Salt Sensitivity: Trophic Effect of Growth and Vasoactive Factors

To the Editor:

The nexus between salt (sodium chloride) intake and essential hypertension is not simple. For a recent review, see Reference 1. Population studies have demonstrated a positive correlation between increased dietary salt intake and the incidence of essential hypertension, whereas intrapopulation studies have not always shown this relation. Established essential hypertension is expressed by a sustained increase in the peripheral vascular resistance (PVR) because of a reduction in the vascular lumen of the peripheral circulatory system. Thus, the high incidence of essential hypertension in populations consuming large quantities of sodium chloride is likely to reflect the chronic influence of a high salt intake on the cardiovascular system. This phenomenon is probably related to enhanced growth of the vascular media and peripheral vasoconstriction, both of which produce narrowing of the vascular lumen. However, a substantial increase of vascular smooth muscle (VSM) mass is unlikely to result from a brief exposure to a high salt intake. Yet, to characterize the nature of "salt-sensitivity," most investigations have monitored the blood pressure response in individuals subjected to an increased intake of salt for short periods ranging from days to months. A significant elevation of blood pressure in association with increased sodium intake was thus considered as indicative of salt-sensitivity.

A recent insight into cellular mechanisms that mediate alterations of the PVR suggests that underlying causes for the increased incidence of essential hypertension in populations habitually consuming a high salt diet results from additional pathophysiological processes to those responsible for blood pressure elevation during short periods of exposure to increased salt intake. A great number of vasoactive agents and growth factors stimulate pathways in VSM cells that may lead both to vasoconstriction and enhanced growth. These factors usually increase the cytosolic free calcium and enhance growth. These factors usually increase the cytosolic free calcium in concert with stimulation of the sodium-proton exchange by factors in serum than do skin fibroblasts from whites. Similar tendencies in VSM cells would favor an increase in the propensity for VSM growth in blacks. I propose that future research into the question of salt-sensitivity in essential hypertension will focus not only on the impact of a brief change of salt intake on blood pressure levels, but also on the influence of a long duration of altered dietary salt intake on the interplay of growth factors and vasoactive agents that can stimulate VSM growth.

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References

Single Versus Triplicate Measurements: A Commentary on Fagan et al

In an article published in this journal, Fagan et al concluded that duplicate or triplicate measurements of blood pressure are neither more accurate nor less variable than single measurements and that the additional measurements are of no value in evaluating the effects of antihypertensive medications or other interventions on blood pressure. This conclusion was based on a study of 40 patients who were withdrawn from antihypertensive medications...
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_Hypertension_, 1990;16:103
doi: 10.1161/01.HYP.16.1.103

_Hypertension_ is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
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Print ISSN: 0194-911X. Online ISSN: 1524-4563

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http://hyper.ahajournals.org/content/16/1/103.1.citation

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