

Plasma lycopene concentration is low in subjects with stable asthma

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Many published studies about lycopene (lyc), a carotenoid without provitamin A activity present in high concentrations in a small number of plant

Lycopene in asthma.

foods (tomato, watermelon, pink grapefruit, papaya, and apricot) suggesting an important role in preventing oxidative stress in some diseases (1). Published studies on lyc concern the serum concentration in bronchoalveolar lavage (BAL) fluid of atopic asthmatic children (2), epidemiological correlation in the Third National Health and Nutrition Examination Survey (3), and exercise-induced oxidative stress in asthmatic subjects (4, 5). Data concerning the relation between plasma lyc and antioxidant vitamins concentrations in asthma are limited and controversial. Open questions remain about serum antioxidant plasma concentrations in asthmatic and healthy subjects. Aim of this study was to evaluate lyc plasma concentration in asthmatic stable patients respect to control healthy subjects.

We enrolled 58 subjects (22 asthmatics and 36 healthy) underwent complete clinical visit, baseline respiratory function test, methacholine challenge test (MCHt), atopic status, and biochemical analyses. The statistical significance of the different concentrations between the two groups were studied using one-way analysis of variance (ANOVA). A *P* value < 0.05 was considered statistical significant.

Table 1 shows the baseline characteristics [gender, age, smoking status, body mass index (BMI), atopic status, forced vital capacity (FVC), peak expiratory flow (PEF), forced expiratory volume in one second (FEV1), provocative concentration of methacholine causing a 20% decrease of the FEV1 (PC20)] of subjects.

Table 1. Anagraphic details of population study.

Variables	Cases	Controls
Subjects (No)	22	36
Gender (M/F)	12/10	17/19
Age y†	35.1 ± 11.7	34.4 ± 12.2
Smoking (Y/N)*	11/22 (50%)	19/36 (52.77)
BMI (kg/m ²)†	24.76 ± 5.94	25.72 ± 6.43
Atopic status (Y/N)*	13/22 (59.09%)	20/36 (55.55%)
FVC (% predicted value)†	84 ± 10.2	97 ± 9.3
FEV1 (% predicted value)†	77 ± 11.2	96 ± 11.3
PEF (% predicted value)†	76 ± 11.9	94 ± 12.5
PC20 (provocative concentration)†	622.42 ± 113.89	1378.46 ± 153.31
Serum Lycopene (µg/dl) [#]	8.12 ± 2.63	18.13 ± 3.67

*percentage.

†mean ± SD.

The mean plasma lyc concentration in asthmatic subjects was 8.12 ± 2.63 µg/dl and in the control group was 18.13 ± 3.67 µg/dl (*P* < 0.001 ANOVA).

Our study demonstrates a significant low serum lyc concentration in adult subject with stable asthma respect to control group. The same results has been found in a little study of Wood et al. (6), who reported low serum lyc concentrations in sputum induced and peripheral blood in nine asthmatic subjects compared with seven healthy control.

On the contrary Schock et al. (2) in a study involving 202 children (124 non-asthmatics and 78 stable atopic asthmatics) didn't found a different serum concentration of lyc in plasma and BAL. The same result was found by Ford et al. (7) in Third National Health and Nutrition Examination Survey (NHANES 1988–1994) in which have been examined 771 adult subjects with stable asthma (age > 20 years), 352 persons with former asthma, and 15 418 persons without asthma (3).

Only one study based on lyc supplementation confirms the hypothesis of both antioxidant imbalance status and lyc antioxidant activity. Neumann et al. (4) in a 4-weeks randomized controlled trial (RCT) on 20 patients with exercise induced asthma (EIA) demonstrated a positive effect of 30 mg/day lyc supplementation during 1 week administration respect to placebo group. In this study he verified the acute beneficial effects of lyc on airway hyperreactivity assessed in patients with EIA after 7 min exercise session. On the contrary Falk et al. (5) in

a RCT in 19 young athletes after 8 min run on treadmill didn't found any significant difference between the two groups: the first supplemented with 30 mg daily dose of lyc for 1 week and the second with placebo.

In the two cited studies Ford et al. considered subjects without bronchial asthma but normal basal oxidative status, while Neumann et al. (4) considered young asthmatic athletes with different basal oxidative status.

The results of the present study show that low serum concentrations of lyc is associated with bronchial asthma. Our findings suggests that serum concentration of lyc, a biomarker of tomato-rich food intake, may play a role in the prevention of bronchial asthma and owing to this reason may have a public health relevance. Dietary supplementation with lyc food-rich may be beneficial in patients with bronchial asthma.

