Supplemental information

Analysis across Taiwan Biobank, Biobank Japan,

and UK Biobank identifies hundreds

of novel loci for 36 quantitative traits

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Figure S1-S68

Figure S1. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for height (HT), related to Figure 2A
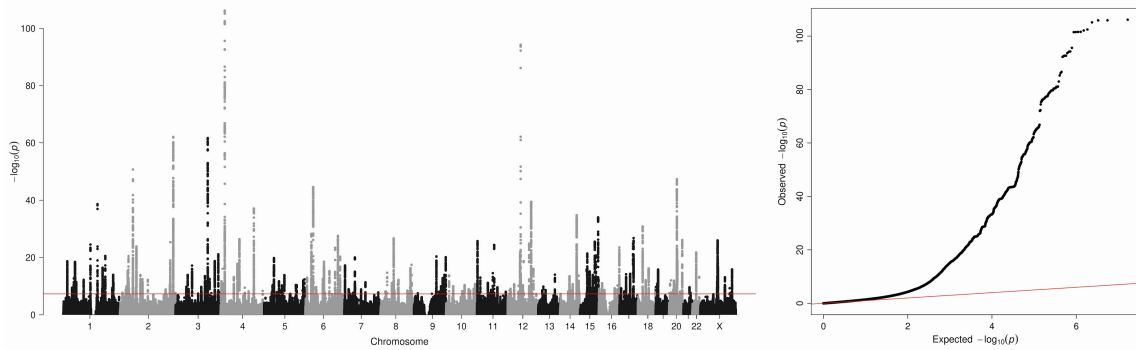

Figure S2. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for weight (WT), related to Figure 2A
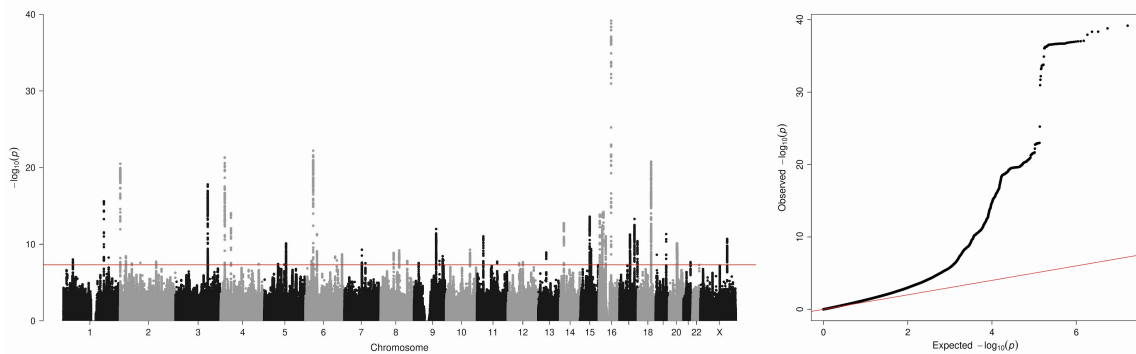

Figure S3. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for body mass index (BMI), related to Figure 2A
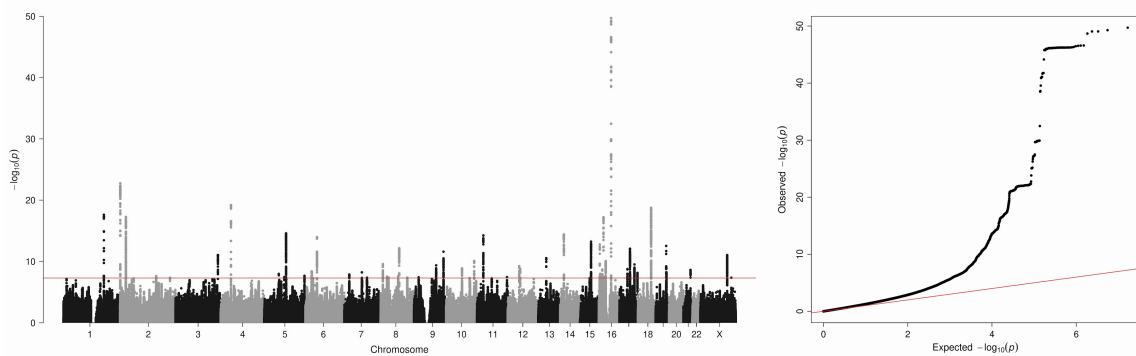
Figure S4. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for body fat rate (BFR), related to Figure 2A
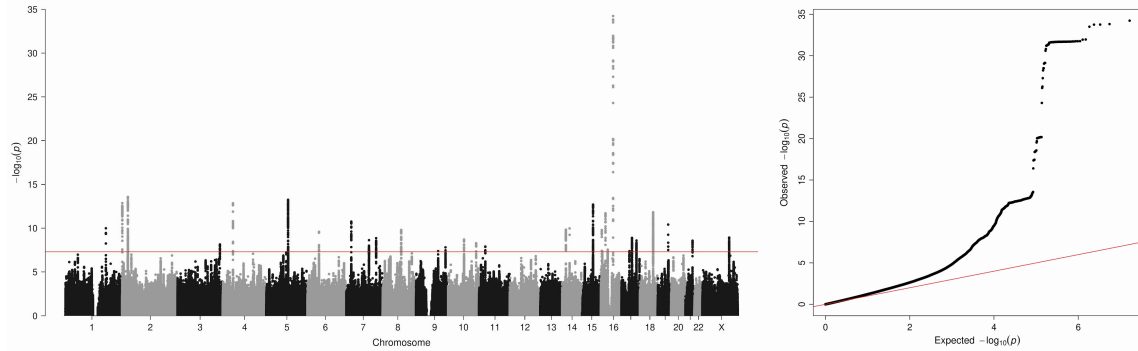

