

# APOA2, Dietary Fat, and Body Mass Index

## Replication of a Gene-Diet Interaction in 3 Independent Populations

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**eTable 1. Association Between the APOA2 -265T>C Polymorphism and Plasma APOA2 or APOA1 Concentrations in the Whole Population and Stratified by Sex and Obesity in the Framingham Offspring Study<sup>a</sup>**

| APOA2 -265T>C                        | Total        | Men          | Women        | No Obesity   | Obesity      |
|--------------------------------------|--------------|--------------|--------------|--------------|--------------|
| <b>APOA2, mg/dL</b>                  |              |              |              |              |              |
| TT+TC                                | 36.5 (7.1)   | 35.1 (6.1)   | 38.2 (7.4)   | 36.9 (6.9)   | 35.3 (6.9)   |
| CC                                   | 34.8 (6.1)   | 32.8 (5.4)   | 36.5 (6.2)   | 35.4 (6.1)   | 32.9 (5.7)   |
| <i>P</i> value <sup>b</sup>          | <.001        | .001         | .04          | .007         | .02          |
| Adjusted <i>P</i> value <sup>c</sup> | .001         | .003         | .03          | .007         | .03          |
| <b>APOA1, mg/dL</b>                  |              |              |              |              |              |
| TT+TC                                | 152.5 (25.8) | 142.2 (20.9) | 162.9 (25.6) | 155.4 (25.8) | 144.4 (24.1) |
| CC                                   | 153.4 (26.3) | 141.3 (21.1) | 163.9 (26.1) | 156.6 (26.7) | 144.1 (22.6) |
| <i>P</i> value <sup>b</sup>          | .63          | .70          | .68          | .57          | .90          |
| Adjusted <i>P</i> value <sup>c</sup> | .78          | .81          | .73          | .82          | .77          |

<sup>a</sup>Data are presented as mean (SD). Biochemical determinations for plasma APOA2 concentrations were available for 1217 individuals.

<sup>b</sup>For comparison of means between APOA2 -265T>C genotypes.

<sup>c</sup>Adjusted for sex, age, body mass index (calculated as weight in kilograms divided by height in meters squared), tobacco smoking, alcohol consumption, cholesterol medication use, and diabetes mellitus.

**Table 2. Association Between the *APOA2* -265T>C Polymorphism and Dietary Intake in Men and Women Dependent on Obesity Status in the Framingham Offspring Study**

