**Supplementary Material to:**

**Circulating Polyunsaturated Fatty Acids as Biomarkers for Dietary Intake across Subgroups: the CODAM and Hoorn Studies**

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This document contains the following supplemental material:

Supplemental Data 1: Recruitment and selection of participants in the CODAM and Hoorn study

Supplemental Table 1: Fully adjusted associations between circulating (% of total FA) and self-reported intakes (% of energy) of LA, ALA, EPA and DHA, stratified for demographic, lifestyle and health characteristics

Supplemental Table 2: Associations between circulating (µg/ml) and self-reported intakes (% of energy) of LA, ALA, EPA and DHA, stratified for demographic, lifestyle and health characteristics

Supplemental Table 3: Demographic, lifestyle and health determinants of circulating (µg/ml) LA, ALA, EPA and DHA

**Supplemental data 1. Recruitment and selection of participants in the CODAM and Hoorn study.**

The CODAM study includes Caucasian men and women aged 40 to 70 years, who participated in a screening study examining the diagnostics of type 2 diabetes mellitus (T2DM) [1]. Baseline measurements of 574 participants (301 with normal glucose tolerance (NGT), 127 with impaired glucose metabolism (IGM), and 146 with T2DM) were obtained between 1999 and 2002 [2]. IGM was defined as impaired glucose tolerance (IGT), impaired fasting glucose (IFG), or both. In total, 495 participated at the follow-up in 2006-2009 after a median of 7.0 years [3].

The Hoorn study started in 1989 and was a population-based study examining the prevalence of T2DM in Caucasian men and women aged 50 to 74 years [4]. For the examination cycle in 2000-2001 an invitation was sent to all surviving patients with T2DM (n=176) and a random sample of participants with IGT (n=193) and NGT (n=705) based on their glucose tolerance status at the examination in 1996-1998. Of all invited persons, 648 participated [5]. In addition, a group of 195 participants with T2DM from the separate Hoorn Screening Study as well as 60 newly diagnosed diabetes patients were included [6].

The current cross-sectional analysis is based on pooled data from the follow-up examinations the CODAM and Hoorn studies.

