a beneficial effect of ω-3 fatty acids on pulmonary function in individuals suffering from bronchial hyperreactivity.

Commentary: Inflammation in the airways may play a role in the pathophysiology of asthma. Chemical mediators of inflammation including thromboxane A$_2$ and leukotriene B$_4$ may be competitively inhibited by eicosapentaenoic and docosahexaenoic acids (polyunsaturated fatty acids), yielding increased amounts of thromboxane A$_3$ and leukotriene B$_5$. This study demonstrates improved spirometric measurements following UNDW, 30 days after supplementation with ω-3 fatty acids. When supplementation was withdrawn, the benefits achieved with supplementation were reversed. Supplementation with ω-3 fatty acids is an inexpensive, effective, and safe therapy and should be considered in patients suffering from seasonal asthma. Future studies are necessary to determine the long-term effects of supplementation in a larger population.

D-Serine Added to Antipsychotics for the Treatment of Schizophrenia

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**Objective:** To determine if the amino acid D-serine exhibits any effect on the positive or negative symptoms of schizophrenia.

**Design:** Double-blind, placebo-controlled trial of D-serine (30 mg/kg per day).

**Setting:** Patients were recruited from an inpatient unit of the Tsyri-Huey Mental Hospital, Kaohsiung Medical School in Taiwan.

**Patients:** Thirty-one Taiwanese schizophrenic patients were enrolled. The patients were evaluated by the Structured Clinical Interview for DSM-IV diagnosis. All patients had a normal physical examination, neurological examination, and laboratory screening tests. All patients had a score of ≥40 on a Scale for the Assessment of Negative Symptoms (SANS). All patients had poor response to treatment with antipsychotic medication (as defined by at least 2 previous attempts of antipsychotic medication).

**Intervention:** All patients were randomly assigned under double-blind conditions to receive a 6-week trial of placebo or D-serine 30 mg/kg daily. D-serine was mixed with orange juice prior to administration.

**Main Outcome Measures:** Baseline scales were performed as follows: Clinical Global Impression scale (CGI), Positive and Negative Syndrome Scale (positive subscale, and cognitive subscale), SANS, and Hamilton Depression Rating Scale. All scales were performed at baseline, and every 2 weeks. Learning effects were measured at baseline and 6 weeks and measured by the Wisconsin Card Sort Test (WCST). Side effects were assessed biweekly. Serum levels of amino acids (aspartate, glutamate, glycine, D-serine, L-serine) were measured at baseline and at 6 weeks.

**Results:** Treatment with D-serine improved the symptoms of schizophrenia starting at week 2 and becoming more prominent through week 4 and 6. D-serine treatment of patients with schizophrenia can improve positive, negative, and cognitive symptoms of disease. An improved score was also achieved in the WCST, consistent with improved cognitive effect. No significant reduction in symptoms of any type, was present in the placebo group. Serum amino acid tests indicated that the D-serine treated group had higher L-serine levels at week 2 in addition to elevated D-serine. D-serine levels remained two orders of magnitude higher than baseline or the placebo-group throughout the six-week treatment. Higher serum levels of D-serine were associated with improved symptom scores. Side effects occurred in both the D-serine and placebo groups. Side effects were all short-lived and resolved spontaneously.

**Conclusion:** D-serine can improve positive, negative, and cognitive symptoms associated
with schizophrenia in a patient population previously found to be poorly responsive to drug therapy. D-serine therapy leads to increases in both serum D-serine and L-serine. Improvements in the symptoms of schizophrenia occur after 2 weeks of therapy, and continue through 4–6 weeks of therapy. Improvements in the symptoms of schizophrenia correspond with elevations in serum D-serine.

Commentary: Schizophrenia is a devastating mental disorder with high morbidity and mortality. Neuroleptic drugs blocking dopamine D2 receptors are the primary treatment. In addition to dopaminergic neurotransmission, glutamatergic neurotransmission has been associated with the pathophysiology of schizophrenia. Previous studies with glutamate and aspartate have yielded beneficial results in treating some of the symptoms of schizophrenia. It is speculated that the mechanism of action providing benefit to these patients is as an agonist of the NMDA (N-methyl-D-aspartate) receptor. D-serine is a selective and potent agonist at the NMDA-glycine site. The beneficial results achieved in this trial with D-serine, provides evidence of an NMDA-hypofunction in patients with schizophrenia. D-serine was safely used in these patients in addition to antipsychotic medication and should be researched further as a single agent.

Positive Association between *Helicobacter pylori* Infection and Food Allergy in Children


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Objective: To measure *Helicobacter pylori* antibodies in the serum of pediatric patients with food allergy, atopic disease, and inflammatory bowel disease. To determine if *H. pylori* antibodies are present in increased frequency in any of these disease conditions.

Design: Laboratory investigation.

Setting: A pediatric gastroenterology unit in Rome, Italy. This study was completed between January 1993 and January 1998.

Patients: Thirty patients with food allergy age 5–12 years, 30 patients with atopic asthma age 6–12, and 30 patients with inflammatory bowel disease (IBD) age 8–14 years.

Method: Patients were selected in consecutive order. Skin prick tests for food antigens and radioimmunoassay (RIA) tests were completed on all patients to assess the likely presence of food allergy. The presence of food allergy was verified with double-blind controlled placebo food challenge (DBCPFC). The presence of atopic disease was considered if the patient had at least 1 skin prick test or 1 positive radioallergosorbent test (RAST) to a panel of common inhalatory allergens. All patients with IBD had a negative skin prick test and RAST for food antigens.

Main Outcome Measure: Serum immunoglobulin (IgG) antibodies to *H. pylori* and IgG antibodies against CagA were determined by enzyme immunoassay.

Results: Of the patients diagnosed with food allergy, 11 of 30 (37%) had positive values indicating the presence of anti-*H. pylori* antibodies and 10 of 30 (33%) had borderline values. Of the patients with atopic asthma 3 of 30 (10%) had positive values and 2 of 30 (7%) had borderline values indicating the presence of anti-*H. pylori* antibodies. All of the patients with IBD had negative results. The anti-CagA titer did not differ significantly between the 3 groups.

Conclusion: A positive association exists between food allergy and *H. pylori* antibodies.

Commentary: The significance of these results to clinical practice is unknown. It is possible that children with food allergies suffer from gastric irritation thus allowing the bacteria, *H. pylori* to adhere to the gastric mucosa. However, it is also possible that *H. pylori* infection, which can lead to a transient achlorhydria, may