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Thermal processing and allergenic potential of egg for children

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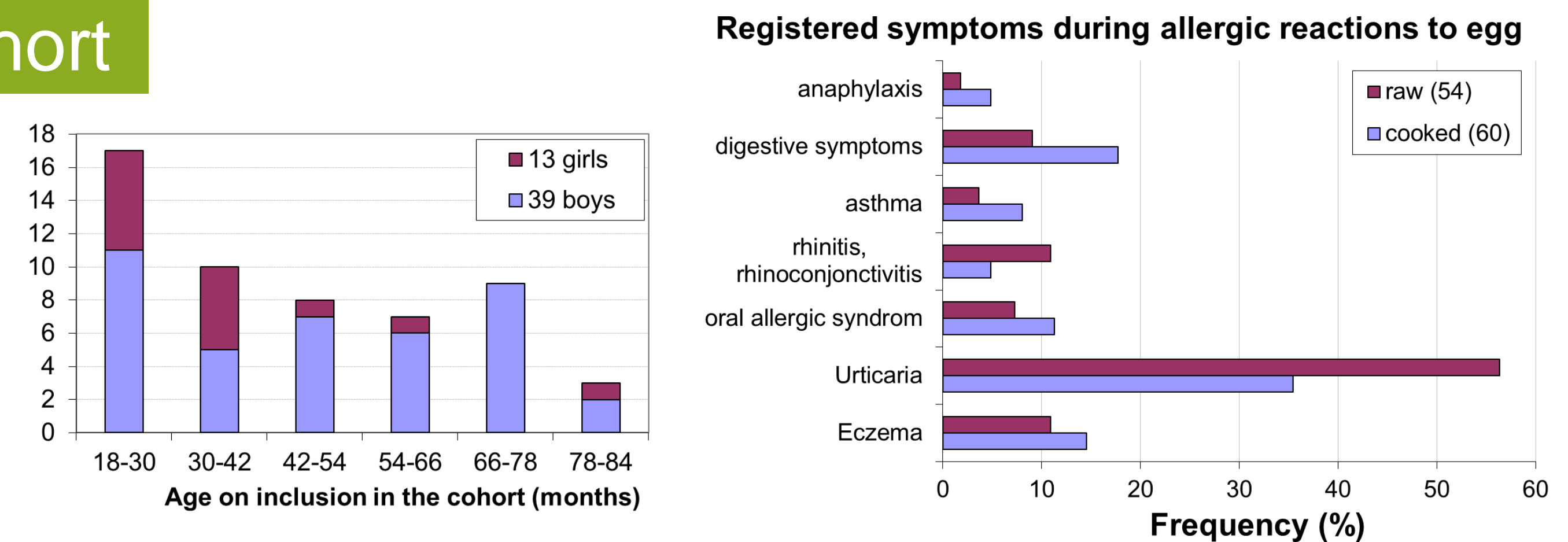


FOOD ALLERGY TO EGG IS VERY FREQUENT IN CHILDHOOD AND IT IS KNOWN THAT SOME ALLERGIC CHILDREN CAN TOLERATE COOKED EGG. THIS WORK AIMS TO ANALYZE HOW PASTEURIZATION AND HARD-BOILING OF EGG AND ITS FRACTIONS IMPACT *IN VIVO* REACTIVITY EVALUATED BY PRICK-TESTING IN A COHORT OF CHILDREN ALLERGIC TO EGG AND ITS RELATION TO IgE-BINDING PROFILES TO EGG PROTEINS OR FRACTIONS