References

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**Supplemental Table 1. Fully adjusted associations between circulating (% of total FA) and self-reported intakes (% of energy) of LA, ALA, EPA and DHA, stratified for demographic, lifestyle and health characteristicsa**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **LA** | | **ALA†** | | **EPA** | | **DHA** | |
|  | **n** | **β (95% CI)** | **p-value‡** | **β (95% CI)** | **p-value** | **β (95% CI)** | **p-value** | **β (95% CI)** | **p-value** |
| Dietary FA (% of energy) |  | 5.5 (1.7) b |  | 0.43 (0.35-0.54) |  | 0.02 (0.01-0.03) |  | 0.05 (0.02-0.07) |  |
| Circulating FA (% of total FA) |  | 27.0 (3.7) |  | 0.54 (0.46-0.65) |  | 0.68 (0.50-0.94) |  | 1.76 (1.40-2.18) |  |
|  |  |  |  |  |  |  |  |  |  |
| Overall association | 1171 | 0.337 (0.271-0.403) |  | 0.165 (0.101-0.229) |  | 0.322 (0.263-0.382) |  | 0.437 (0.382-0.493) |  |
| Gender § |  |  |  |  |  |  |  |  |  |
| Men | 631 | 0.358 (0.276-0.440) | ref | **0.111 (0.032-0.191)** | **ref** | **0.405 (0.323-0.487)** | **ref** | **0.489 (0.416-0.561)** | **ref** |
| Women | 540 | 0.313 (0.238-0.389) | 0.399 | **0.239 (0.153-0.326)** | **0.027** | **0.241 (0.163-0.319)** | **0.004** | **0.374 (0.298-0.451)** | **0.031** |
| Age |  |  |  |  |  |  |  |  |  |
| Tertile 1 | 384 | 0.285 (0.183-0.386) | ref | 0.173 (0.064-0.282) | ref | 0.374 (0.263-0.485) | ref | 0.480 (0.379-0.581) | ref |
| Tertile 2 | 387 | 0.376 (0.271-0.480) | 0.159 | 0.174 (0.055-0.293) | 0.986 | 0.332 (0.201-0.464) | 0.592 | 0.384 (0.276-0.492) | 0.154 |
| Tertile 3 | 400 | 0.340 (0.231-0.449) | 0.402 | 0.154 (0.039-0.268) | 0.789 | 0.281 (0.176-0.386) | 0.188 | 0.454 (0.347-0.560) | 0.691 |
| Smoking status |  |  |  |  |  |  |  |  |  |
| Never | 369 | 0.308 (0.206-0.410) | ref | 0.147 (0.041-0.253) | ref | 0.319 (0.226-0.411) | ref | 0.436 (0.354-0.518) | ref |
| Former | 598 | 0.366 (0.279-0.453) | 0.346 | 0.168 (0.079-0.257) | 0.752 | 0.294 (0.204-0.384) | 0.691 | 0.423 (0.337-0.508) | 0.817 |
| Current | 195 | 0.309 (0.171-0.447) | 0.989 | 0.188 (0.026-0.349) | 0.647 | 0.416 (0.257-0.575) | 0.264 | 0.483 (0.338-0.627) | 0.555 |
| Physical activity |  |  |  |  |  |  |  |  |  |
| Tertile 1 | 387 | 0.361 (0.261-0.461) | ref | 0.120 (0.016-0.225) | ref | 0.338 (0.246-0.430) | ref | 0.446 (0.353-0.539) | ref |
| Tertile 2 | 386 | 0.315 (0.205-0.426) | 0.496 | 0.189 (0.070-0.309) | 0.340 | 0.268 (0.156-0.380) | 0.309 | 0.466 (0.356-0.576) | 0.765 |
| Tertile 3 | 387 | 0.327 (0.221-0.434) | 0.608 | 0.183 (0.069-0.297) | 0.373 | 0.367 (0.248-0.486) | 0.679 | 0.404 (0.302-0.507) | 0.519 |
| Alcohol intake |  |  |  |  |  |  |  |  |  |
| No | 186 | **0.232 (0.108-0.357)** | **ref** | 0.244 (0.107-0.381) | ref | 0.229 (0.114-0.345) | ref | **0.286 (0.176-0.397)** | **ref** |
