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— LETTER TO THE EDITOR —

Dietary supplementation with L-arginine in women with preeclampsia

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Dear Sir,

In a recent report by Staff et al. (1), the possible effect of oral supplementation of L-arginine on the diastolic blood pressure in women with preeclampsia was examined. No beneficial effect of L-arginine on the diastolic blood pressure was found. As the L-arginine nitric oxide (NO) pathway is known to play important functional roles in the physiology of human reproduction (2), I would like to comment on some information given in this paper.

The authors write that L-arginine is an NO donor. By definition, NO donors are compounds that produce NO-related activity when applied to biological systems (3). Thus, NO donors are either suited to mimic an endogenous NO-related response or substitute an endogenous NO deficiency. The term 'NO donor' implies that the compound releases the active mediator NO. However, the vasodilator (antihypertensive) effect of NO donors is mainly a consequence of the relative richness of guanylyl cyclase within the vascular smooth muscle tissue. This enzyme catalyzes the formation of cGMP from NO. In mammalian cells, NO is generated when L-arginine is converted to L-citrulline through a complex oxidation reaction. Thus, L-arginine is not an NO donor but the substrate for endogenous NO synthesis. In other words, L-arginine is the precursor to endogenously synthesized NO.

The authors define L-arginine as an essential amino acid. Based on balance nitrogen studies in many mammalian species, including the human, it is clear that L-arginine is a non-essential dietary amino acid for healthy adults (4). Consequently, placing adult humans on L-arginine-free diet will have little or no effects on plasma L-arginine levels. However, in young animals and during recovery from injury or disease, dietary L-arginine is required for optimal growth and recovery. Thus, under these circumstances L-arginine is classified as a conditionally essential or semiessential amino acid (4). The primary site of endogenous L-arginine synthesis is in the proximal tubules of the kidney, where L-citrulline synthesized and released by epithelial cells of the small intestine is extracted from the blood, converted to L-arginine, and then released into the systemic circulation. Thus, L-citrulline, the byproduct of NO synthesis from L-arginine, is recycled back to L-arginine incorporating one nitrogen (5). This modified urea cycle has two functions – a secretory role to regenerate L-arginine for NO synthesis and an excretory role to eliminate excess nitrogen created by the cells' metabolism. According to available data, it therefore is incorrect to say that L-arginine is an essential amino acid, even in women suffering from preeclampsia.

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