Recruitment and characterization of the children cohort

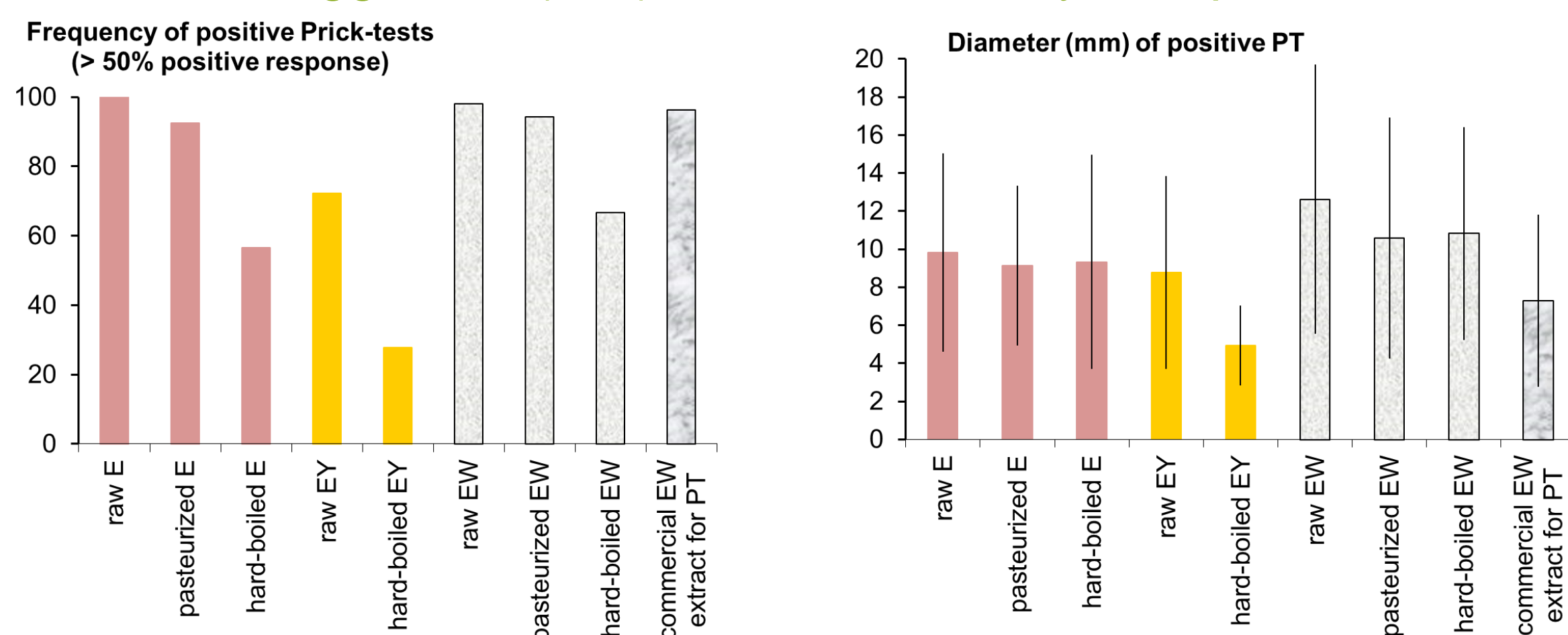
Allergologists from 4 medical units recruited with informed consent 52 children allergic to egg (18 months-7 years old). Upon inclusion, they gathered clinical data, performed PT with specially prepared egg fractions and took sera.

Youngest children (18-30 months) and boys were the most frequent. Urticaria largely dominates among registered symptoms upon allergic reaction both with raw and cooked egg offending foods. These characteristics agree with knowledge on food allergy to egg and previous children cohort allergic to egg.