| Moderate | 789 | **0.349 (0.270-0.427)** | **0.085** | 0.133 (0.044-0.223) | 0.150 | 0.351 (0.266-0.436) | 0.077 | **0.485 (0.409-0.561)** | **0.002** |
| High | 196 | **0.424 (0.241-0.607)** | **0.047** | 0.204 (0.018-0.391) | 0.686 | 0.360 (0.178-0.541) | 0.180 | **0.463 (0.284-0.642)** | **0.061** |
| Body Mass Index |  |  |  |  |  |  |  |  |  |
| Normal | 282 | **0.474 (0.360-0.587)** | **ref** | 0.214 (0.098-0.329) | ref | 0.303 (0.193-0.414) | ref | 0.426 (0.331-0.520) | ref |
| Overweight | 588 | **0.284 (0.193-0.375)** | **0.004** | 0.154 (0.055-0.254) | 0.398 | 0.380 (0.273-0.486) | 0.282 | 0.478 (0.385-0.571) | 0.403 |
| Obesity | 299 | **0.326 (0.190-0.461)** | **0.052** | 0.139 (-0.003-0.281) | 0.355 | 0.265 (0.137-0.392) | 0.611 | 0.380 (0.258-0.502) | 0.519 |
| Waist |  |  |  |  |  |  |  |  |  |
| Normal | 220 | **0.495 (0.367-0.623)** | **ref** | 0.207 (0.070-0.343) | ref | 0.418 (0.281-0.554) | ref | 0.462 (0.352-0.572) | ref |
| Increased | 300 | **0.380 (0.235-0.525)** | **0.159** | 0.153 (0.001-0.306) | 0.543 | 0.308 (0.152-0.464) | 0.215 | 0.447 (0.316-0.579) | 0.845 |
| High | 636 | **0.269 (0.173-0.364)** | **0.002** | 0.157 (0.050-0.263) | 0.525 | 0.299 (0.195-0.403) | 0.134 | 0.420 (0.326-0.514) | 0.532 |
| Cardiovascular disease |  |  |  |  |  |  |  |  |  |
| No | 574 | **0.391 (0.307-0.476)** | **ref** | 0.204 (0.120-0.289) | ref | 0.353 (0.265-0.440) | ref | 0.451 (0.375-0.527) | ref |
| Yes | 571 | **0.285 (0.211-0.360)** | **0.045** | 0.124 (0.043-0.204) | 0.159 | 0.299 (0.224-0.374) | 0.356 | 0.424 (0.350-0.497) | 0.608 |
| Lipid lowering medication | |  |  |  |  |  |  |  |  |
| No | 846 | 0.344 (0.181-0.507) | ref | 0.006 (-0.167-0.178) | ref | 0.329 (0.157-0.501) | ref | 0.550 (0.392-0.709) | ref |
| Yes | 325 | 0.338 (0.277-0.400) | 0.927 | 0.129 (0.061-0.198) | 0.051 | 0.324 (0.257-0.390) | 0.936 | 0.461 (0.400-0.523) | 0.137 |
| Glucose tolerance status | |  |  |  |  |  |  |  |  |
| Normal glucose tolerance | 467 | 0.322 (0.231-0.412) | ref | **0.079 (-0.012-0.171)** | **ref** | 0.380 (0.282-0.479) | ref | 0.466 (0.383-0.550) | ref |
| Impaired glucose metabolism | 290 | 0.319 (0.199-0.438) | 0.966 | **0.169 (0.038-0.299)** | **0.230** | 0.297 (0.171-0.423) | 0.259 | 0.441 (0.322-0.559) | 0.709 |
| Type 2 diabetes mellitus | 406 | 0.365 (0.267-0.463) | 0.480 | **0.262 (0.159-0.365)** | **0.005** | 0.290 (0.187-0.393) | 0.175 | 0.401 (0.305-0.497) | 0.282 |
| Energy underreporting |  |  |  |  |  |  |  |  |  |
| Normal reporters | 906 | 0.324 (0.250-0.397) | ref | 0.178 (0.108-0.249) | ref | 0.342 (0.272-0.412) | ref | 0.461 (0.397-0.524) | ref |
| Under-reporters | 263 | 0.373 (0.265-0.480) | 0.434 | 0.120 (0.004-0.235) | 0.387 | 0.277 (0.177-0.377) | 0.293 | 0.376 (0.279-0.473) | 0.151 |

