**Supplementary Table S1.** Quality assessment of cohort studies included in the meta-analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | Selection\* | Comparability† | Outcome‡ | Quality§ |
| Jorde R, *et al.* 2013(3), Norway | ★★★★ | ★★ | ★★ | High |
| Becerra-Tomás N, *et al.* 2014(4), Spain | ★★★★ | ★★ | ★★ | High |
| Lorenzo C, *et al.* 2014(17), USA | ★★★★ | ★★ | ★★ | High |
| Rooney MR, *et al.* 2016(6), USA | ★★★★ | ★★ | ★★ | High |
| Zaccardi F, *et al.* 2015(10), Finland | ★★★ | ★ | ★★ | Moderate |
| Sing CW, *et al.* 2016(9), China | ★★★ | ★★ | ★★ | Moderate |
| Suh S, *et al.* 2017(27), Korea | ★★★★ | ★★ | ★★ | High |
| Kim KN, *et al.* 2018(22), Korea | ★★★★ | ★★ | ★★ | High |

USA, the United States of America.

\* Stars awarded for representativeness of the cohort, selection of the controls, the accuracy of blood calcium tests, and the diagnostic ascertainment of type 2 diabetes. A maximum of 4 stars could be awarded.

† Stars awarded for adjustment of associated confounders. A maximum of 2 stars could be awarded.

‡ Stars awarded for assessment of type 2 diabetes, length of follow-up, and adequacy of follow-up cohorts. A maximum of 3 stars could be awarded.

§ Studies with a sum of stars of 0-4, 5-7, and 8-9 were considered as low, moderate, and high quality, respectively.

**Supplementary Table S2.** Quality assessment of case-control studies included in the meta-analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | Selection\* | Comparability† | Exposure‡ | Quality§ |
| Heath 3rd H, *et al.* 1979(34), USA | ★★★ | - | ★★ | Moderate |
| McNair P, *et al.* 1983(35), Denmark | ★ | - | ★★ | Low |
| Levy J, *et al.*1986(18), Israel | ★ | ★★ | ★★ | Moderate |
| Sorva A, *et al.* 1990(7), Finland | ★ | ★ | ★★ | Low |

USA, the United States of America.

\* Stars awarded for adequate definition of type 2 diabetes with independent validation, consecutive or obvious representativeness of the cases, selection of community controls, controls with no history of type 2 diabetes. A maximum of 4 stars could be awarded.

† Stars awarded for adjustment of associated confounders based on the design or analysis. A maximum of 2 stars could be awarded.

‡ Stars awarded for assessment of circulating calcium levels, same method of ascertainment for cases and controls and same non-response rate. A maximum of 3 stars could be awarded.

§ Studies with a sum of stars of 0-4, 5-7, and 8-9 were considered as low, moderate, and high quality, respectively.

**Supplementary Table S3.** Quality assessment of cross-sectional studies included in the meta-analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Source | Selection\* | Comparability† | Outcome‡ | Quality§ |
| Wareham NJ, *et al.* 1997(23), UK | ★★★★ | ★★ | ★★ | High |
| Sun G, *et al.* 2005(21), Canada | ★★★ | ★★ | ★ | Moderate |
| Hagström E, *et al.* 2007(24), Sweden | ★★★ | ★★ | ★ | Moderate |
| Kim MK, *et al.* 2010(19), Korea | ★★★★ | ★★ | ★★ | High |
| Yamaguchi T, *et al.* 2011(20), Japan | ★★ | ★★ | ★ | Moderate |
| Cho GJ, *et al.* 2011(36), Korea | ★★★ | ★★ | ★★ | Moderate |
| Guasch A, *et al.* 2012(38), Spain | ★★ | ★★ | ★★ | Moderate |
| Shimodaira M, *et al.* 2015(37), Japan | ★★★ | ★★ | ★ | Moderate |

UK, the United Kingdom.

\* Stars awarded for representativeness of the sample, justified and satisfied sample size, ascertainment of blood calcium assessment, non-response rate description. A maximum of 4 stars could be awarded.