Reactivity to raw and processed egg fractions

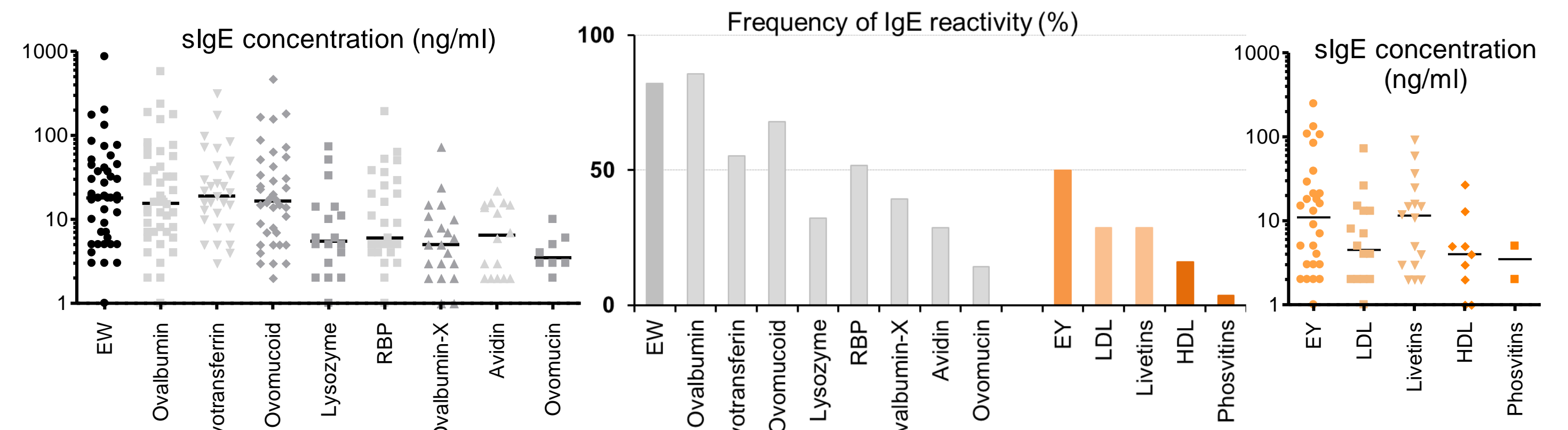
Reactivity to raw, pasteurized and hard-boiled egg (E), egg yolk (EY) and egg white (EW) was evaluated by skin prick-test



All children had positive skin prick-tests (SPT) to raw E and EW and 72% to raw EY; mean diameter was larger for EW. Pasteurization had limited impact on PT reactivity to E and EW. Hard-boiling reduced both frequency of positive PT and mean positive diameter for EY but only frequency of positive PT for E and EW.