95% CI, 95 percent confidence interval; LA, linoleic acid; ALA, alpha-linoleic acid; EPA eicosapentaenoic acid; DHA, docosahexaenoic acid; EI, energy intake; BMR, basal metabolic rate

a Standardized β coefficients were derived from multivariable linear regression analyses with circulating FA (% of total FA), self-reported intake of FA (% of energy) and interaction terms (dietary fatty acid intake \* dummy variable), adjusted for original cohort and for EI/BMR (normal/underreporters), age (y), gender (men/women), BMI (kg/m2), waist (normal/increased/high), physical activity score (min per week x intensity), smoking status (never/former/current), cardiovascular disease (no/yes), glucose tolerance status (NGT/IGM/T2DM), anti-hypertensive (no/yes) and lipid-lowering medication (no/yes), alcohol intake (No/moderate/high), and the dietary variables energy intake, carbohydrates, protein, SFA, MUFA and TFA intake (En%)

b Values are presented as means ± Standard Deviation or medians (interquartile range)

† Circulating and dietary ALA, EPA and DHA were log-transformed

‡ p-values from interaction terms (dietary fatty acid intake \* dummy variable)

§ Age was categorized as tertile 1 (48-65 years), tertile 2 (65-71 years), and tertile 3 (71-87 years); Physical activity was categorized as tertile 1 (<3.8 min/week \* intensity), tertile 2 (3.8-7.0 min/week \* intensity), and tertile 3 (>7.0 min/week \* intensity); Alcohol intake was categorized as no (<0.1 g/day), moderate (<30.0 g/day for men or <20.0 g/day for women), and high (≥30.0 g/day for men and ≥20.0 g/day for women); Body Mass Index was categorized as normal (<25 kg/m2), overweight (25-30 kg/m2), and obese (>30 kg/m2); waist circumference was categorized as normal (<94 cm for men and <80.0 cm for women), increased (94-102 cm for men and 80-88 cm for women), and high (>102 cm for men and >88 cm for women)

