Basophil Activation Test in the Clinical Management of Peanut vs. Tree Nut-Allergic Children: Experience from the Markers4Care Study

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Background. Basophil activation testing (BAT) acts as an ex vivo surrogate marker of clinically relevant IgE-mediated allergies. Expert recommendations for peanut (PN) BAT rest on substantial data, whereas conditions for tree nut (TN) BAT are less well defined. We therefore compared BAT results in the Markers4Care study, which is based on a well-characterized Luxembourg cohort of PN versus TN-allergic children.

Methods. 89 children aged 2–18 years with PN or TN allergy were enrolled and underwent prick-to-prick testing (SPT), blood IgE testing (ImmunoCAP, ALEX2) and oral food challenge (OFC). BAT was performed on fresh blood across 0.1–10,000 ng/mL allergen (flow cytometry).

Results. PN (n=43) and TN (n=46) patients had a similar median age of 6.5 years (IQR 4–9). SPT wheal size was larger in TN than PN patients (median 18 vs. 13.5 mm; P=0.01), while sIgE was higher in PN (median 100 vs. 12.2 kUA/L; P<0.001). OFC threshold dose reactivity did not differ, with 37.2% of PN and 21.7% of TN patients reacting to ≤44 mg cumulative nut protein (P=0.17). PN BAT became positive at low allergen concentrations, whereas TN BAT required 10-fold higher doses (median CD63% basophils at 10 ng/mL; P<0.001). sIgE and BAT responses correlated in both groups, and specifically in hazelnut-allergic patients (Cor a 9, P=0.002, r=0.659). Stratifying by threshold dose response, only PN BAT differentiated the clinical groups (0.1–10,000 ng/mL; P=0.01–0.03).

Conclusion. We recapitulated the clinical relevance of BAT in Markers4Care, our real-world study on nut allergy. BAT results varied by nut allergy type, so its interpretation for clinical management needs to be adapted accordingly.

References

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Biosketch

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CURRENT AND PAST POSITIONS

2025–present: Postdoctoral Researcher, Luxembourg Institute of Health, Department of Infection and Immunity, Molecular and Translational Allergology Group.

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EDUCATION

2016–2022: Doctoral Degree, Sabancı University, Istanbul, Department of Molecular Biology, Genetics, and Bioengineering.

2011–2015: Master's Degree, Istanbul University, Experimental Medicine Research Institute, Molecular Medicine.

2007–2011: Bachelor's Degree, Istanbul University, Department of Biology.

OTHER RELEVANT PROFESSIONAL ACTIVITIES AND ACCOMPLISHMENTS

Laboratory Leadership for Postdocs – EMBO, 2025.

Laboratory Animal Science – FELASA A (2025).

Advanced GDPR (EU) Training – 2023.

European Academy of Allergy and Clinical Immunology (EAACI) – Member since 2024.

“Targeting NR1D2 to Reverse Immunosuppression in Glioblastoma”, 30th European Cell Death Organization (ECDO) Conference, 2024 – Poster.