

Occupational rhinitis due to Pepsin

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Summary. A woman presented work-related rhinoconjunctivitis due to inhalation of pepsin used in a slaughterhouse. Prick tests and conjunctival challenge were positive to pepsin. Serum specific IgE to pepsin was 5.58 kU/L and an IgE-binding band of 43 kDa was detected in SDS-PAGE Immunoblotting. Rhinoconjunctivitis improved clearly when the patient was assigned to another place without contact with pepsin. Pepsin has been previously reported to cause occupational allergic asthma on three occasions. As far as we know, this is the first reported case in which an IgE-immunoblot has been performed.

Key words: enzymes, occupational rhinitis, pepsin A

Resumen. Se describe el caso de una mujer con rinoconjuntivitis relacionada con la actividad laboral como consecuencia de la inhalación de pepsina utilizada en un matadero. El prick y la provocación conjuntival fueron positivos a la pepsina. La IgE sérica específica para la pepsina fue de 5,58 kU/l y se detectó una banda de unión a IgE de 43 kDa mediante SDS-PAGE/inmunotransferencia. La rinoconjuntivitis mejoró claramente cuando la paciente fue reubicada en el trabajo a otro puesto en el que no estaba en contacto con la pepsina. Previamente se han notificado otros tres casos de asma alérgica profesional provocada por pepsina. Según nuestros conocimientos actuales, éste es el primer caso en el que se emplea la técnica de inmunotransferencia para IgE.

Palabras clave: Enzimas, rinitis profesional, pepsina A.

Enzymes are well known sensitizers that often cause occupational respiratory diseases. Pepsin is an enzyme used in different occupational settings. We describe a case of occupational allergic rhinoconjunctivitis due to pepsin in a woman who worked checking meat for trichinae.

A 22 year-old-woman who had been working at a slaughterhouse for 3 years presented work-related rhinoconjunctivitis after 7 months. She did three weekly rotatory tasks at her work: checking meat for trichinae at the laboratory; sanitary control of cattle and sheep, and sanitary control on a pork production line.

She suffered from immediate and delayed rhinoconjunctivitis in the laboratory area. Symptoms were triggered by pepsin powder used to proteolyze the samples of meat in order to search for trichinae larvae. A standard method is used to prepare these samples before its examination by the veterinarian: pure pepsin powder is poured in a pan with boiling water and pieces of meat. This is when the patient presented her symptoms.

We prepared a pepsin solution at 10 mg/ml and performed cutaneous and challenge tests on the patient.

Serum specific IgE measurement and IgE SDS-PAGE immunoblotting were also carried out.

The prick test was positive to pepsin (wheal 4 mm) (negative in various atopic and non atopic controls). Prick tests to common inhalants were positive for *Dermatophagoides pteronyssinus* and pollens from *Chenopodium album* and *Artemisia vulgaris*. Pepsin conjunctival challenge was positive: at 10 mg/ml she presented conjunctival erythema with epifora and pruritus (negative in three atopic and three non atopic controls). Serum specific IgE was 5.58 kU/L to pepsin (class 3), 1.2 kU/L (class 2) to *Dermatophagoides pteronyssinus*, and 2.8 kU/L (class 2) for cow dander. When the pepsin sample was incubated with patient's serum in SDS-PAGE Immunoblotting, an IgE-binding band of 43 kDa was detected (Figure 1). Spirometry values were in the normal range (FVC 3.54 L (86%), FEV1 3.24 L (96%), FEV1/FVC 91%). The rhinoconjunctivitis improved clearly when the patient was assigned to another place without contact with pepsin.

The patient's clinical history suggested occupational

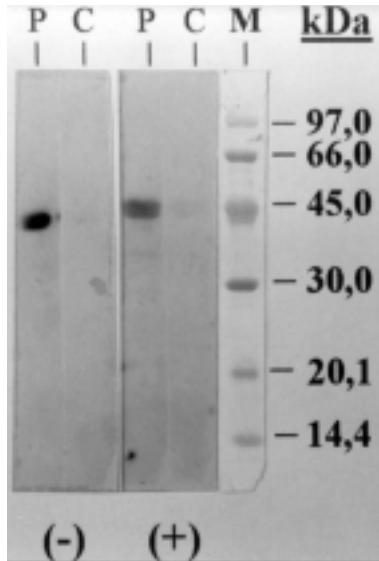


Figure 1. SDS-PAGE Immunoblotting with pepsin sample. Lane P: Patient serum. Lane C: Control serum. (-): Sample without 2-mercaptoethanol. (+): Sample with 2-mercaptoethanol.

rhinitis due to pepsin exposition. Prick test, CAP and immunoblot results showed IgE-mediated reaction to pepsin and the challenge test identified pepsin as the etiologic agent. We consider the sensitization to *Dermatophagoides pteronyssinus* and cow dander not significant to the rhinoconjunctivitis symptoms observed, as the patient only manifests these symptoms when exposed to pepsin powder, not in any other situation. Moreover, it is quite normal to find simultaneous sensitizations in occupational asthma and rhinitis [1].

Commercial pepsin is a protease usually obtained from pig pepsinogen by post-translational proteolysis and acts as an important digestive enzyme of the gastric juice. There are many allergens with protease activity. In recent years, some authors have suggested the importance of the protease activity of certain allergens (Der p 1, Der p 3, Der p 9, protein extracts from *Aspergillus sp.*, from cockroach, from various species of pollen) to elicit the allergic response. *In vitro* they demonstrated the proteolytic activity of some allergens on some membrane proteins (CD25, CD23, protease-activated receptor type 2, occludin, claudin) of different types of cells (lung epithelial cells, B cells, dendritic cells) which produce physiological pro-inflammatory or pro-allergenic changes in them [2,3]. *In vivo*, using immunization assays with animal models, they observed a different T cell response depending on the catalytic state of the allergen used to immunize them: when the active form of the enzyme was used, a Th2 response was observed, whereas a Th1 response was detected when the inactive form was used [4].

Pepsin has been previously reported to cause occupational allergic asthma: Cartier et al described a case of occupational asthma in the pharmaceutical industry, with positive cutaneous test at 10 mg/ml [5]; Añibarro et al described a case of asthma in a cheese factory and used

pepsin at 1 mg/ml for cutaneous test [6]; in 1997 Drexler et al described a patient with the same job as ours with asthma and used pepsin at 10 mg/ml [7]. As far as we know this is the first reported case in which an IgE-immunoblot has been performed.

Many of the causative agents of occupational asthma are also capable of inducing occupational rhinitis and patients with occupational asthma frequently report symptoms of occupational rhinitis. In a recent study, a higher risk of asthma was found among patients with occupational rhinitis than among those with other occupational diseases [8]. In our patient the eviction of pepsin may possibly prevent the evolution to asthma.

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