were observed in 23 cases (grade=2 in 10 patients, grade=3 in 13 patients). Blood samples were collected before OFC (T1), 5-10 mins after the reaction (T2) and 2h post-onset (T3). Histamine (LDN, Nordhorn, Germany), cys-LTs (LTC4, LTD4, LTE4) and 9α11β-PGF2 (both Cayman Chemical, Ann Arbor, USA) were determined by ELiSA. Tryptase was kindly measured by Thermo Fisher Scientific, Freiburg, Germany.

Results: We observed a significant increase of tryptase, cyc-LTs and 9α11β-PGF2 after food provocation but not histamine in sera from patients with positive OFC. Tryptase levels correlated significantly with the severity of the reaction and a positive tendency of this correlation was also observed for histamine- and 9α11β-PGF2-levels, but not cys-LTs values.

Discussion: The studied markers differ in their reliability. Histamine does not support evidence for a positive OFC. By contrast, tryptase but also 9α11β-PGF2 (alone or combined) may be used as supportive markers for diagnosing FA. Whether the total increase of the markers helps to predict severity in a given patient will need to be assessed in future studies.