† Stars awarded for comparable subjects in different outcome groups based on the study design or analysis, adjustment of associated confounders. A maximum of 2 stars could be awarded.

‡ Stars awarded for assessment of type 2 diabetes or related parameters (impaired glucose tolerance), clearly described and completed statistical analysis. A maximum of 2 stars could be awarded.

§ Studies with a sum of stars of 0-4, 5-7, and 8 were considered as low, moderate, and high quality, respectively.

**Supplementary Table** **S4.** Influence of a single study on the pooled association of albumin-adjusted serum calcium levels (highest versus lowest) with risk of T2DM: a sensitivity analysis

|  |  |
| --- | --- |
| Study omitted | OR (95% CI)  Highest *vs*. lowest |
| None | 1.14 (1.05, 1.24) |
| Becerra-Tomás N, *et al.* 2014(4) | 1.14 (1.05, 1.24) |
| Rooney MR, *et al.* 2016(6) | 1.11 (1.01, 1.21) |
| Sing CW, *et al.* 2016(9) | 1.13 (1.04, 1.24) |
| Kim KN, *et al.* 2018(22) | 1.16 (1.05, 1.27) |
| Suh S, *et al.* 2018(27) | 1.19 (1.07, 1.32) |

T2DM, type 2 diabetes mellitus; OR, odds ratio; CI, confidence interval.

**Supplementary Table S5.** Influence of a single study on the pooled association of per 1 mg/dL increments in albumin-adjusted serum calcium levels with risk of T2DM: a sensitivity analysis

|  |  |
| --- | --- |
| Study omitted | OR (95% CI)  Per 1 mg/ dL↑ |
| None | 1.16 (1.07, 1.27) |
| Becerra-Tomás N, *et al.* 2014(4) | 1.16 (1.06, 1.27) |
| Lorenzo C, *et al.* 2014(17) | 1.15 (1.04, 1.26) |
| Rooney MR, *et al.* 2016(6) | 1.14 (1.04, 1.26) |
| Sing CW, *et al.* 2016(9) | 1.15 (1.05, 1.25) |
| Kim KN, *et al.* 2018(22) | 1.20 (1.09, 1.32) |
| Suh S, *et al.* 2018(27) | 1.20 (1.09, 1.32) |

T2DM, type 2 diabetes mellitus; OR, odds ratio; CI, confidence interval.

**Supplementary Table S6.** Influence of a single study on the pooled association of total calcium levels (highest versus lowest) with risk of T2DM: a sensitivity analysis

|  |  |
| --- | --- |
| Study omitted | OR (95% CI)  Highest *vs*. lowest |
| None | 1.25 (1.10, 1.42) |
| Jorde R, *et al.* 2013(3) | 1.24 (1.06, 1.44) |
| Lorenzo C, *et al.* 2014(17) | 1.21 (1.10, 1.33) |
| Sing CW, *et al.* 2016(9) | 1.25 (1.06, 1.46) |
| Kim KN, *et al.* 2018(22) | 1.27 (1.06, 1.54) |
| Suh S, *et al.* 2018(27) | 1.32 (1.16, 1.50) |

T2DM, type 2 diabetes mellitus; OR, odds ratio; CI, confidence interval.

**Supplementary Table S7.** Influence of a single study on the pooled association of per 1 mg/dL increments in total calcium levels with risk of T2DM: a sensitivity analysis

|  |  |
| --- | --- |
| Study omitted | OR (95% CI)  Per 1 mg/ dL↑ |
| None | 1.19 (1.11, 1.28) |
| Jorde R, *et al.* 2013(3) | 1.20 (1.11, 1.29) |
| Lorenzo C, *et al.* 2014(17) | 1.18 (1.09, 1.27) |
| Sing CW, *et al.* 2016(9) | 1.18 (1.10, 1.27) |
| Kim KN, *et al.* 2018(22) | 1.21 (1.11, 1.32) |
| Suh S, *et al.* 2017(27) | 1.21 (1.11, 1.31) |

T2DM, type 2 diabetes mellitus; OR, odds ratio; CI, confidence interval.