Figure S5. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for waist circumference (WC), related to Figure 2A
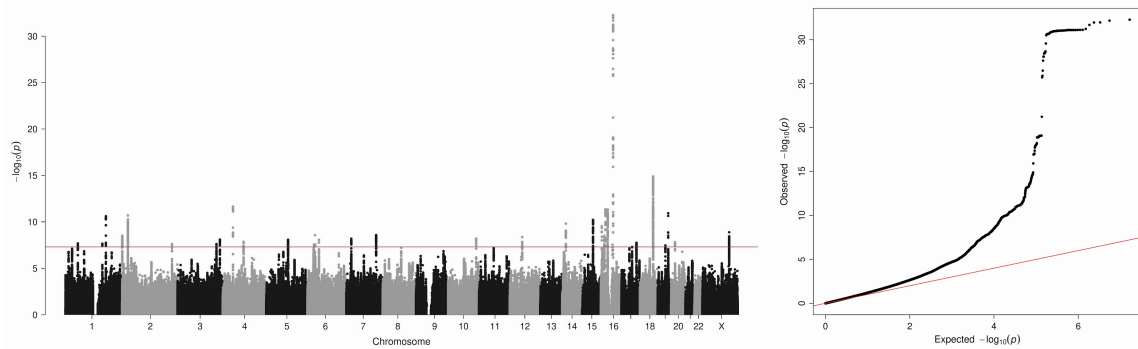

Figure S6. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for hip circumference (HC), related to Figure 2A
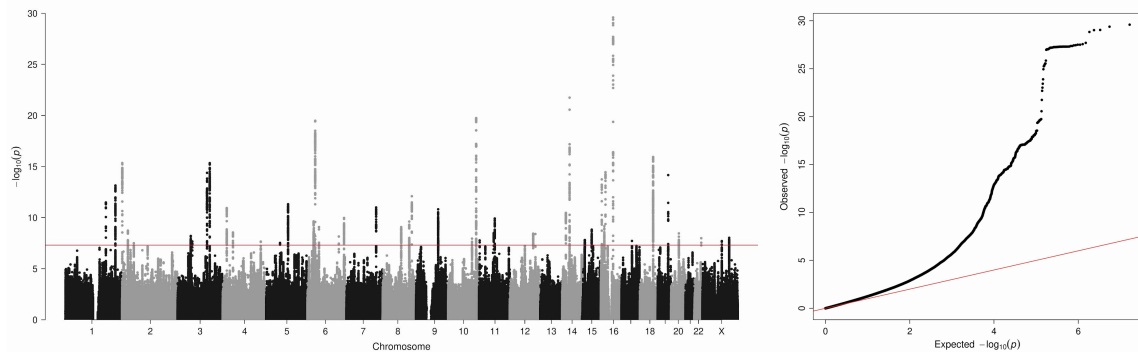
Figure S7. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for waist-to-Hip ratio (WHR), related to Figure 2A
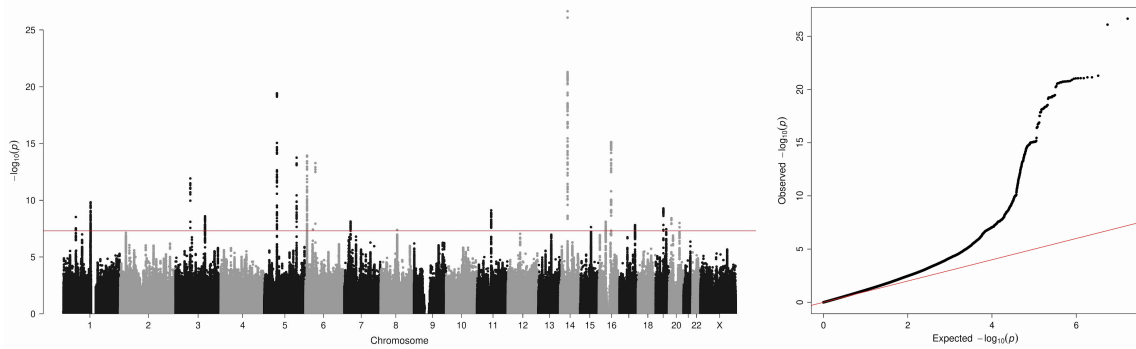

Figure S8. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for bone mineral density T-score (BMD-T), related to Figure 2A
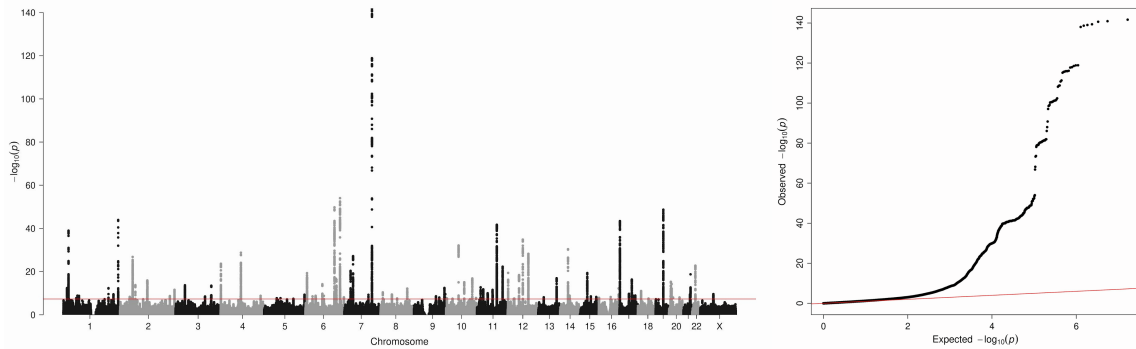