**Supplemental** **Table 2. Associations between circulating (µg/mL) and self-reported intakes (% of energy) of LA, ALA, EPA and DHA, stratified for demographic, lifestyle and health characteristicsa**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | LA | | ALA† | | EPA | | DHA | |
|  | n | β (95% CI) | p-value ‡ | β (95% CI) | p-value | β (95% CI) | p-value | β (95% CI) | p-value |
| Dietary FA (% of energy) |  | 5.5 (1.7) b |  | 0.43 (0.35-0.54) |  | 0.02 (0.01-0.03) |  | 0.05 (0.02-0.07) |  |
| Circulating FA (ug/ml) |  | 888 (184) |  | 17.3 (14.0-22.8) |  | 22.0 (15.7-32.8) |  | 56.8 (44.0-72.2) |  |
|  |  |  |  |  |  |  |  |  |  |
| Overall association | 1171 | 0.187 (0.131-0.244) |  | 0.099 (0.040-0.158) |  | 0.306 (0.251-0.361) |  | 0.409 (0.356-0.462) |  |
| Gender § |  |  |  |  |  |  |  |  |  |
| Men | 631 | 0.210 (0.134-0.287) | ref | 0.073 (-0.003-0.150) | ref | **0.369 (0.291-0.447)** | **ref** | **0.459 (0.387-0.530)** | **ref** |
| Women | 540 | 0.191 (0.112-0.270) | 0.731 | 0.128 (0.041-0.214) | 0.354 | **0.237 (0.162-0.311)** | **0.016** | **0.339 (0.263-0.416)** | **0.026** |
| Age |  |  |  |  |  |  |  |  |  |
| Tertile 1 | 384 | 0.135 (0.033-0.237) | ref | 0.150 (0.043-0.258) | ref | 0.369 (0.260-0.477) | ref | 0.470 (0.370-0.571) | ref |
| Tertile 2 | 387 | 0.189 (0.077-0.302) | 0.442 | 0.101 (-0.021-0.223) | 0.507 | 0.345 (0.216-0.474) | 0.755 | 0.397 (0.287-0.506) | 0.280 |
| Tertile 3 | 400 | 0.217 (0.103-0.332) | 0.247 | 0.039 (-0.075-0.153) | 0.125 | 0.248 (0.147-0.350) | 0.081 | 0.385 (0.279-0.491) | 0.205 |
| Smoking status |  |  |  |  |  |  |  |  |  |
| Never | 369 | 0.132 (0.029-0.234) | ref | 0.030 (-0.073-0.134) | ref | 0.295 (0.205-0.385) | ref | 0.412 (0.329-0.496) | ref |
| Former | 598 | 0.184 (0.091-0.277) | 0.433 | 0.125 (0.036-0.215) | 0.151 | 0.310 (0.221-0.400) | 0.803 | 0.415 (0.328-0.503) | 0.956 |
| Current | 195 | 0.289 (0.142-0.435) | 0.056 | 0.168 (0.007-0.330) | 0.119 | 0.394 (0.238-0.551) | 0.246 | 0.418 (0.273-0.564) | 0.942 |
| Physical activity |  |  |  |  |  |  |  |  |  |
| Tertile 1 | 387 | 0.192 (0.096-0.288) | ref | 0.048 (-0.051-0.147) | ref | 0.287 (0.202-0.373) | ref | 0.406 (0.317-0.496) | ref |
| Tertile 2 | 386 | 0.220 (0.103-0.336) | 0.701 | 0.140 (0.021-0.259) | 0.205 | 0.281 (0.171-0.391) | 0.928 | 0.439 (0.328-0.549) | 0.627 |
| Tertile 3 | 387 | 0.118 (0.005-0.231) | 0.291 | 0.101 (-0.013-0.215) | 0.453 | 0.361 (0.245-0.477) | 0.286 | 0.388 (0.285-0.492) | 0.780 |
| Alcohol intake |  |  |  |  |  |  |  |  |  |
| No | 186 | 0.200 (0.074-0.326) | ref | 0.213 (0.075-0.352) | ref | 0.257 (0.145-0.369) | ref | **0.300 (0.191-0.409)** | **ref** |
| Moderate | 789 | 0.183 (0.098-0.268) | 0.814 | 0.063 (-0.028-0.154) | 0.057 | 0.297 (0.217-0.377) | 0.551 | **0.432 (0.356-0.508)** | **0.040** |
| High | 196 | 0.206 (0.017-0.395) | 0.954 | 0.144 (-0.044-0.332) | 0.488 | 0.339 (0.160-0.518) | 0.389 | **0.418 (0.241-0.595)** | **0.206** |
| Body Mass Index |  |  |  |  |  |  |  |  |  |
| Normal | 282 | 0.220 (0.107-0.332) | ref | 0.134 (0.019-0.249) | ref | 0.280 (0.170-0.391) | ref | 0.386 (0.290-0.482) | ref |
| Overweight | 588 | 0.167 (0.070-0.264) | 0.452 | 0.097 (-0.005-0.199) | 0.605 | 0.354 (0.250-0.458) | 0.294 | 0.456 (0.361-0.551) | 0.273 |
| Obesity | 299 | 0.214 (0.071-0.357) | 0.944 | 0.078 (-0.063-0.219) | 0.493 | 0.251 (0.124-0.378) | 0.695 | 0.346 (0.224-0.469) | 0.578 |
| Waist |  |  |  |  |  |  |  |  |  |
| Normal | 220 | 0.212 (0.080-0.344) | ref | 0.158 (0.020-0.295) | ref | 0.385 (0.248-0.523) | ref | 0.424 (0.312-0.537) | ref |
| Increased | 300 | 0.218 (0.061-0.374) | 0.946 | 0.062 (-0.095-0.218) | 0.282 | 0.268 (0.109-0.427) | 0.190 | 0.393 (0.256-0.529) | 0.684 |
| High | 636 | 0.160 (0.058-0.262) | 0.502 | 0.094 (-0.014-0.201) | 0.424 | 0.296 (0.194-0.397) | 0.256 | 0.400 (0.306-0.494) | 0.719 |
| Cardiovascular disease |  |  |  |  |  |  |  |  |  |
| No | 574 | 0.228 (0.148-0.308) | ref | 0.140 (0.057-0.222) | ref | 0.340 (0.256-0.423) | ref | 0.442 (0.367-0.518) | ref |
| Yes | 571 | 0.145 (0.065-0.225) | 0.147 | 0.068 (-0.013-0.148) | 0.216 | 0.268 (0.193-0.343) | 0.209 | 0.365 (0.291-0.439) | 0.152 |
| Lipid lowering medication | |  |  |  |  |  |  |  |  |
| No | 846 | 0.285 (0.114-0.456) | ref | -0.055 (-0.227-0.118) | ref | 0.315 (0.147-0.484) | ref | 0.494 (0.335-0.653) | ref |
| Yes | 325 | 0.207 (0.144-0.270) | 0.243 | 0.064 (-0.004-0.132) | 0.063 | 0.307 (0.244-0.371) | 0.903 | 0.426 (0.364-0.487) | 0.259 |
| Glucose tolerance status | |  |  |  |  |  |  |  |  |
| Normal glucose tolerance | 467 | 0.154 (0.064-0.243) | ref | 0.040 (-0.051-0.132) | ref | 0.328 (0.235-0.421) | ref | 0.411 (0.329-0.494) | ref |
| Impaired glucose metabolism | 290 | 0.238 (0.111-0.364) | 0.252 | 0.092 (-0.041-0.226) | 0.498 | 0.319 (0.194-0.443) | 0.897 | 0.455 (0.335-0.576) | 0.529 |
| Type 2 diabetes mellitus | 406 | 0.209 (0.104-0.314) | 0.399 | 0.193 (0.088-0.298) | 0.022 | 0.286 (0.186-0.386) | 0.518 | 0.387 (0.291-0.482) | 0.684 |
| Energy underreporting |  |  |  |  |  |  |  |  |  |
| Normal reporters | 906 | 0.189 (0.124-0.254) | ref | 0.110 (0.044-0.177) | ref | 0.326 (0.260-0.393) | ref | 0.422 (0.360-0.484) | ref |
| Under-reporters | 263 | 0.174 (0.060-0.289) | 0.829 | 0.073 (-0.045-0.191) | 0.588 | 0.260 (0.163-0.357) | 0.272 | 0.386 (0.287-0.484) | 0.547 |

