

**Table S1.** Multivariate linear regression of liver function biomarkers across the quartiles of dietary pattern <sup>a</sup>.

| Liver Function Biomarkers | Quartiles of Dietary Pattern |                     |                 |                      |                 |                      |                 |
|---------------------------|------------------------------|---------------------|-----------------|----------------------|-----------------|----------------------|-----------------|
|                           | 1                            | 2                   | 3               |                      | 4               |                      |                 |
|                           |                              | $\beta$ (95% CI)    | <i>p</i> -Value | $\beta$ (95% CI)     | <i>p</i> -Value | $\beta$ (95% CI)     | <i>p</i> -Value |
| ALT (IU/L)                |                              | 0.18 (0.06, 0.31)   | 0.000           | 0.31 (0.19, 0.44)    | 0.000           | 0.55 (0.42, 0.68)    | 0.000           |
| AST (IU/L)                |                              | 0.03 (-0.18, 0.24)  | 0.600           | 0.30 (0.09, 0.51)    | 0.000           | 0.47 (0.26, 0.68)    | 0.000           |
| $\gamma$ -GT (IU/L)       |                              | -0.03 (-0.18, 0.13) | 0.671           | 0.12 (-0.03, 0.27)   | 0.363           | -0.04 (-0.19, 0.11)  | 0.222           |
| ALP (IU/L)                | Ref                          | 3.24 (2.38, 4.09)   | 0.000           | 4.91 (4.06, 5.76)    | 0.000           | 12.76 (11.90, 13.62) | 0.000           |
| LDH (IU/L)                |                              | 2.81 (1.82, 3.80)   | 0.000           | 5.62 (4.63, 6.60)    | 0.000           | 13.59 (12.59, 14.58) | 0.000           |
| Albumin (g/dL)            |                              | -0.00 (-0.00, 0.01) | 0.100           | -0.01 (-0.01, -0.02) | 0.001           | -0.02 (-0.02, -0.01) | 0.000           |
| Total bilirubin (mg/dL)   |                              | 0.01 (0.01, 0.02)   | 0.000           | 0.01 (0.01, 0.02)    | 0.000           | 0.01 (0.01, 0.02)    | 0.000           |

ALT: alanine transaminase, AST: aspartate transaminase,  $\gamma$ -GT gamma-glutamyltransferase, ALP: alkaline phosphatase, LDH: lactate dehydrogenase.

<sup>a</sup> Multivariate model was adjusted for age, gender, marital status, education, family income, body mass index, body fat, systolic pressure, diastolic pressure, smoking status, drinking status, sleep duration, and physical activity.

**Table S2.** Logistic regression models for the association of lifestyle variables with abnormal liver function biomarkers ( $n = 62,645$ ).

| <b>Lifestyle Variables</b>      | <b>Model 1 <sup>a</sup></b><br><b>OR (95% CI)</b> | <b><i>p</i>-Value</b> | <b>Model 2 <sup>b</sup></b><br><b>OR (95% CI)</b> | <b><i>p</i>-Value</b> |
|---------------------------------|---|-----------------------|---|-----------------------|
| Smoking status (Ref: no)        |   |                       |   |                       |
| Second-hand smoker              | 0.99 (0.94, 1.04)                                 | 0.599                 | 0.97 (0.92, 1.02)                                 | 0.28                  |
| Past smoker                     | 1.47 (1.38, 1.57)                                 | <0.0001               | 1.43 (1.34, 1.52)                                 | <0.0001               |
| Smoke occasionally              | 1.28 (1.19, 1.37)                                 | <0.0001               | 1.27 (1.18, 1.37)                                 | <0.0001               |
| Smoke daily                     | 1.55 (1.49, 1.62)                                 | <0.0001               | 1.54 (1.47, 1.61)                                 | <0.0001               |
| Drinking status (Ref: no)       |   |                       |   |                       |
| Past drinker                    | 1.18 (1.05, 1.32)                                 | 0.005                 | 1.03 (0.91, 1.17)                                 | 0.62                  |
| 1-2 times/week                  | 1.52 (1.46, 1.59)                                 | <0.0001               | 1.39 (1.34, 1.46)                                 | <0.0001               |
| 3-4 times/week                  | 1.74 (1.62, 1.88)                                 | <0.0001               | 1.57 (1.45, 1.70)                                 | <0.0001               |
| Drank daily                     | 1.74 (1.54, 1.96)                                 | <0.0001               | 1.57 (1.38, 1.78)                                 | <0.0001               |
| Sleep duration (Ref: normal)    |   |                       |   |                       |
| Short (<6 h)                    | 1.12 (1.09, 1.15)                                 | <0.0001               | 1.07 (1.04, 1.09)                                 | <0.0001               |
| Long (>8 h)                     | 1.18 (1.09, 1.19)                                 | <0.0001               | 1.11 (1.10, 1.12)                                 | <0.0001               |
| Physical activity (Ref: active) |   |                       |   |                       |
| Less active (<2 h/week)         | 1.33 (1.26, 1.41)                                 | <0.0001               | 1.25 (1.17, 1.33)                                 | <0.0001               |
| BMI (Ref: normal weight)        |   |                       |   |                       |
| Underweight                     | 1.69 (1.62, 1.76)                                 | <0.0001               | 1.71 (1.62, 1.80)                                 | <0.0001               |
| Overweight                      | 3.30 (3.16, 3.45)                                 | <0.0001               | 3.15 (2.96, 3.39)                                 | <0.0001               |
| Obese                           | 4.75 (4.52, 4.99)                                 | <0.0001               | 4.52 (4.23, 4.85)                                 | <0.0001               |

