

## LETTERS TO THE EDITOR

## Asthma in reaction to two occupational agents in the same workplace

Workers can be simultaneously exposed to several agents that can cause occupational asthma (OA). The frequency of exposure to sensitisers at the workplace is high: more than 50% of workers reported being or having been exposed to such agents.<sup>1</sup> In the presence of OA, it is important to avoid further exposure to the causal agent to prevent worsening of asthma.<sup>2</sup> This justifies identification of the causal agent by exposing subjects to specific inhalation challenges.<sup>3</sup> We describe five subjects, all working at food production companies, with a diagnosis of OA exposed to two different agents present in their workplace.

The methods used in the investigation are described in the online supplement. The characteristics of the subjects are shown in table 1. There were three men and two women, aged 24–46 years, all exposed for more than 1 year, with the duration of asthmatic symptoms (wheezing in all subjects) ranging from 1 to 7 years, all with symptoms of rhinoconjunctivitis. The five subjects were on the production line and were exposed to various occupational agents present as dry aerosols (flour, enzymes, natural products, etc.). All subjects were atopic. Skin-prick tests performed with dilutions of the causal agents were positive in most instances. Responsiveness to methacholine was increased in all subjects. All subjects showed a significant immediate reaction, except in one instance (subject no. 1, on exposure to casein) in which there was a maximum fall of 13% in FEV<sub>1</sub> 20 min after the end of exposure followed by a significant late reaction. Another subject (subject no. 3, on exposure to camomile) experienced, after the immediate reaction, a 16% fall in FEV<sub>1</sub> 6 h after the end of exposure. In two instances (subject no. 2, on exposure to wheat flour, and subject no. 3, on exposure to ginger), there was a significant change in PC20 after exposure. There were significant changes in the percentage of induced sputum eosinophils for subject nos 1 and 2 on exposure to lactoserum (from 5% to 31% and from 0% to 3.5%), and subject no. 3 on exposure to ginger (from 0% to 3%).

Although the onset of immediate asthmatic reactions on exposure to the suspected agent was the rule in our subjects, we can reasonably exclude non-specific irritant reactions, at the least in 5 of the 10 challenges to the active agent. We used an equipment that generates dry aerosol at low concentrations (online supplement), which makes non-specific reactions unlikely. The mechanisms underlying these dual sensitisations may be related to cross-reactivity

Table 1 Characteristics of subjects and reactions

Subject no.	Duration of exposure (years)	Duration of symptoms (years)	Atopic status (years)*	Specific prick tests	FEV <sub>1</sub> (% pred)	PC20 (mg/ml)	Specific reactions
1	1.4	1	+	+Lactoserum (10 mg/ml) +Casein (1 mg/ml)	87	1.3	Immediate (10 min; 28%) lactoserum Late (240 min; 33%) casein†
2	26	2.5	+	ND lactoserum +Wheat flour	77	0.8	Immediate (10 min; 29%) lactoserum Immediate (10 min; 23%) wheat flour
3	6	1	+	+Camomile (10 mg/ml) +Ginger (10 mg/ml)	85	7	Immediate (10 min; 24%) camomile‡ Immediate (20 min; 32%) ginger
4	10	7	+	+Guar gum (10 mg/ml) +Wheat flour	118	4	Immediate (20 min; 23%) guar gum Immediate (10 min; 20%) wheat flour
5	11	1	+	–Lactoserum (10 mg/ml) +Wheat flour	84	1.6	Immediate (10 min; 20%) lactoserum Immediate (10 min; 22%) wheat flour

\*Atopic status: + if one or more positive prick test reactions to a battery of 15 common aeroallergens; the wheat flour extract used was a commercial preparation at a dilution of 1:10 (Omega, Montreal, Canada).

†Immediate fall in FEV<sub>1</sub> of 13% followed by the late reaction.

‡Immediate reaction followed by a late fall in FEV<sub>1</sub> of 16%.

FEV<sub>1</sub>, forced expiratory volume in one second; ND, not done; PC20, concentration of methacholine causing a fall of 20% in FEV<sub>1</sub>.

to common proteinaceous content. Also, subjects who get sensitised to one proteinaceous agent may be more likely to get sensitised to other proteins as this has been shown in the case of grass pollens and wheat flour<sup>4</sup> as well as for domestic pets and laboratory animals.<sup>5</sup> All our subjects worked in food production companies where many proteinaceous agents, such as cereals, enzymes, animal-derived proteins, egg and milk proteins, are often used. Therefore, the occurrence of OA in this sector with sensitisation to two or more agents should be investigated further. It is important not to stop the investigation if a worker exposed to flour and other agents is not sensitised to flour.

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