Figure S9. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for bone density Z-score (BMD-Z), related to Figure 2A
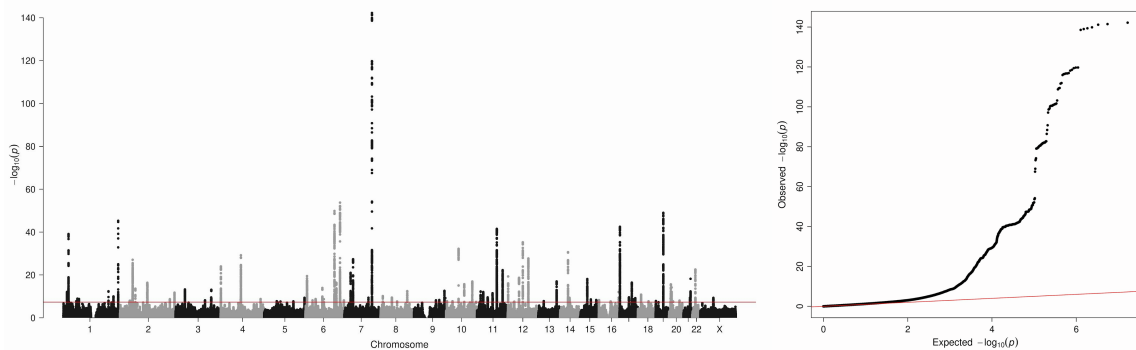
Figure S10. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for diastolic blood pressure (DBP), related to Figure 2A
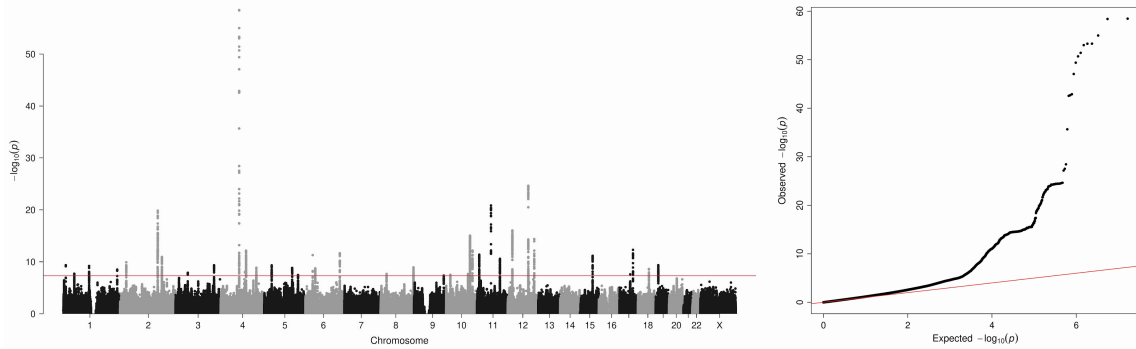

Figure S11. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for systolic blood pressure (SBP), related to Figure 2A
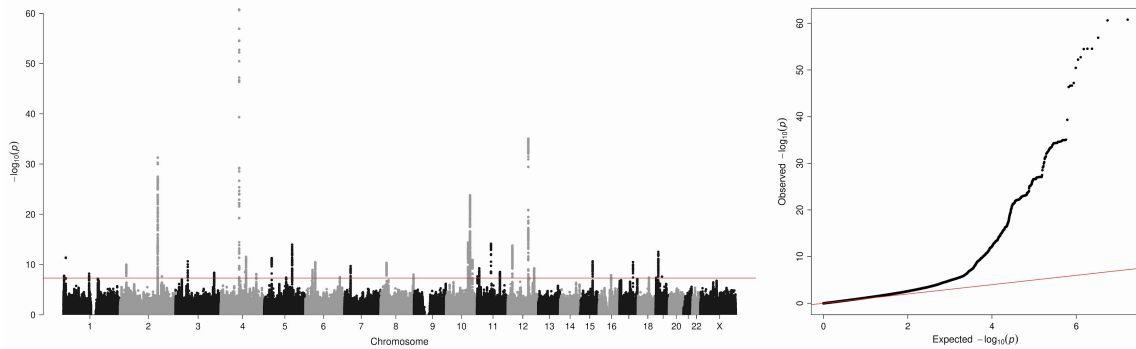

Figure S12. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for resting heart rate (HR), related to Figure 2A
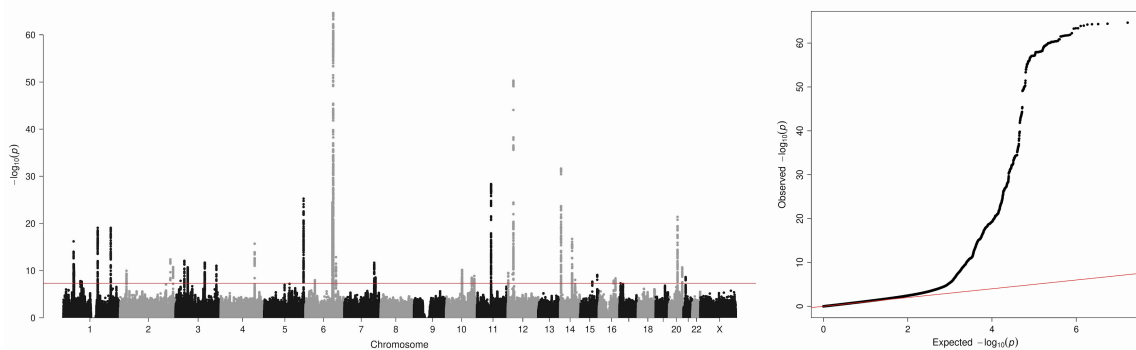
Figure S13. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for white blood cell (WBC), related to Figure 2A
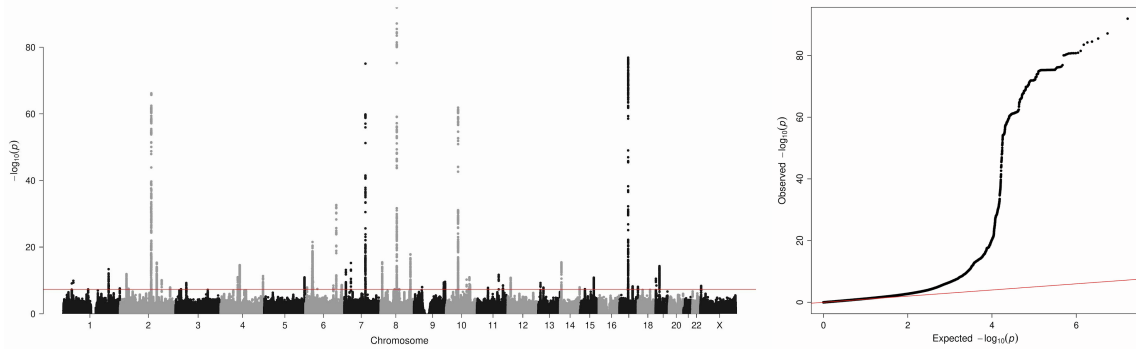