| Characteristics                | Obesity (n=368) <sup>a</sup>   |                            |                       |                                  |                                  | No Obesity (n=1086) <sup>a</sup> |                             |                       |                                  |                                  |
|--------------------------------|--------------------------------|----------------------------|-----------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------|-----------------------|----------------------------------|----------------------------------|
|                                | TT+TC,<br>Mean (SD)<br>(n=307) | CC,<br>Mean (SD)<br>(n=61) | Unadjusted<br>P Value | Adjusted<br>P Value <sup>b</sup> | Adjusted<br>P Value <sup>c</sup> | TT+TC,<br>Mean (SD)<br>(n=910)   | CC,<br>Mean (SD)<br>(n=176) | Unadjusted<br>P Value | Adjusted<br>P Value <sup>b</sup> | Adjusted<br>P Value <sup>c</sup> |
| Age, y                         | 55.7 (8.7)                     | 55.8 (9.7)                 | .94                   | NA                               | NA                               | 55.4 (9.5)                       | 55.7 (9.8)                  | .68                   | NA                               | NA                               |
| BMI                            | 34 (3.9)                       | 34.1 (4.1)                 | .96                   | NA                               | NA                               | 25.4 (2.7)                       | 25.3 (2.7)                  | .60                   | NA                               | NA                               |
| Physical activity <sup>d</sup> | 36.6 (7.6)                     | 36.4 (6.2)                 | .90                   | .88                              | NA                               | 37.2 (7.2)                       | 36.7 (6.9)                  | .40                   | .47                              | NA                               |
| Total energy intake, kcal/d    | 1832.1 (629.1)                 | 2097.3 (735.1)             | .008                  | .004                             | .004                             | 1838.2 (605.4)                   | 1891.5 (614.3)              | .34                   | .31                              | .31                              |
| Total fat, g/d                 | 63.1 (26.8)                    | 71.2 (28.2)                | .02                   | .02                              | .02                              | 59.6 (24.7)                      | 60.1 (24.1)                 | .88                   | .63                              | .63                              |
| Saturated fat, g/d             | 22.3 (9.9)                     | 25.2 (11.2)                | .04                   | .04                              | .04                              | 20.9 (9.3)                       | 21.1 (8.9)                  | .79                   | .55                              | .54                              |
| MUFA, g/d                      | 24.2 (10.6)                    | 27.1 (11.1)                | .03                   | .03                              | .03                              | 22.6 (9.8)                       | 22.8 (9.6)                  | .94                   | .67                              | .66                              |
| PUFA, g/d                      | 12.5 (5.8)                     | 13.5 (5.7)                 | .22                   | .21                              | .20                              | 11.9 (5.3)                       | 12.2 (5.7)                  | .91                   | .80                              | .79                              |
| Proteins, g/d                  | 71.1 (26.7)                    | 80.2 (29.7)                | .02                   | .01                              | .01                              | 68.7 (25.5)                      | 69.4 (26.1)                 | .73                   | .64                              | .64                              |
| Carbohydrates, g/d             | 224.9 (85.5)                   | 263.6 (103.4)              | .005                  | .006                             | .005                             | 237.6 (90.1)                     | 248.3 (93.7)                | .25                   | .15                              | .16                              |
| Fructose, g/d                  | 22.8 (14.2)                    | 30.1 (21.9)                | .01                   | .009                             | .009                             | 25.2 (15.3)                      | 26.3 (14.7)                 | .33                   | .23                              | .24                              |
| Cholesterol, mg/dL             | 231.9 (101.8)                  | 262.2 (107.2)              | .03                   | .02                              | .02                              | 219.1 (99.4)                     | 219.3 (97.2)                | .95                   | .77                              | .76                              |
| Dietary fiber, g/d             | 18.4 (7.7)                     | 21.9 (9.7)                 | .06                   | .049                             | .046                             | 19.2 (8.4)                       | 20.3 (10.0)                 | .39                   | .41                              | .41                              |
| PUFA n-3, g/d                  | 1.43 (0.7)                     | 1.66 (1.1)                 | .07                   | .05                              | .06                              | 1.3 (0.6)                        | 1.4 (0.6)                   | .88                   | .88                              | .88                              |
| PUFA n-6, g/d                  | 10.9 (5.9)                     | 13.1 (10.7)                | .15                   | .13                              | .13                              | 10.3 (4.8)                       | 10.7 (5.5)                  | .77                   | .65                              | .64                              |
| Animal fat, g/d                | 35.1 (16.5)                    | 40.1 (17.7)                | .01                   | .008                             | .009                             | 32.4 (15.4)                      | 32.3 (14.8)                 | >.99                  | .77                              | .72                              |
| Vegetable fat, g/d             | 29.6 (14.8)                    | 32.1 (16.1)                | .33                   | .37                              | .36                              | 28.6 (14.3)                      | 29.4 (14.9)                 | .78                   | .61                              | .60                              |
| Alcohol in drinkers, g/d       | 15.9 (21.3)                    | 18.2 (28.7)                | .56                   | .50                              | .47                              | 14.6 (16.8)                      | 14.7 (16.6)                 | .99                   | .68                              | .67                              |

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); MUFA, monounsaturated fatty acids; NA, not applicable; PUFA, polyunsaturated fatty acids.

<sup>a</sup>No statistically significant differences in sex distribution were observed with regard to the *APOA2* polymorphism in individuals with obesity ( $P=.78$ ) and in those without obesity ( $P=.22$ ).

<sup>b</sup>Adjusted for sex, age, BMI, tobacco smoking, alcohol consumption, cholesterol medication use, and diabetes mellitus.

<sup>c</sup>Adjusted for sex, age, BMI, tobacco smoking, alcohol consumption, cholesterol medication use, diabetes mellitus, and physical activity.

<sup>d</sup>Estimated as a physical activity score, as indicated in the "Methods" section of the text.