

# ALLERGY Net

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## Selective ovine serum albumin allergy in an adult

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**Keywords:** food allergy; goat milk allergy; serum albumin; sheep milk allergy.

Milk allergy is a very rare cause of food allergy in adults, and it is generally believed that patients allergic to milk cannot tolerate cow, sheep, and goat milk because of significant cross-reactivity between homologous allergens in milk from these animals. We report a case of selective ovine milk allergy in an adult caused by sensitization to serum albumin, an allergen that is generally not considered relevant in this food.

A 41-year-old man with a history of seasonal rhino-conjunctivitis and asthma in springtime for 5 years and of severe allergy to both sheep and goat milk and cheeses since early infancy was recently seen. He reported that as few as 1 g of these foods caused asthma, diffuse urticaria, and angioedema of the face with a latency of about 15 min. He had experienced at least 20 such episodes throughout his life, and in four cases they were so severe that he asked for help at the emergency room. The patient reported good tolerance to cow milk and cheeses that he ate on a regular basis.

Skin tests with common aeroallergens showed monosensitization to grass

pollen. Skin prick test (SPT) with a cow milk extract (ALK-Abello, Madrid, Spain 1 : 20 w/v) and fresh Parmesan cheese scored negative, whereas SPT with fresh sheep and goat cheeses produced 11 × 9 mm and 12 × 8 mm wheals, respectively (histamine 10 mg/ml SPT wheal 6 × 6 mm).

Fresh goat and sheep cheese were homogenized, mixed with 300 ml of pre-cooled acetone, and equilibrated at -20°C overnight. After washing, the precipitate was dried, and the resulting powders were extracted (1); sheep and goat cheese extracts contained 0.6 and 2 mg/ml of protein, respectively. On enzyme-linked immunosorbent assay (ELISA) assays, 1 µg of extracts or 1 µg of fresh cow milk diluted in 100 µl of coating buffer/well were used for coating 96-well microtitre plates. After washings, wells were saturated with 2% bovine serum albumin (BSA) in phosphate buffered saline for 2 h at room temperature. After further washing, 100 µl of serum/well were added and incubated for 2 h at room temperature. After washing, bound specific IgE was detected by peroxidase-conjugated anti-human IgE from goat (Biospecific, Emeryville, CA, USA; 1 : 1500). The enzyme reaction was stopped after 20 min by 1 M HCl. Absorbance, read at 450 nm, was expressed as optical density (OD). Sera from a nonallergic subject and from a patient allergic to cow milk were used as negative and positive controls, respectively. Immunoblot under reducing conditions was performed as well. Electrophoresis of extracts (15 µg/lane) was carried out in a 10% polyacrylamide precast Nupage Bis-Tris gel with 2-(N-morpholino) ethane sulfonic acid buffer at 180 mA for 1 h. The resolved proteins were transferred for 1 h onto a nitrocellulose membrane that was saturated with

0.1 M tris buffered saline containing 5% of BSA and incubated for 16 h at 4°C with serum. Bound specific IgE were detected by peroxidase-conjugated anti-human IgE antibodies from goat (1 : 1000) using an enhanced chemiluminescence western blotting kit as substrate.

Patient's serum showed a strong IgE reactivity to sheep milk, a slighter reactivity to goat milk, but no reactivity to cow milk (Table 1), whereas the positive control serum strongly reacted to milk proteins from all three animals. On immunoblot, an intense IgE reactivity at about 55 kDa, and a less evident reactivity at about 28 kDa with sheep milk, but no reactivity to cow milk were observed (Fig. 1). Preadsorption of serum with 130 µg of sheep milk extract totally inhibited IgE reactivity to sheep milk, whereas 130 µg of house dust mite or cow milk did not exert any effect. The negative control serum did not react to any milk.

Although it is generally believed that the significant homology between milk from cow, sheep, and goat results in clinical cross-reactivity, cases of ovine milk allergy in the absence of cow milk allergy are being increasingly reported (2, 3). Several patients were sensitized to sheep and goat casein, and reactivity to a 14 kDa allergen in goat milk was found in a patient who tolerated cow and sheep cheese (4). Other patients

**Table 1** IgE reactivity to sheep, goat, and cow milk proteins

| Serum            | Sheep | Goat | Cow  |
|------------------|-------|------|------|
| Patient          | 1578  | 568  | 216  |
| Positive control | 3515  | 3571 | 3443 |
| Negative control | 272   | 387  | 212  |

Figures represent absorbance (OD) at 450 nm.

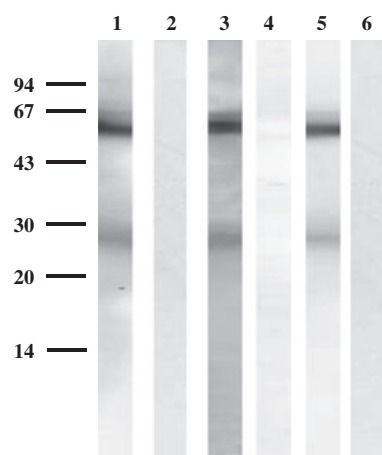


**Figure 1** Analysis of patient's IgE reactivity to ovine and cow milk by immunoblot. Lane 1: sheep cheese (uninhibited); lane 2: cow milk; lane 3: sheep cheese (serum preadsorbed with cow milk); lane 4: sheep cheese (serum preadsorbed with sheep cheese); lane 5: sheep cheese (serum preadsorbed with house dust mite); lane 6: sheep cheese (normal serum).

reacted to multiple ovine milk allergens (5), but following the report by Alvarez (6), this is the first report of selective

IgE reactivity to a 55 kDa protein in ovine milk. This molecular weight corresponds to serum albumin. In a case of allergy to pork serum albumin (7), we observed that only raw or semi-raw meats, but not cooked meats induced symptoms, suggesting the heat sensitivity of the allergen. In conclusion, serum albumin can be associated with allergy to dairy products, and this kind of allergy can be species specific.

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## References

1. Asero R, Mistrello G, Roncarolo D, Casarini M, Falagiani P. Allergy to nonspecific lipid transfer proteins in Rosaceae: a comparative study of different in vivo diagnostic methods. *Ann Allergy Asthma Immunol* 2001;**87**:68–71.
2. Wüthrich B, Johansson SG. Allergy to cheese produced from sheep's and goat's milk but not to cheese produced from cow's milk. *J Allergy Clin Immunol* 1995;**96**:270–273.
3. Calvani M Jr, Alessandri C. Anaphylaxis to sheep's milk cheese in a child unaffected by cow's milk protein allergy. *Eur J Pediatr* 1998;**157**:17–19.
4. Tavares B, Pereira C, Rodrigues F, Loureiro G, Chieira C. Goat's milk allergy. *Allergol Immunopathol (Madr)* 2007;**35**:113–116.
5. Martins P, Borrego LM, Pires G, Pinto PL, Alfonso AR, Rosado-Pinto J. Sheep and goat's milk allergy: a case study. *Allergy* 2005;**60**:129–130.
6. Alvarez MJ, Lombardero M. IgE-mediated anaphylaxis to sheep's and goat's milk. *Allergy* 2002;**57**:1091–1092.
7. Asero R, Mistrello G, Falagiani P. Oral allergy syndrome from pork. *Allergy* 1997;**52**:684–686.