Figure S14. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for red blood cell (RBC), related to Figure 2A
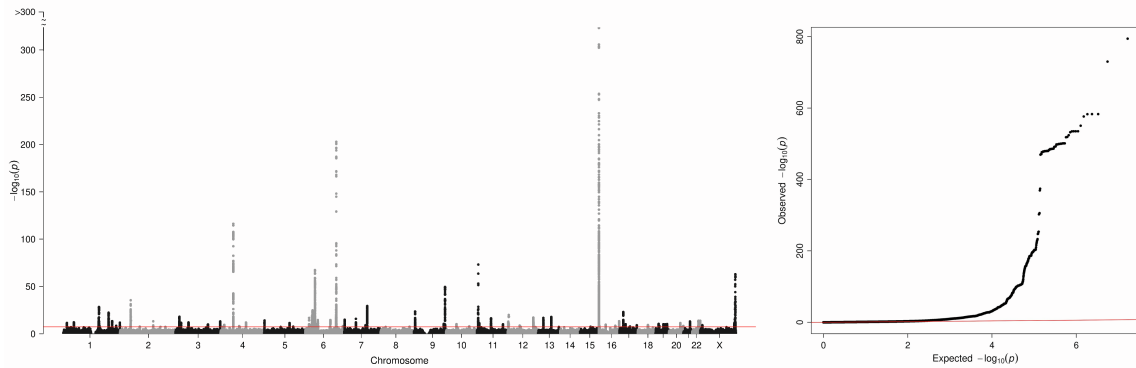

Figure S15. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for hemoglobin (HB), related to Figure 2A
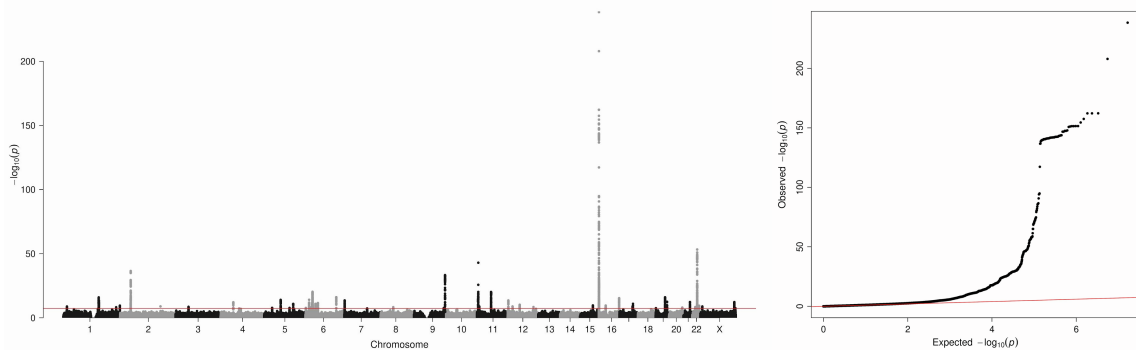
Figure S16. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for hematocrit (HCT), related to Figure 2A
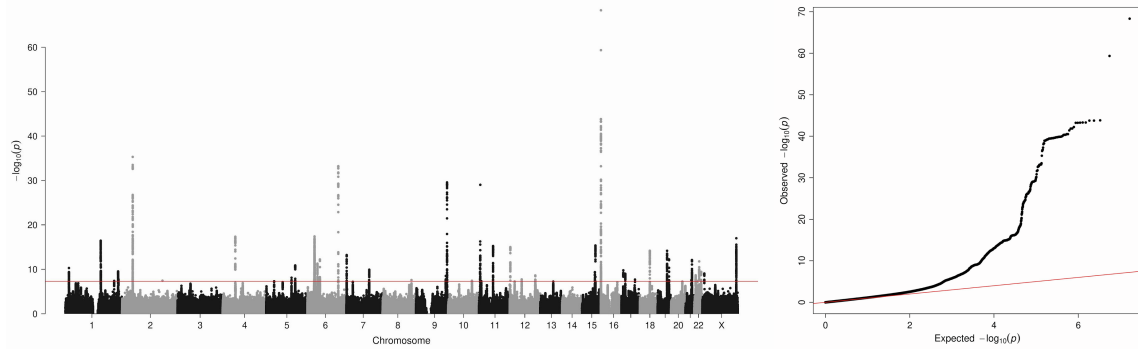