95% CI, 95 percent confidence interval; LA, linoleic acid; ALA, alpha-linoleic acid; EPA eicosapentaenoic acid; DHA, docosahexaenoic acid; EI, energy intake; BMR, basal metabolic rate

a Standardized β coefficients were derived from multivariable linear regression analyses with circulating FA **(µg/mL)**, self-reported intake of FA (% of energy) and interaction terms (dietary fatty acid intake \* dummy variable), adjusted for original cohort

b Values are presented as means ± Standard Deviation or medians (interquartile range)

†Circulating and dietary ALA, EPA and DHA were log-transformed

‡ p-values from interaction terms (dietary fatty acid intake \* dummy variable)

§ Age was categorized as tertile 1 (48-65 years), tertile 2 (65-71 years), and tertile 3 (71-87 years); Physical activity was categorized as tertile 1 (<3.8 min/week \* intensity), tertile 2 (3.8-7.0 min/week \* intensity), and tertile 3 (>7.0 min/week \* intensity); Alcohol intake was categorized as no (<0.1 g/day), moderate (<30.0 g/day for men or <20.0 g/day for women), and high (≥30.0 g/day for men and ≥20.0 g/day for women); Body Mass Index was categorized as normal (<25 kg/m2), overweight (25-30 kg/m2), and obese (>30 kg/m2); waist circumference was categorized as normal (<94 cm for men and <80.0 cm for women), increased (94-102 cm for men and 80-88 cm for women), and high (>102 cm for men and >88 cm for women)