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References

1. Sesso HD, Buring JE, Norkus EP, Gaziano JM. Plasma Lycopene, other carotenoids, and retinol and the risk of cardiovascular disease in men. *Am J Clin Nutr* 2005;**81**:990–997.
2. Schock BC, Young IS, Rrown V, Fitch PS, Shields MD, Ennis M. Antioxidants and oxidative stress in BAL fluid of atopic asthmatic children. *Pediatr Res* 2003;**53**:365–368.
3. McKeever TM, Lewis SA, Smit H, Burney P, Britton J, Cassano PA. Serum markers and skin prick test using data from the Third National Health and Nutrition Examination Survey. *J Allergy Clin Immunol* 2004;**114**:1398–1402.
4. Neuman I, Nahum H, Ben-Amotz A. Reduction of exercise-induced asthma oxidative stress by lycopene, a natural antioxidant. *Allergy* 2000;**55**:1184–1189.
5. Falk B, Gorev R, Zigel L, Ben-Amotz A, Neuman I. Effect of lycopene supplementation on lung function after exercise in young athletes who complain of exercise-induced bronchoconstriction symptoms. *Ann Allergy Asthma Immunol* 2005;**94**:480–485.
6. Wood LG, Garg ML, Blake RJ, Gibson PG. Carotenoid concentrations in asthmatics versus healthy controls. *Asia Pac J Clin Nutr* 2004;**13**:(Suppl.) S74.
7. Ford ES, Mannino DM, Redd SC. Serum antioxidants concentration among US adults with self-reported asthma. *J Asthma* 2004;**41**:179–187.

Allergy due to head lice (*Pediculus humanus capitis*)

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Key words: asthma due to insects; louse; *Pediculus humanus capitis*.

A 6-year-old boy suffered repeated infestation by head lice, causing intense skin-itching, bilateral nasal obstruction, rhinorrhea and nightly whistles. These symptoms disappear with two

The possibility of an IgE mediated reaction to louse allergens must be taken into account.

applications of pyrethrins lotion. The rhinitis and asthma were not manifested when lice infestation did not occur. He and his family did not remember having allergic reactions to any other allergenic source or throughout lice infestation free periods.

Living head lice were captured from the hair of the patient. The ectoparasites were homogenized in radio immuno precipitation assay (RIPA) buffer for 10 min at 4°C. After removing the insoluble material the soluble protein extract was stored at –20°C. We performed *in vivo* tests, prick test, and conjunctival provocation by Hosen technique (1) performed with lice extract 1/10 w/v (1/1000 dilution). *In vitro* test, the sodium dodecyl sulphate-polyacrylamide gel electrophoresis-immunoglobulin E immunoblotting performed with patient serum (2).

Prick and provocation tests were positive. IgE-immunoblotting showed a band around 20 kDa that was recognized by the patient's serum (Fig. 1).

Lice infestation is one of the most common infectious diseases in child care. Lice are transmitted through direct skin-to-skin contact or by sharing personal articles. Lice are not dangerous but they are extremely irritating, and are not known to carry diseases. The symptoms, mainly intense itching are often manifested weeks after the actual

infestation, this increases the possibility of a specific immune response due to lice antigens. The American Academy of Pediatrics (AAP) established diagnosis and treatment guidelines for pediculosis in 2002 (3).

Nevertheless other arthropods as house dust mite are considered the most important triggers of atopic dermatitis (4). Only one article suggested and allergic reaction from contact with *Pediculus humanus capitis* (5), but as far as we known no case of asthma due to a specific IgE mediated sensitization to lice antigens have been proved before. There are no reliable data on how many people get lice but it is thought to be quite usual. The possibility of an IgE mediated reaction to louse allergens in atopic people must be taken into account.

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References

1. Hosen H. Provocation ophthalmic and nasal testing as contrasted with skin test. *J Asthma* 1985;**22**:215–221.
2. Armentia A, Lombardero M. Occupational rhinitis to leek (*Allium porrum*). *Allergy* 2005;**60**:132.
3. American Academy of Pediatrics, American Public Health Association, National Resource Center for Health and Safety in Child Care. *Caring for Our Children National Health and Safety Performance Standards: Guidelines for Out-of-Home Child Care Programs*. *Pediatrics* 2000;**105** (Suppl 14, Pt1): 738–742.
4. Cameron MM. Can house dust mite-triggered atopic dermatitis be alleviated using acaricides? *Br J Dermatol* 1997;**137**: 1–8.
5. Lafeber A. An allergic reaction from contact with *Pediculus humanus capitis* (head lice). *Ned Tijdschr Geneesk* 1984;**128**:1860–1861.

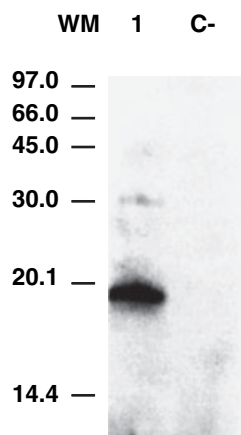


Figure 1. Immunoglobulin E (IgE)-immunoblotting. Lane 1, *Pediculus humanus*; lane 2, negative control.