Figure S17. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for platelet (PLT), related to Figure 2A
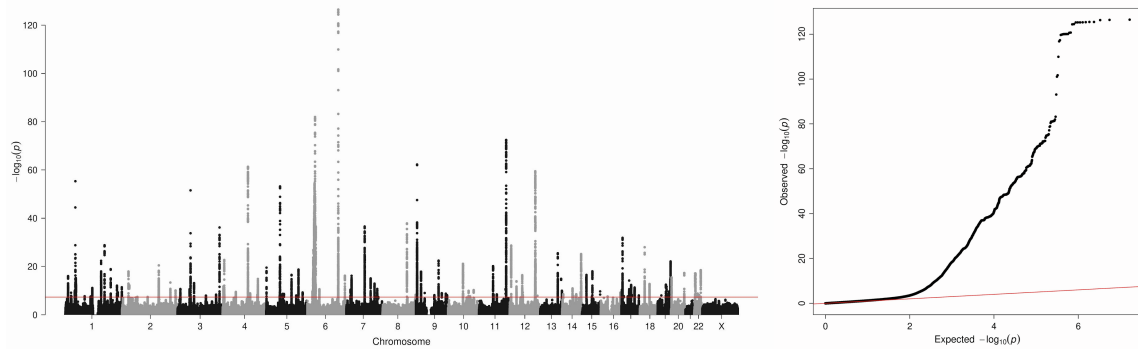

Figure S18. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for blood urea nitrogen (BUN), related to Figure 2A
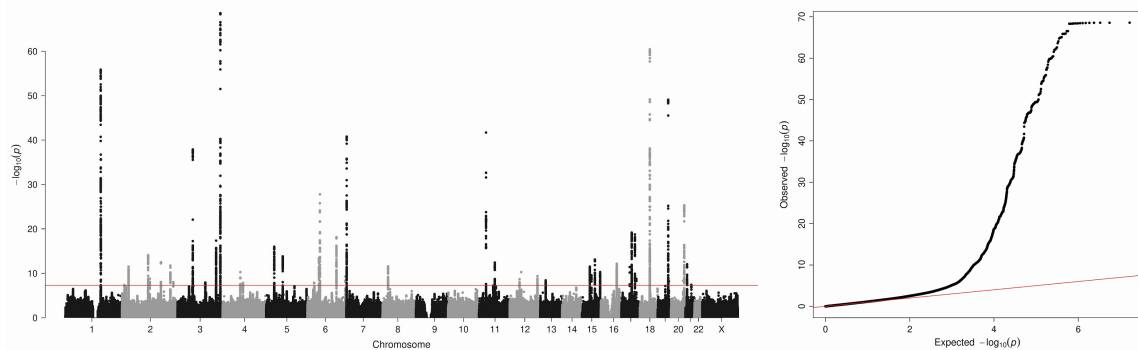
Figure S19. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for creatinine (CR), related to Figure 2A
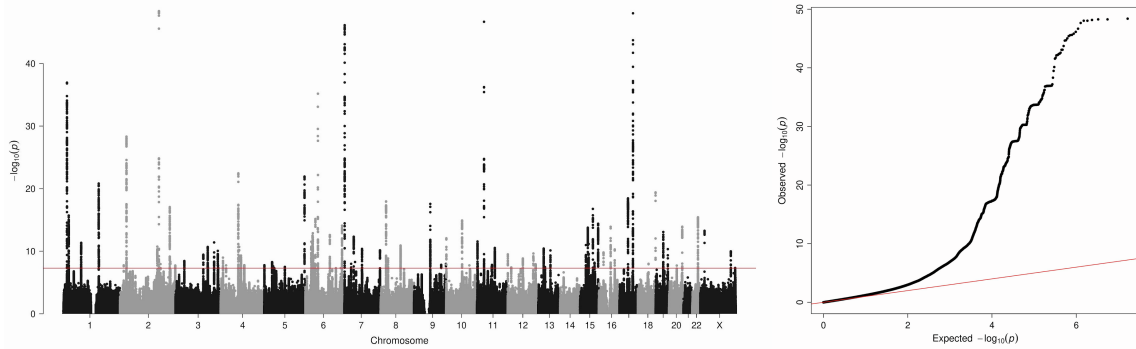

Figure S20. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for microalbumin urine (mALB), related to Figure 2A
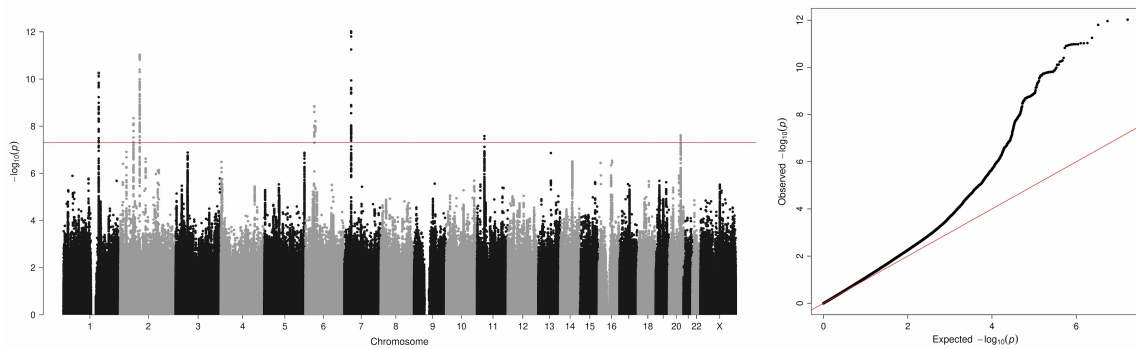