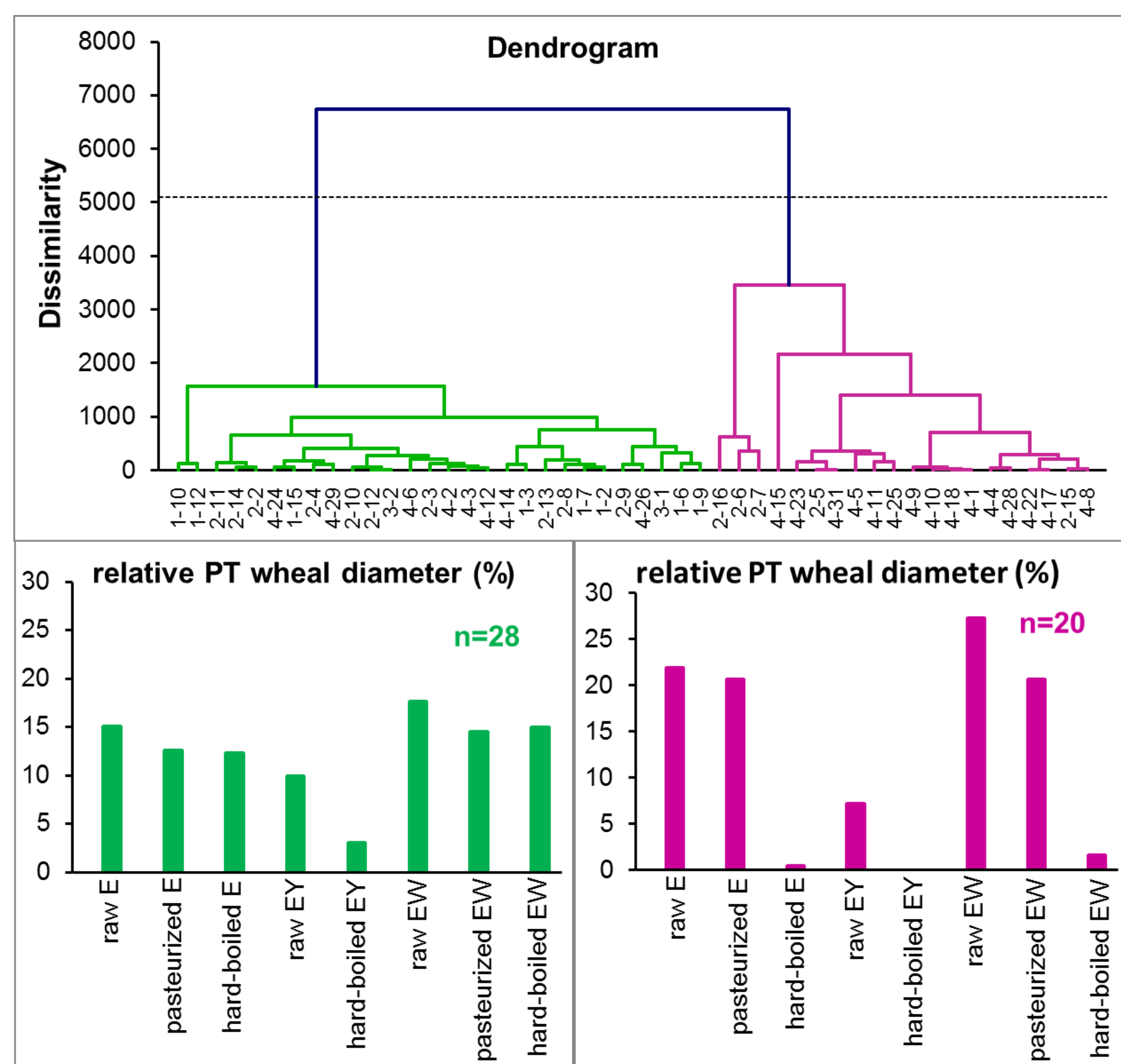
IgE reactivity to egg proteins and fractions

Sera samples were analyzed by ELISA for IgE-reactivity against EW and 4 known allergens + 4 proteins of EW EY and 4 sub-fractions of EY



Large differences in IgE sensitization towards both EW and EY were evidenced. In EW, ovalbumin (Gal d 2), ovomucoid (Gal d 1), ovomucoid (Gal d 1) and riboflavin-binding protein (RBP) were IgE-reactive for more than 50% sera. In EY, plasma sub-fractions (LDL and livetins) were more IgE reactive than granules sub-fractions (HDL and phosvitins).