**Supplemental table 3. Demographic, lifestyle and health determinants of circulating (µg/mL) LA, ALA, EPA and DHAa**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | LA | | | ALA† | | | EPA | | | DHA | | |
| β | p-value | partial R2 | β | p-value | partial R2 | β | p-value | partial R2 | β | p-value | partial R2 |
| Age (years) ‡ | -0.107 | 0.003 | 0.7% | -0.109 | 0.003 | 0.7% | 0.051 | 0.138 | 0.2% | 0.088 | 0.008 | 0.5% |
| Gender (ref=men) | 0.108 | 0.055 | 0.3% | -0.034 | 0.562 | 0.0% | 0.1 | 0.066 | 0.3% | 0.085 | 0.103 | 0.2% |
| Physical activity (min/week \* intensity) | 0.029 | 0.329 | 0.1% | 0.032 | 0.303 | 0.1% | -0.016 | 0.578 | 0.0% | -0.008 | 0.786 | 0.0% |
| Smoking status (ref=never) |  |  |  |  |  |  |  |  |  |  |  |  |
| Former | -0.006 | 0.859 | 0.1% | -0.074 | 0.041 | 0.4% | -0.015 | 0.655 | 0.1% | -0.018 | 0.58 | 0.2% |
| Current | 0.027 | 0.419 |  | -0.035 | 0.321 |  | 0.023 | 0.477 |  | 0.031 | 0.323 |  |
| Alcohol intake (ref=no) |  |  |  |  |  |  |  |  |  |  |  |  |
| Moderate | -0.053 | 0.197 | 0.2% | -0.047 | 0.267 | 0.1% | 0.069 | 0.08 | 1.3% | 0.068 | 0.072 | 0.6% |
| High | -0.024 | 0.696 |  | -0.018 | 0.757 |  | 0.216 | <0.001 |  | 0.153 | 0.003 |  |
| Body Mass Index (kg/m²) | 0.052 | 0.278 | 0.1% | 0.065 | 0.189 | 0.1% | 0.047 | 0.312 | 0.1% | 0.018 | 0.687 | 0.0% |
| Waist circumference (ref=normal) |  |  |  |  |  |  |  |  |  |  |  |  |
| Increased | 0.044 | 0.263 | 0.1% | 0.128 | 0.002 | 0.9% | 0.069 | 0.073 | 0.7% | 0.081 | 0.028 | 0.7% |
| High | 0.029 | 0.577 |  | 0.156 | 0.004 |  | 0.149 | 0.003 |  | 0.152 | 0.002 |  |
| Glucose tolerance status (ref=normal) |  |  |  |  |  |  |  |  |  |  |  |  |
| Impaired glucose metabolism | 0.035 | 0.272 | 0.1% | 0.061 | 0.066 | 0.3% | 0.03 | 0.334 | 1.3% | 0.063 | 0.036 | 0.4% |
| Type 2 Diabetes Mellitus | -0.018 | 0.595 |  | 0.028 | 0.428 |  | -0.107 | <0.001 |  | -0.001 | 0.975 |  |
| Anti-hypertensive medication (ref=no) | -0.043 | 0.2 | 0.1% | -0.044 | 0.202 | 0.1% | -0.056 | 0.085 | 0.2% | -0.087 | 0.005 | 0.5% |
| Lipid lowering medication (ref=no) | -0.083 | 0.013 | 0.5% | -0.005 | 0.896 | 0.0% | 0.053 | 0.099 | 0.2% | 0.091 | 0.003 | 0.6% |
| Cardiovascular disease (ref=no) | -0.035 | 0.264 | 0.1% | 0.044 | 0.174 | 0.2% | 0.001 | 0.983 | 0.0% | -0.005 | 0.856 | 0.0% |
| EI:BMR | 0.278 | 0.019 | 0.4% | 0.286 | 0.02 | 0.5% | 0.208 | 0.069 | 0.2% | 0.155 | 0.157 | 0.1% |
| Fatty acid intake (%En) |  |  |  |  |  |  |  |  |  |  |  |  |
| LA | 0.163 | <0.001 | 1.6% |  |  |  |  |  |  |  |  |  |
| ALA † |  |  |  | 0.106 | 0.002 | 0.9% |  |  |  |  |  |  |
| EPA |  |  |  |  |  |  | 0.273 | <0.001 | 6.3% |  |  |  |
| DHA |  |  |  |  |  |  |  |  |  | 0.38 | <0.001 | 12.3% |
| Model R2 |  |  | 13.4% |  |  | 6.6% |  |  | 18.9% |  |  | 25.5% |

LA, linoleic acid; ALA, alpha-linoleic acid; EPA eicosapentaenoic acid; DHA, docosahexaenoic acid; EI, energy intake; %En, percentage of energy; BMR, basal metabolic rate.

a (Partial) R2 derived from multivariable models for circulating FA **(µg/ml)** including original cohort, age, sex, BMI, waist circumference, physical activity score, smoking status, cardiovascular disease, glucose tolerance status, anti-hypertensive and lipid lowering medication, EI/BMR, alcohol intake, and the specific self-reported FA intake, additionally controlled for total energy intake and intakes from carbohydrate, protein, SFA, MUFA and TFA

† Circulating and dietary ALA, EPA and DHA were log-transformed

‡ Alcohol intake was categorized as no (<0.1 g/day), moderate (<30.0 g/day for men or <20.0 g/day for women), and high (≥30.0 g/day for men and ≥20.0 g/day for women); waist circumference was categorized as normal (<94 cm for men and <80.0 cm for women), increased (94-102 cm for men and 80-88 cm for women), and high (>102 cm for men and >88 cm for women)