Figure S21. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for uric acid (UA), related to Figure 2A
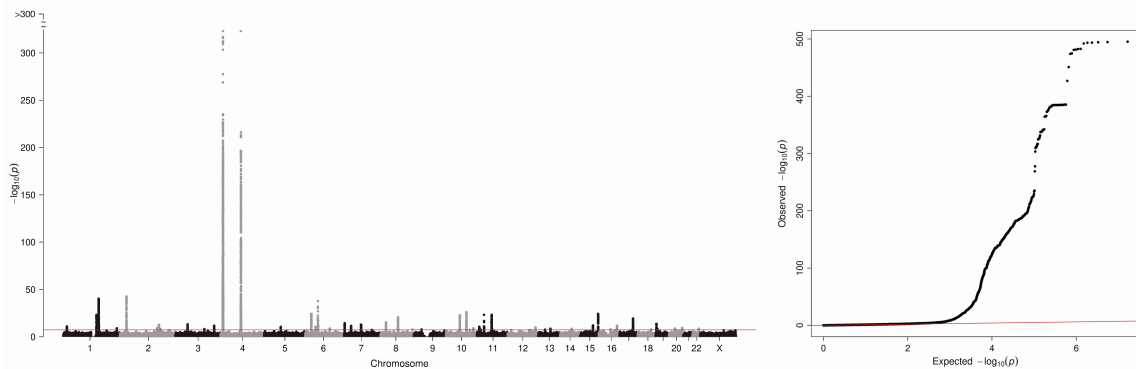
Figure S22. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for total bilirubin (T-BIL), related to Figure 2A
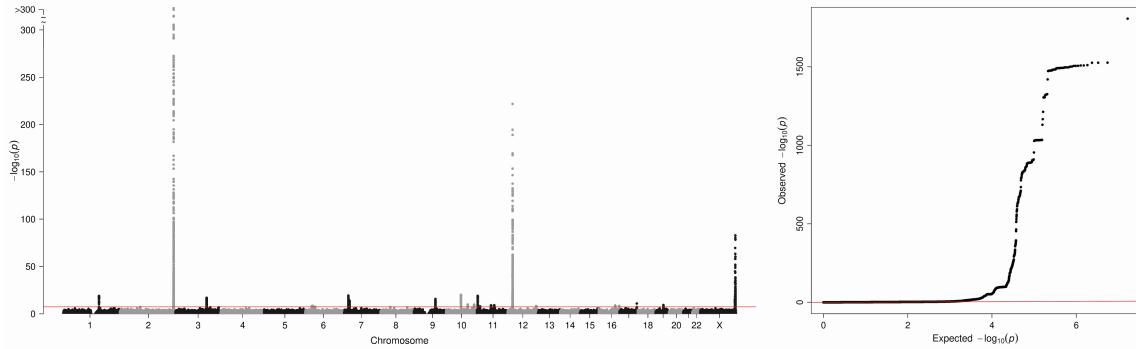

Figure S23. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for alanine aminotransferease (ALT), related to Figure 2A
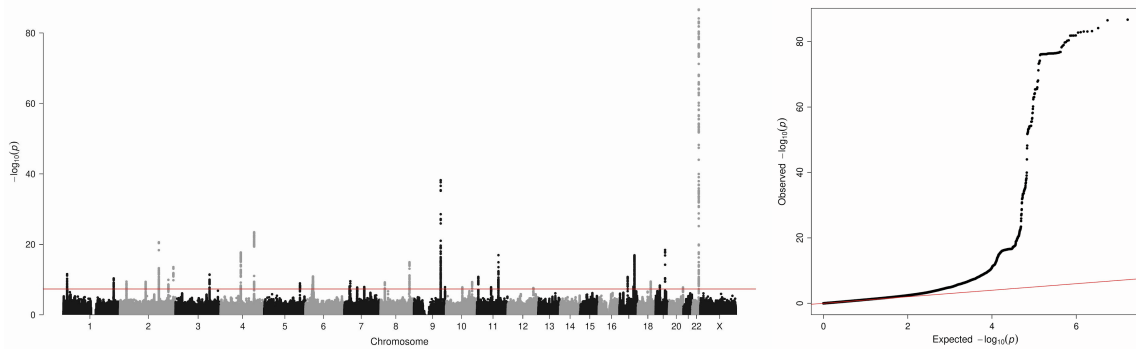

