To be allergic or not
A question of predisposition and allergen exposure

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One of the most common allergies in children involves cow’s milk, which contains approximately 20 different proteins that can cause allergic reactions. Common root cause for the onset and the maintenance of the symptoms is the recognition of normal, harmless cow’s milk proteins as being “dangerous” (Figure 1). Allergic reactions to cow’s milk proteins manifest symptomatically early in infancy (within the first weeks to months) at the skin, gut and airways.

It is well known that some children exhibiting clinical signs of cow’s milk allergy early in life also develop allergy-related diseases such as rhinitis and asthma later in life. Therefore it is crucial to manage early sensitization and symptoms of cow’s milk allergy appropriately and effectively, not only to manage the acute symptoms but also to influence the subsequent “allergic march”.

The fundamental pillar in the dietary treatment of cow’s milk allergy is the strict allergen avoidance. This strict allergen avoidance addresses the acute/immediate hypersensitivity pathway of the underlying allergic pathogenesis by taking away the root causing agent (allergen-exposure). However the ultimate goal of the dietary management of cow’s milk allergy is not only to manage the acute symptoms but concurrently to modify the course of the allergic disease. Acquisition of oral tolerance (“dangerous recognition” to “recognized as harmless”) is the ultimate goal (Figure 1). Oral tolerance to cow’s milk describes an acquired state in which the infant does not react to cow’s milk proteins. This state is a highly regulated process in which the T-cells play a crucial role (Figure 2). From an immunological point of view the acquisition of oral tolerance is an active process which requires 2 types of signals. The 1st signal is the recognition of cow’s milk protein residues and the 2nd signal determines the type of immune response, allergic versus tolerance, respectively (Figure 2).

In terms of the 1st signal several studies have assessed the capacity of hydrolyzed cow’s milk based formulas in managing allergies. One important learning from these studies is that the degree of hydrolysis does not predict the capacity of inducing oral tolerance but rather it is the unique protein and nutrient composition of the formula itself. In these clinical studies, Nutramigen®, an extensively hydrolyzed formula, was shown to be effective in terms of reducing the risk of allergy symptoms associated with the gut and skin. The capacity of hydrolyzed cow’s milk based infant formulas in allergy management have been extensively.

Figure 1: The Role of Diet in Allergy: Tolerance or Sensitization?

Figure 2: The immune system requires 2 signals to develop oral tolerance

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reviewed by several expert groups and medical societies including the European Academy of Allergy and Clinical Immunology (EAACI) and recommendation for use are published accordingly²⁴.

It is well established that exclusively breastfed infants have a lower risk of developing cow’s milk allergy by acquiring oral tolerance early in life to cow’s milk proteins. This result may be related to the combination of very low amounts of cow’s milk residue and immunological co-factors favoring the development of oral tolerance present in breast milk. Interestingly Nutramigen contains a similar amount of these immuno-reactive cow’s milk proteins as found in breast milk⁵.

A recent study demonstrated that by combining Nutramigen with the probiotic Lactobacillus GG, the acquisition of oral tolerance can be accelerated⁷ (Figure 3). This study suggests that the combination of low dose exposure to hydrolyzed casein peptides in the formula and Lactobacillus GG seem to direct the immune response to build oral tolerance early in life. While this result indicates that faster oral tolerance acquisition could be a novel approach in the management of CMA, further research is needed to identify the exact molecular mechanism and to describe the sequences of these peptides in extensively hydrolyzed formulas.

In conclusion low dose exposure to food allergens in human milk contributes to the efficacy of breast milk in acquisition of oral tolerance early in life. From an immunological point of view acquisition of oral tolerance requires exposure to cow’s milk protein residue in combination with co-factors favoring the development of oral tolerance. The dietary intervention with hydrolyzed cow’s milk based formulas is a feasible approach to promote acquisition of oral tolerance to cow’s milk proteins early in life.

References

For Cow’s Milk Allergy
- Fast management of colic often within 48 hours†
- Nutritionally complete
- Probiotic LGG to help support digestive health

†Studied before the addition of DHA, ARA and probiotics.

To learn more about Nutramigen, visit meadjohnsonprofessional.com