

## CLINICAL SPECIFICATIONS

### SOFT CHEESE + HARD CHEESE

#### Antigen Made From:

Soft Cheese (Cottage, Brie, Cream) and Hard Cheese (Colby, Cheddar, Parmesan) were mixed together

#### Associated With:

Cheese immune reactivity

#### Known Cross-Reactions:

#### Clinical Significance:

Cheese is a food derived from milk and is formed by the coagulation of the milk protein casein. During the maturation of hard cheeses, such as parmesan, caseins are gradually and constantly broken down and gradually shifting from full proteins to longer peptides, then to shorter peptides and free amino acids.<sup>1</sup> The peptide fraction of aged cheese is thus extremely complex.<sup>2</sup> One hundred grams of cheese contain up to 35.75% protein.<sup>3</sup> Studies on food immune reactivities predominantly use raw food antigens. However, some researchers have noted that heating or combining food proteins can change their antigenicity.<sup>4-6</sup>

This array tests for IgG and IgA food immune reactivity.<sup>7,8</sup> Equivocal or out-of-range results indicate antibody reactivity to the tested food antigen. We tested 288 blood donor sera against soft and hard cheese antigens at optimal dilution, 22.9% of these donors were IgG and IgA reactive.

Due to cross-reactivity, possible connections between food antigens and human autoimmunity has been previously suggested because proteins in nature can have a similarity in sequence and structure to certain human tissues.<sup>9-12</sup>

Data suggests that eliminating foods identified using IgG antibody food testing can play a role in improvement of symptoms.<sup>13</sup> Because certain food components can lead to gut flora changes and gut permeability, eliminating specified food antigens should result in the reduction of antigenic stimuli and the improvement of symptoms.<sup>13,14</sup>

The results of this food array may be used to develop and implement an immune targeted dietary plan, which includes the avoidance of triggering and known cross-reactive foods. Furthermore, when followed over time, avoidance/prevention treatment plans tailored and supervised by the ordering healthcare professional, may help: (a) repair the gut barrier; and (b) re-establish oral tolerance to the offending food.<sup>13,14</sup>

#### References:

1. Fundamentals of Cheese Science. Eds. Fox et al. Aspen Publishers, Inc: Gaithersburg, MD. 2000.
2. Alessandri et al. Tolerability of a fully matured cheese in cow's milk allergic children: biochemical, immunochemical, and clinical aspects. PLoS One, 2012; 7(7):e40945.
3. U.S. Department of Agriculture. <http://ndb.nal.usda.gov/ndb/foods>
4. Sanchez and Fremont. Consequences of heat treatment and processing of food on the structure and allergenicity of component proteins. Rev Fr Allergol Immunol Clin, 2003; 43:13-20.
5. Sathe et al. Effects of food processing on the stability of food allergens. Biotechnol Adv, 2005; 23:423-429.
6. Vojdani. Detection of IgE, IgG, IgA and IgM antibodies against raw and processed food antigens. Nutr Metab (Lond), 2009; 6: 22. DOI: 10.1186/1743-7075-6-22.
7. Barnes. IgG and IgA antibodies to dietary antigens in food allergy and intolerance. Clin Exp Allergy, 1995; 25(Suppl 1):7-9.
8. Mullin et al. Testing for food reactions: the good, the bad, and the ugly. Nutr Clin Pract, 2010; 25(2):192-198.
9. Vaishnav et al. Aquaporin 4 molecular mimicry and implications for neuromyelitis optica. J Neuroimmunol, 2013; 260: 92-98.
10. Agris et al. Plant DNA topoisomerase 1 is recognized and inhibited by human SCI-70 sera autoantibodies. Exp Cell Res, 1990;189:276-279.
11. Lunardi et al. Glycine-rich cell wall proteins act as specific antigen targets in autoimmune and food allergic disorders. Int Immunol, 2000; 12(5):647-657.
12. Bullard-Dillard et al. Anti-Sm autoantibodies of systemic lupus erythematosus cross react with dietary plant proteins. Immunol Invest, 1992; 21(3):193-202.
13. Cordain et al. Modulation of immune function by dietary lectins in rheumatoid arthritis. Br J Nutr, 2000; 83:207-217.
14. Atkinson et al. Food elimination based on IgG antibodies in irritable bowel syndrome: a randomised controlled trial. Gut, 2004; 53(10):1459-1464.