Figure S24. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for aspartate aminotransferase (AST), related to Figure 2A
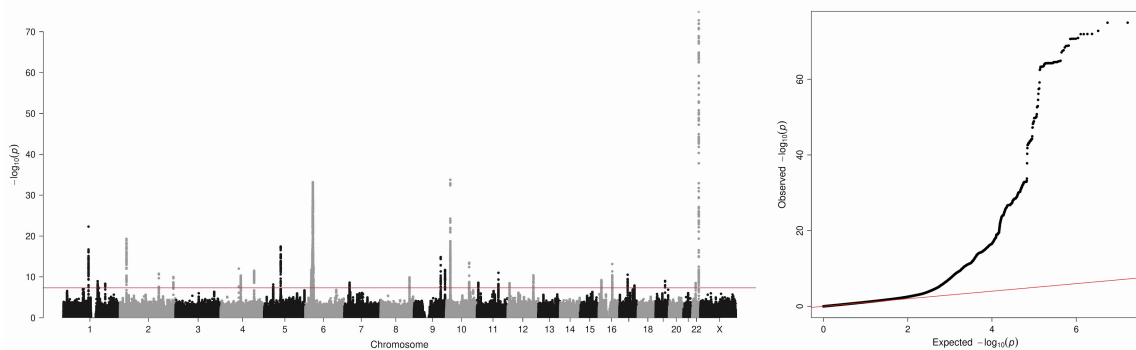
Figure S25. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for gamma-glutamyltransferase (GGT), related to Figure 2A
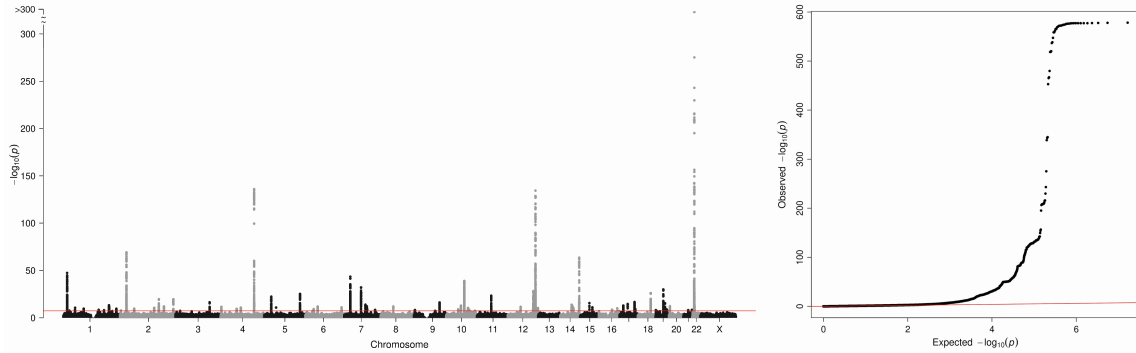

Figure S26. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for alpha-fetoprotein (AFP), related to Figure 2A
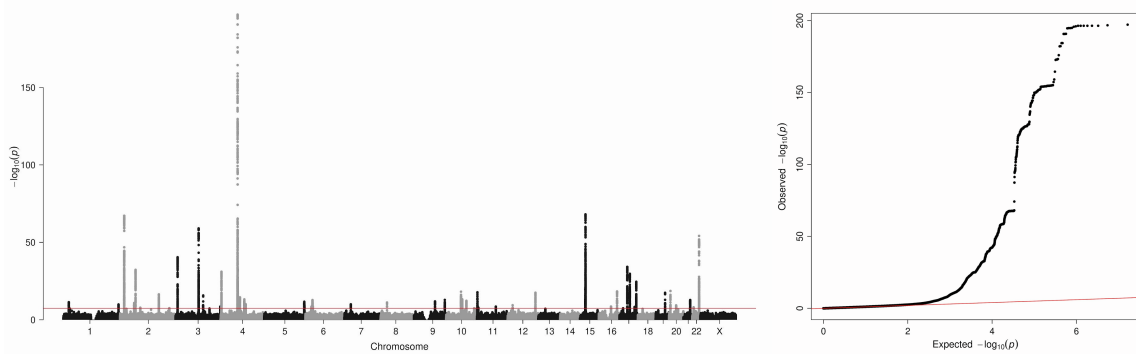

Figure S27. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for albumin (ALB), related to Figure 2A
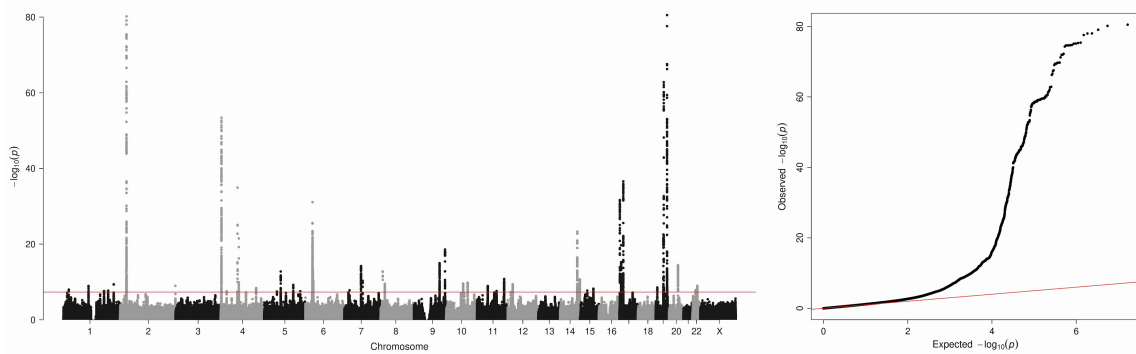
Figure S28. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for forced expiratory flow (FEV1), related to Figure 2A
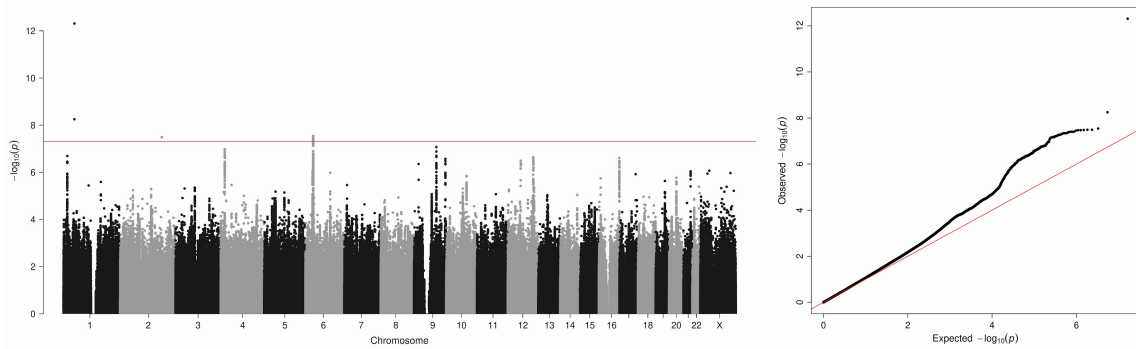