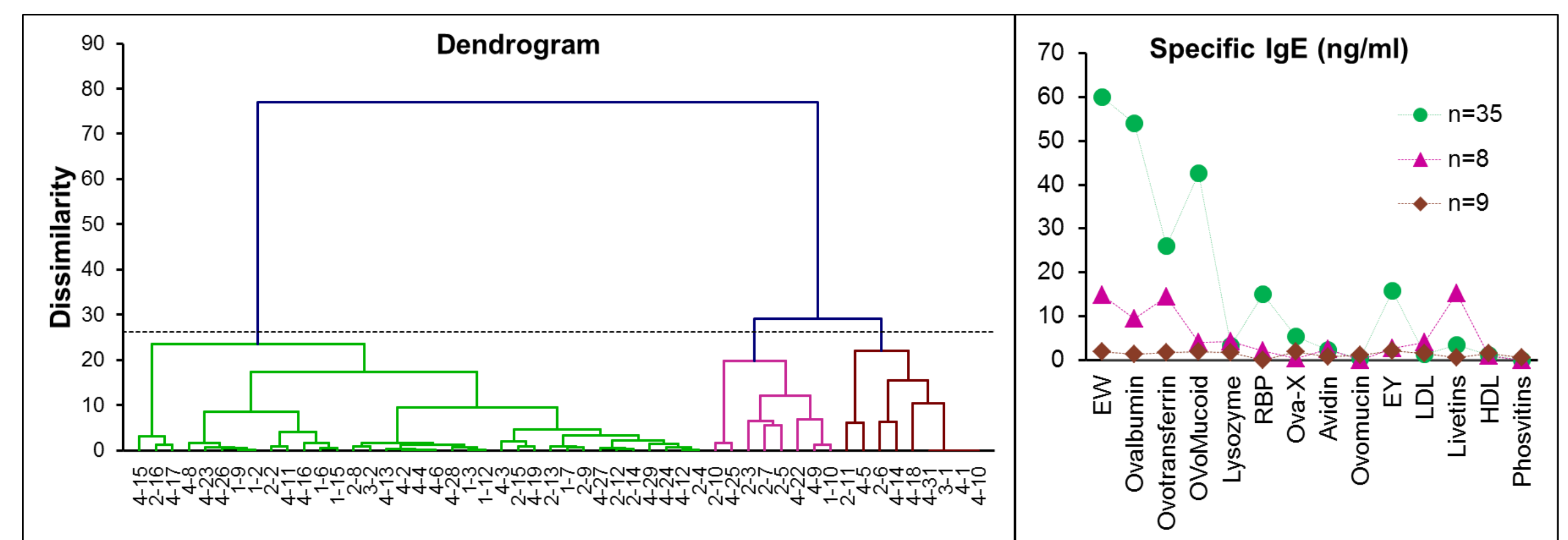
Hierarchical Ascending Classification (HAC) analysis of relative PT diameters by child (n=48) evidenced two typical behaviors



The most frequent profile (n=28) corresponds to children with very low impact of thermal process on PT reactivity except for hard-boiling of EY.

The second profile (n=20) corresponds to children with a lower reactivity to EY and a clear decrease of PT reactivity upon hard-boiling for the both E, EY and EW.

HAC analysis of IgE profiles by child (n=52) evidenced three typical profiles



For 9 children, profile of IgE reactivity was flat since very low IgE-responses could be detected by ELISA against the 11 tested fractions or antigens.

The most frequent profile (n=35) corresponds to children with large IgE sensitization specially toward ovalbumin and ovomucoid in EW; these children are also sensitized to ovomucoid and RBP in EW and to EY.

The third profile (n=8) corresponds to children with a mild sensitization mainly directed toward ovalbumin and ovomucoid in EW and the livetins fraction of EY. Both ovalbumin, ovomucoid and α -livetins are thermosensible proteins.

Links between PT reactivity and IgE profiles (n=48)

Children with no impact of thermal process on PT reactivity except hard-boiling of EY significantly tended to be mainly sensitized to ovalbumin and ovomucoid,

Children with a clear decrease of PT reactivity upon hard-boiling for the both E, EY and EW significantly presented a flat IgE profile or a mild sensitization. They are mainly sensitized to ovalbumin and ovomucoid in EW and livetins in EY.

Contingency table		Relative PT reactivity	
IgE profile	1	22	9
	2-3	6	11

$\chi^2=0,017$

CONCLUSIONS - KEY POINTS

- TWO PT-REACTIVITY PROFILES VERSUS THERMAL PROCESSES OF EGG ARE CLEARLY EVIDENCED AND RELATED TO IgE SENSITIZATION
- PASTEURIZATION OF EGG OR EGG WHITE SHOWED VERY LOW IMPACT ON *IN VIVO* REACTIVITY EVALUATED BY PRICK-TESTING
- HOW PT-REACTIVITY AND IgE PROFILES CHANGE WITH TOLERANCE OF EGG IS CURRENTLY INVESTIGATED

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