

## CORRESPONDENCE



## Multivitamin Supplements and HIV Disease Progression

**TO THE EDITOR:** Fawzi and coworkers (July 1 issue)<sup>1</sup> demonstrate the benefit of multivitamin supplementation in pregnant women with human immunodeficiency virus (HIV) infection. What is most impressive is that the effects of vitamins on the immune system, on disease progression, and on mortality appear to be secondary to immune-system restoration. Overwhelming but exhausted cellular immune activation, characterized by activated T cells that are prone to apoptosis, and impairment of the ability of the immune system to restrict the growth of secondary pathogens are key features in the pathogenesis of HIV infection.<sup>2</sup> Excessive production of reactive oxygen species by activated cells such as macrophages may degrade vitamins, which are often effective antioxidants.<sup>3</sup> Accelerated conversion of tryptophan by the enzyme indolamine-2,3-dioxygenase has been demonstrated in HIV infection.<sup>4</sup> Indolamine-2,3-dioxygenase may underlie diminished T-cell responsiveness in HIV infection.<sup>5</sup> This enzyme requires superoxide anion,<sup>5</sup> which is destroyed by antioxidants. Thus, vitamin supplementation may compensate for the enhanced degradation of vitamins and thereby counteract the immunosuppression induced by indolamine-2,3-dioxygenase and interrupt a vicious cycle. Regardless of these possible explanations, larger clinical trials will be needed to confirm the effects seen in this pilot study.

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**THE AUTHORS REPLY:** Dr. Schroecksnadel and colleagues propose a mechanism by which multivitamin supplementation could result in delayed disease progression among HIV-infected persons. Their hypothesis is supported by the findings of our trial, in which supplementation with vitamin B complex and vitamins C and E, as compared with placebo, resulted in significantly increased CD4+ cell counts and decreased risks of the HIV-related complications that are common with immune suppression.

We agree that additional studies are needed to address the efficacy of various micronutrient supplements in the context of HIV infection. The trial in Tanzania, however, was not designed as a pilot study; it included a large sample and had adequate

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statistical power to detect an effect on clinical outcomes. Similar findings in Thailand<sup>1</sup> and the results of numerous epidemiologic studies confirm the importance of multivitamins in persons with HIV infection.<sup>2</sup> In light of the evidence accumulated to date, the next trial involving persons in the early stages of HIV disease ought to examine the role of other nutrients that were not included in our regimen, such as selenium.<sup>3</sup> The safety and efficacy of vitamin and mineral supplementation among persons who have more advanced disease and who are receiving antiretroviral therapy are also important issues that will need to be examined.

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## Metabolic Effects of Liposuction — Yes or No?

**TO THE EDITOR:** Klein and colleagues (June 17 issue)<sup>1</sup> report an absence of effects of abdominal liposuction on cardiovascular risk factors, inflammatory markers, and insulin resistance in obese women. We would suggest alternative explanations for their negative findings. The small number of subjects investigated (eight obese women without diabetes) and the limited length of follow-up (10 to 12 weeks) precluded the emergence of significant differences. We pooled data from our own studies<sup>2-4</sup> evaluating the effect of large-volume liposuction on markers of vascular inflammation and insulin resistance in 45 premenopausal obese women (mean [±SD] age, 37±4 years) who were followed for up to six months (Table 1, facing page). We selected women whose changes in body weight during the follow-up period were due only to the liposuction procedure. Only at six months was there a significant shift in inflammatory markers, which were significantly reduced, and antiinflammatory markers, which were significantly increased.

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**TO THE EDITOR:** I do not agree with the conclusion that removal of about 10 kg of adipose-tissue mass alone fails to achieve the metabolic benefits of weight loss. It depends on what type of fat you remove.<sup>1</sup> My colleagues and I compared the removal of less than 1 kg of visceral fat in connection with bariatric surgery with bariatric surgery alone.<sup>2</sup> When the subjects were reinvestigated two years after surgery, we observed significant improvements in glucose tolerance, insulin sensitivity, and fasting plasma levels of glucose and insulin in the group receiving both visceral-fat removal and bariatric surgery, as compared with the group receiving bariatric surgery alone. Thus, it might be essential to remove visceral adipose tissue in order to obtain beneficial effects in obese patients. Visceral fat is directly connected to the liver by the portal system; therefore, the release of fatty acids and other regulatory factors to the portal vein may be decreased