

## ARIC Manuscript Proposal # 890B

PC Reviewed: 6 / 5 /07

Status: A

Priority: 2

SC Reviewed: \_\_\_\_\_

Status: \_\_\_\_\_

Priority: \_\_\_\_\_

### 1.a. Full Title:

Plasma Fatty Acid Composition and Incidence of Heart Failure in Middle Aged Adults: The Atherosclerosis Risk in Communities (ARIC) Study

### b. Abbreviated Title (Length 26 characters):

Plasma FA composition and HF

### 2. Writing Group:

Writing group members: Kazumasa Yamagishi, Jennifer A. Nettleton, Aaron R. Folsom

I, the first author, confirm that all the coauthors have given their approval for this manuscript proposal. KY [please confirm with your initials electronically or in writing]

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### 3. Timeline: 6 months, but we do hope to submit an abstract for AHA (deadline: June 1<sup>st</sup>)

Approval of proposal  
Literature review - 2 weeks  
Outline paper - 1 week  
Data analysis - 6 weeks

Manuscript writing - 8 weeks  
Review and edit - 8 weeks

#### **4. Rationale:**

Previous epidemiological studies have examined the association of several fatty acids with coronary heart disease, stroke, arrhythmia and risk factors (1-3), but evidence of an association between fatty acids composition and heart failure (HF) is limited. Mozaffarian et al. showed that fish and/or omega-3 polyunsaturated fatty acids (PUFA) intake measured by food frequency questionnaire was associated with reduced the risk of HF (4). However, to date, few studies have evaluated associations between fatty acids composition, including omega-3 PUFA, and HF. Furthermore, data on plasma fatty acids, common biomarkers of fatty acid intake, are quite limited.

In the ARIC Minneapolis field center, fractions of cholesterol ester (CE) and phospholipids (PL) plasma fatty acids at baseline were measured by gas-liquid chromatography. The associations with carotid artery intima-media thickness (5), hypertension (6), diabetes (7), coronary heart disease (8) and cognitive decline (9) have been already examined. We propose to examine the association of CE and PL fractions of plasma fatty acids composition and HF in the ARIC Minneapolis cohort.

#### **5. Main Hypothesis/Study Questions:**

- (1) Plasma omega-3 PUFAs are associated inversely with HF. These associations persist for EPA, DPA, and DHA separately.
- (2) Plasma saturated fatty acids are associated positively with HF.
- (3) Plasma monounsaturated fatty acids, omega-6 and omega-9 PUFAs are associated inversely and modestly with HF.
- (4) We will further analyze association of HF with specific fatty acids, including linoleic acid, oleic acid etc.

#### **6. Design and analysis (study design, inclusion/exclusion, outcome and other variables of interest with specific reference to the time of their collection, summary of data analysis, and any anticipated methodologic limitations or challenges if present).**

Sample: Minnesota participants (n=4,009) with fatty acid data

Exclusions: missing fatty acid compositions, prevalent HF, prevalent coronary heart disease, prevalent stroke, non-white

Dependent variable: incident HF (n=245)

Independent variable: PL and CE fatty acids

Covariates: age, smoking, alcohol intake, BMI, blood pressure, antihypertensive medication use, diabetes, plasma total cholesterol, total energy intake and other factors. Food frequency data will be used to help interpret our findings.

Analysis plan: Sex-specific hazard ratios and 95% confidence intervals of HF for quintiles of fatty acids composition will be calculated adjusted for age and other covariates using Cox proportional hazard model. Subgroup analysis will be conducted by stratification. Interactions will be tested using cross product terms.

**7.a. Will the data be used for non-CVD analysis in this manuscript?**  Yes

No

**b. If Yes, is the author aware that the file ICTDER02 must be used to exclude persons with a value RES\_OTH = "CVD Research" for non-DNA analysis, and for DNA analysis RES\_DNA = "CVD Research" would be used?**

Yes  No

(This file ICTDER02 has been distributed to ARIC PIs, and contains the responses to consent updates related to stored sample use for research.)

**8.a. Will the DNA data be used in this manuscript?**  Yes

No

**8.b. If yes, is the author aware that either DNA data distributed by the Coordinating Center must be used, or the file ICTDER02 must be used to exclude those with value RES\_DNA = "No use/storage DNA"?**

Yes  No

**9. The lead author of this manuscript proposal has reviewed the list of existing ARIC Study manuscript proposals and has found no overlap between this proposal and previously approved manuscript proposals either published or still in active status. ARIC Investigators have access to the publications lists under the Study Members Area of the web site at: <http://www.csc.unc.edu/ARIC/search.php>**

Yes  No

**10. What are the most related manuscript proposals in ARIC (authors are encouraged to contact lead authors of these proposals for comments on the new proposal or collaboration)?**

#890 Plasma fatty acid composition and incidence of coronary heart disease in middle aged adults: The Atherosclerosis Risk in Communities (ARIC) Study  
Lead author: Lu Wang

#1182 Diet and the risk of congestive heart failure in the Atherosclerosis Risk in Communities Study (ARIC)  
Lead author: Jennifer A. Nettleton

