- 22 **Stichting NEVO**. *Nederlands voedingsstoffenbestand*. The Hague: Voorlichtingsbureau voor de Voeding, 1996.
- 23 **Asher MI**, Keil U, Anderson HR, *et al*. International study of asthma and allergies in childhood (ISAAC): rationale and methods. *Eur Respir J* 1995;**8**:483–91.
- 24 **Riedler J**, Reade T, Dalton M, *et al*. Hypertonic saline challenge in an epidemiologic survey of asthma in children. *Am J Respir Crit Care Med* 1994;**150**:1632–9.
- 25 **Riedler J**, Reade T, Robertson CF. Repeatability of response to hypertonic saline aerosol in children with mild to severe asthma. *Pediatr Pulmonol* 1994;**18**:330–6.
- 26 **European Respiratory Society**. Standardized lung function testing. Official statement of the European Respiratory Society. *Eur Respir J* 1993;**6**(Suppl):1–100.
- 27 **ISAAC**. *Phase II modules of the International Study of Asthma and Allergies in Childhood*. Münster, Germany: University of Münster, 1998.
- 28 **EAACI**. Skin tests used in type I allergy testing (position paper). Subcommittee on Skin Tests of the European Academy of Allergology and Clinical Immunology. *Allergy* 1989;**44**(Suppl 10):1–59.
- 29 **Takemura Y**, Sakurai Y, Honjo S, *et al*. The relationship between fish intake and the prevalence of asthma: the Tokorozawa Childhood Asthma and Pollinosis study. *Prev Med* 2002;**34**:221–5.
- 30 **Thien FCK**, Woods RK, Walters EH. Oily fish and asthma—a fishy story? Further studies are required before claims can be made of a beneficial effect of oily fish consumption on asthma. *Med J Aust* 1996;**164**:135–6.
- 31 **Arm JP**, Horton CE, Mencia-Huerta J-M, *et al*. Effect of dietary supplementation with fish oil lipids on mild asthma. *Thorax* 1988;**43**:84–92.
- 32 **Arm JP**, Horton CE, Spur BW, *et al*. The effects of dietary supplementation with fish oil lipids on the airway response to inhaled allergen in bronchial asthma. *Am Rev Respir Dis* 1989;**139**:1395–400.
- 33 **Tabak C**, Smit HA, Heederik D, *et al*. Diet and chronic obstructive pulmonary disease: independent beneficial effects of fruits, whole grains, and alcohol (the MORGEN study). *Clin Exp Allergy* 2001;**31**:747–55.
- 34 **Huang S-L**, Pan W-H. Dietary fats and asthma in teenagers: analyses of the first Nutrition and Health Survey in Taiwan (NAHSIT). *Clin Exp Allergy* 2001;**31**:1875–80.

LUNG ALERT

Deficient innate immunity and susceptibility of asthmatics to infection

▲ Contoli M, Message SD, Laza-Stanca V, *et al*. Role of deficient type III interferon- λ production in asthma exacerbations. *Nat Med* 2006;**12**:1023–6

Rhinoviruses are a major cause of asthma exacerbations. Asthmatics may have increased susceptibility to rhinoviral (and bacterial) infections but the mechanisms involved are not known. This study aimed to identify a possible mechanism of susceptibility involving induction of type III interferon, interferon λ .

Primary bronchial epithelial cells from asthmatic and normal subjects were infected with rhinovirus and levels of viral RNA expression were measured. Viral replication was increased in cells from asthmatic subjects compared with normal subjects. Furthermore, both the expression of mRNA encoding type III interferons as well as the level of interferon λ protein was decreased in asthmatics compared with normal volunteers. Levels of mRNA encoding the type III interferon and levels of interferon λ protein were inversely related to levels of viral RNA. The production of interferon λ by bronchoalveolar lavage (BAL) cells (mainly macrophages) from asthmatic and normal subjects infected with rhinovirus was also measured. Production of interferon λ was again lower in cells from asthmatics than in cells from normal subjects.

After the ex vivo studies the same volunteers were inoculated with rhinovirus 2. Significant inverse correlations were observed between the ex vivo production of interferon λ and severity of symptoms, BAL fluid virus load, and airway inflammation. The increased risk of bacterial infection was assessed by incubating BAL cells from the same subjects with lipopolysaccharide and measuring type III interferon production. Significant induction of interferon λ was noted, but this was impaired in asthmatic subjects.

This study highlights a possible mechanism in the pathogenesis of asthma exacerbations involving type III interferon.

A Adams

FY2 Doctor, Royal Free Hospital, London, UK; ashokadams@hotmail.com