

ARIC MANUSCRIPT PROPOSAL FORM

Manuscript #416

1. a. Full Title: Plasma Fatty Acid Composition and 6-Year Incidence of Hypertension in Middle-Aged Adults

b. Abbreviated Title: Plasma Fatty Acids and Incident HTN

2. Writing Group:

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3. Timeline: This is based on ancillary Minneapolis data. Analyses are expected to be completed within 4 weeks; a draft manuscript can be presented to the writing group within 1 month after the completion of the analysis.

4. Rationale: Fatty acid (FA) intake and metabolism may play a role in the etiology of essential hypertension (HTN). Animal experiments have demonstrated that dietary fat affects blood pressure regulation: saturated FAs tend to increase blood pressure, while polyunsaturated FAs (particularly linoleic and the n-3 series) to decrease blood pressure. The protective effects of polyunsaturated FAs on blood pressure may be mediated through changes in prostaglandin metabolism.

The association of dietary fat intake with blood pressure has been examined in population-based epidemiologic studies; the results, however, are inconsistent. Of seven cross-sectional studies in five populations with relatively large sample size, only one found an inverse association between dietary linoleic acid and systolic blood pressure. Dietary saturated fat was correlated with high blood pressure only in a Finnish population. Dietary oleic acid was inversely associated with blood pressure in two small studies, but not in any of the larger populations. Total dietary fat was not associated with blood pressure in any of these studies. In a prospective study from the Nurses' Health Study, dietary saturated, monounsaturated, or polyunsaturated fatty acids were not

statistically significantly associated with 4 year incidence of hypertension, after adjustment for age, weight, energy intake, and other nutrients.

The FA composition of adipose tissue or plasma lipid fractions may be good indicators of an individual's biological response to dietary fat intake. In several cross-sectional studies, but no incidence studies, the FA compositions of adipose tissue, triglycerides and serum/plasma lipid fractions have been associated with blood pressure: linoleic acid was inversely, while saturated fatty acids were positively, associated with blood pressure.

The FA composition of plasma cholesterol esters and phospholipids was measured at the Minneapolis Field Center as part of the ARIC baseline examination. During 6 years of follow up (up to visit 3), over 400 Minneapolis participants have developed hypertension.

5. Main Hypotheses: 1) Higher levels of saturated fatty acids and monounsaturated fatty acids in plasma cholesterol esters and phospholipids are associated with increased risks of hypertension; 2) Higher levels of polyunsaturated FAs and higher P/S ratio are associated with lower risks of hypertension.

6. Data :

ARIC baseline, visit 2, and visit 3 data from Minneapolis will be used for analyses. Incident hypertension is defined as systolic BP \geq 140 mmHg or diastolic BP \geq 90 mmHg, or treatment for hypertension at the visit 2 or visit 3 examinations, but without evidence of hypertension at the baseline visit. The main variables include baseline status of HTN, status of HTN at visit 3, baseline FA composition of plasma cholesterol esters and phospholipids. Other variables include age, gender, baseline levels of blood pressures, body-mass index, waist-hip ratio, baseline cigarette smoking status, education level, alcohol consumption, physical activity (leisure index and sport index), and family history of hypertension.