BMI: body mass index.

<sup>a</sup>Model 1 was adjusted for age and gender.

<sup>b</sup>For smoking status, drinking status, sleep duration, and physical activity, model 2 was adjusted for age, gender, marital status, education, family income, body mass index, body fat, systolic pressure, and diastolic pressure. For BMI, model 2 was adjusted for age, gender, marital status, education, family income, body mass index, body fat, systolic pressure, diastolic pressure, smoking status, drinking status, sleep duration, and physical activity.

**Table S3.** Multiple logistic regression for the association of dietary pattern or lifestyle variables with abnormal liver function biomarkers in both genders ( $n = 62,645$ )<sup>a</sup>.

| Variables                                  | OR (95% CI)              |            |                            |            |
|--|--------------------------|------------|----------------------------|------------|
|  | Male<br>( $n = 13,189$ ) | $p$ -Value | Female<br>( $n = 49,456$ ) | $p$ -Value |
| Liver associated dietary pattern (Ref: Q1) |                          |            |                            |            |
| Q2   | 0.99 (0.97, 1.06)        | 0.087      | 1.09 (1.05, 1.12)          | <0.0001    |
| Q3   | 1.06 (0.92, 1.19)        | 0.210      | 1.14 (1.10, 1.18)          | <0.0001    |
| Q4   | 1.13 (1.08, 1.14)        | 0.014      | 1.18 (1.14, 1.19)          | <0.0001    |
| Smoking status (Ref: no)                   |                          |            |                            |            |
| Second-hand smoker                         | 1.13 (0.99, 1.26)        | 0.062      | 1.04 (0.89, 1.24)          | 0.610      |
| Past smoker                                | 1.19 (1.10, 1.28)        | <0.0001    | 1.07 (1.06, 1.08)          | 0.002      |
| Smoke occasionally                         | 1.02 (0.92, 1.15)        | 0.639      | 1.08 (1.07, 1.09)          | 0.007      |
| Smoke daily                                | 0.97 (0.89, 1.06)        | 0.616      | 1.12 (1.09, 1.17)          | <0.0001    |
| Drinking status (Ref: no)                  |                          |            |                            |            |
| Past drinker                               | 1.07 (1.06, 1.09)        | 0.013      | 1.04 (0.89, 1.21)          | 0.584      |
| 1-2 times/week                             | 1.08 (1.07, 1.08)        | <0.0001    | 0.94 (0.88, 1.01)          | 0.095      |
| 3-4 times/week                             | 1.09 (1.09, 1.11)        | <0.0001    | 1.04 (1.01, 1.04)          | <0.0001    |
| Drank daily                                | 1.11 (1.09, 1.16)        | <0.0001    | 1.06 (1.05, 1.08)          | <0.0001    |
| Sleep duration (Ref: normal)               |                          |            |                            |            |
| Short (<6 h)                               | 0.88 (0.84, 1.01)        | 0.083      | 1.01 (1.01, 1.02)          | <0.0001    |
| Long (>8 h)                                | 1.11 (1.08, 1.29)        | <0.0001    | 1.08 (1.02, 1.13)          | 0.002      |
| Physical activity (Ref: active)            |                          |            |                            |            |
| Less active (<2 h/week)                    | 1.31 (1.10, 1.55)        | 0.002      | 1.24 (1.03, 1.48)          | 0.020      |

<sup>a</sup> For smoking status, drinking status, sleep duration, and physical activity, age, marital status, education, family income, body mass index, body fat, systolic pressure, and diastolic pressure were adjusted.