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Airway Disease and Thaumatin-like Protein in an Olive-Oil Mill Worker

TO THE EDITOR: The olive fruit is frequently consumed as food and used as raw material to obtain olive oil. Olive oil is pressed in mills, where workers are exposed daily to inhalation of particles derived from this processing. Despite widespread consumption, allergies to olive fruit and derivative products have seldom been documented.¹⁻⁴

We report on a 41-year-old man who had been working since 1993 in an olive-oil mill. He was first seen in 2006, when the olive-oil mill was operating in Jaén, Spain; he had a 2-year history of episodic rhinitis, shortness of breath, chest tightness, and wheezing. Symptoms occurred within 30 minutes after he arrived at the workplace and partially improved immediately after he left it. He controlled the symptoms by using salbutamol as needed and formoterol-budesonide twice a day on a regular basis. Baseline spirometric measurements showed a forced expiratory volume in 1 second (FEV₁) of 3.74 liters (87% of the predicted value), with a ratio of FEV₁ to forced vital capacity of 76%. Methacholine challenge showed a 20% decrease in FEV₁ at 1.2 mg per milliliter. The peak expiratory flow (PEF) varied, depending on workplace exposure (Fig. 1A). The patient had a diurnal variation in PEF rates that was greater than 20% on 11 working days, whereas no significant changes were observed on days away from the workplace.

Olive pulp from the mill was lyophilized, powdered, and extracted with ether-ethanol (3:1 ratio). The pellet was extracted with phosphate-buffered saline (pH 7.0). The supernatant obtained by centrifugation was dialyzed against 0.05 M ammonium bicarbonate (pH 8.0), lyophilized, and stored at -20°C. All the steps were performed at 4°C. A skin-prick test with this extract at 6 mg per milliliter was positive in the patient (wheal

area, 50 mm²) and was negative in control subjects.

We investigated sensitization to olive-fruit allergens as possible causative agents. Immunoblotting with the patient's serum revealed a reactive 23-kD band in olive-fruit protein extract (Fig. 1B) that was purified by size-exclusion chromatography and reverse-phase high-performance liquid chromatography. The purified protein was IgE-reactive (Fig. 1C), and Edman degradation gave the amino acid sequence ATFXIVNQXTYT-VXAAASP, which showed homology to allergenic thaumatin-like proteins (TLPs) from plant foods and pollen.⁵

A skin-prick test with purified TLP at 1 µg per milliliter was positive in the patient (wheal area, 9 mm²) and was negative in control subjects. We performed a nasal challenge test in the patient by measuring nasal resistance with active anterior rhinomanometry, using TLP (0.1 µg per milliliter); the result was positive, with nasal obstruction, sneezing, and runny nose. A nasal challenge test with TLP (100 µg per milliliter) was negative in four healthy subjects and three patients who were allergic to olive pollen.

Our findings indicate that occupational asthma can be caused by a thaumatin-like protein from olive fruit.

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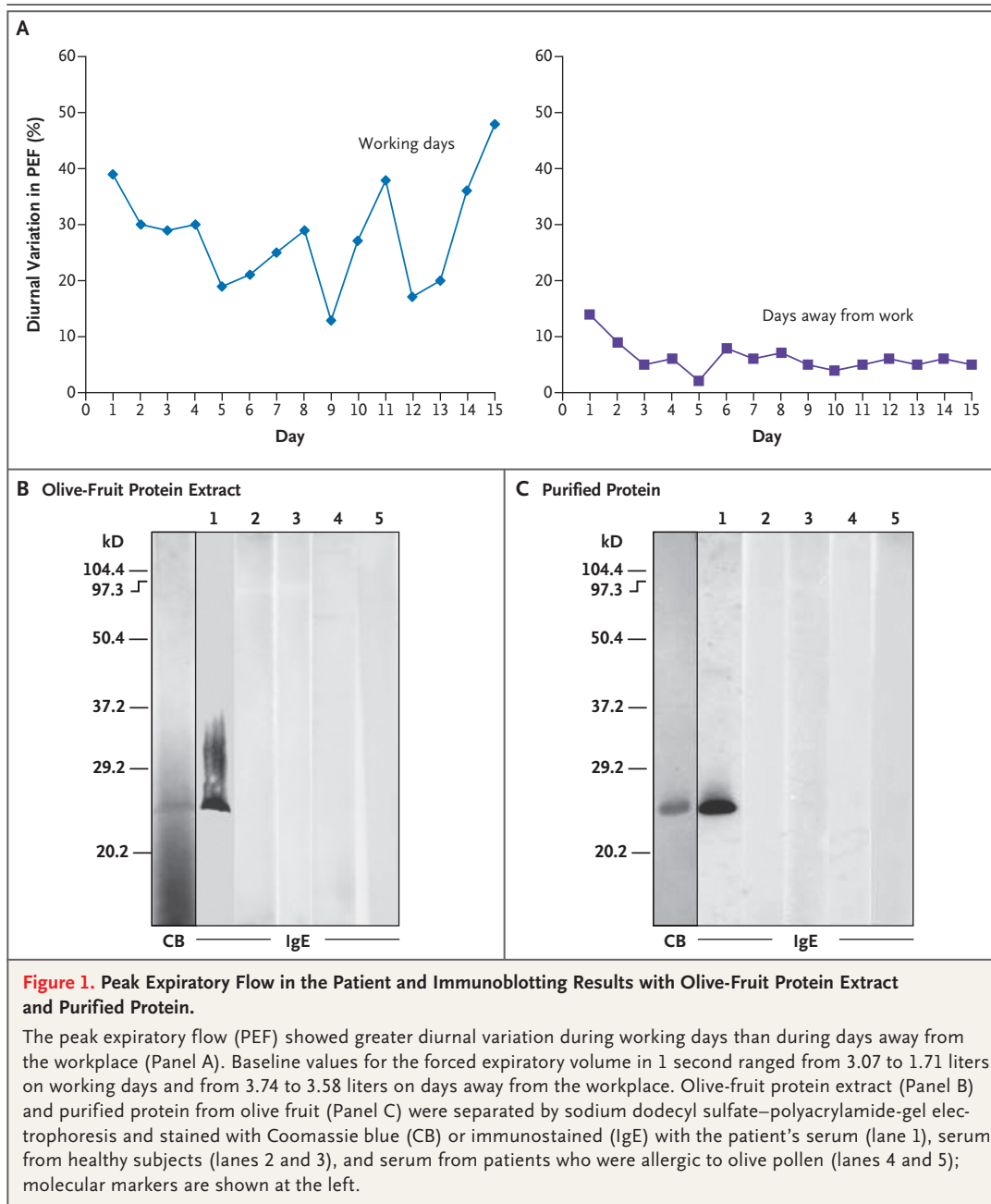
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