Figure S29. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for forced vital capacity (FVC), related to Figure 2A
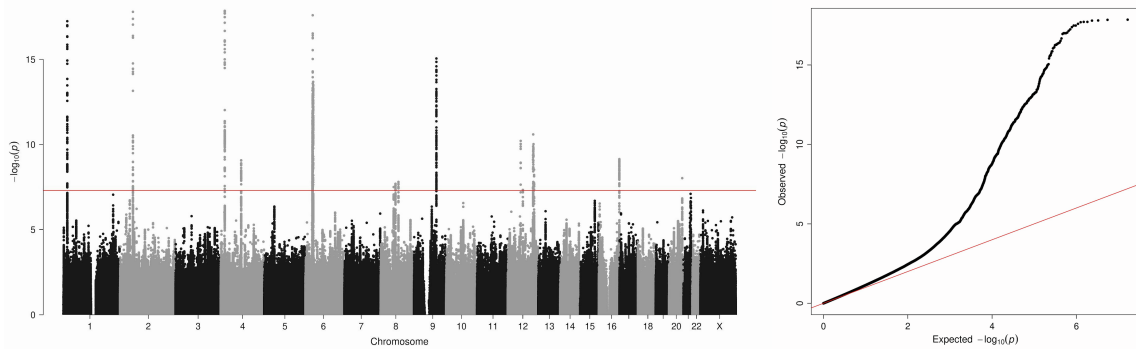

Figure S30. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for FEV1 to FVC ratio (FEV1R), related to Figure 2A
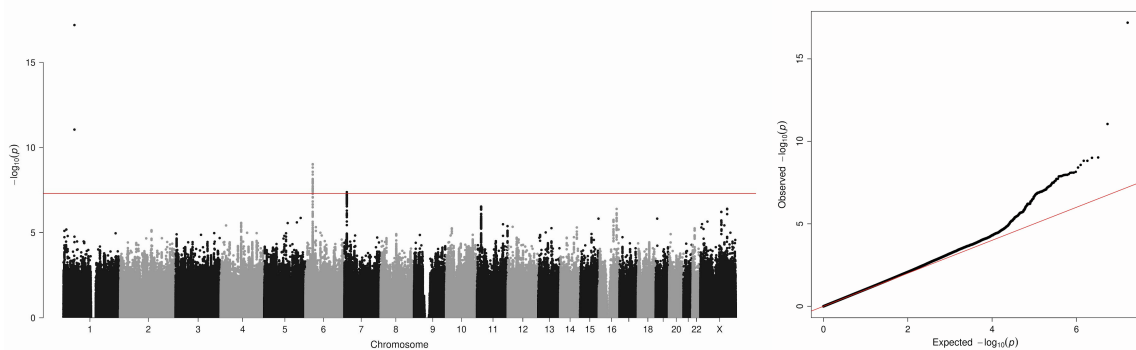
Figure S31. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for fasting glucose (FG), related to Figure 2A
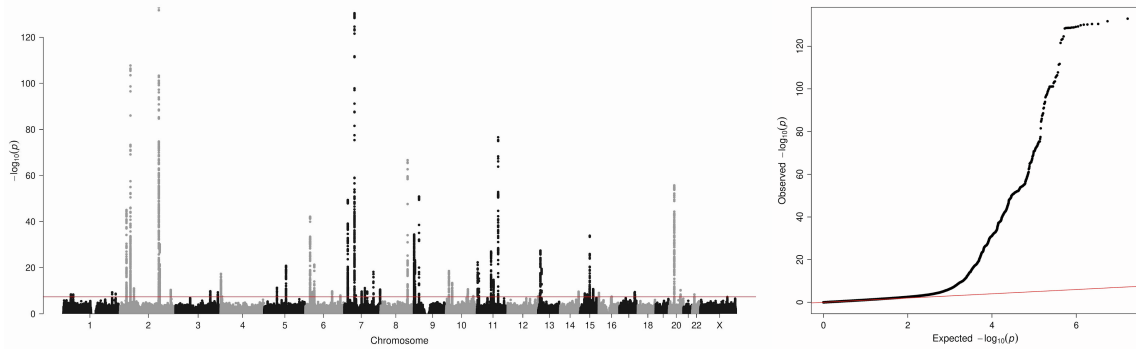

Figure S32. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for hemoglobin A1c (HbA1c), related to Figure 2A
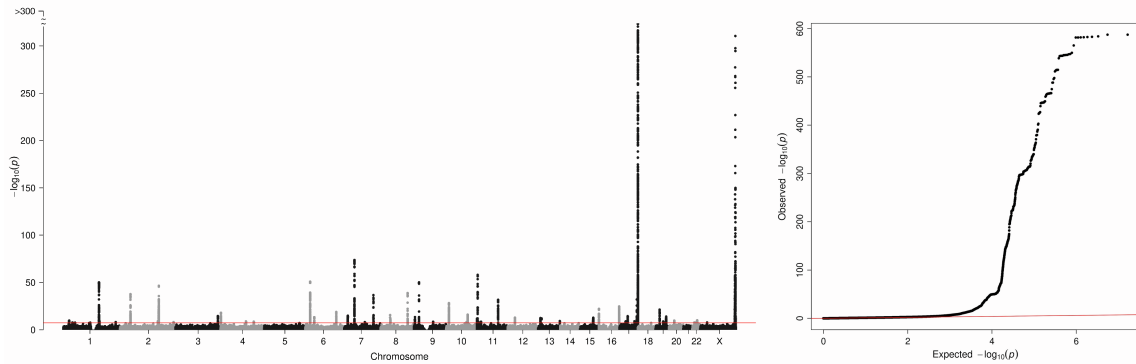

Figure S33. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for total cholesterol (TC), related to Figure 2A
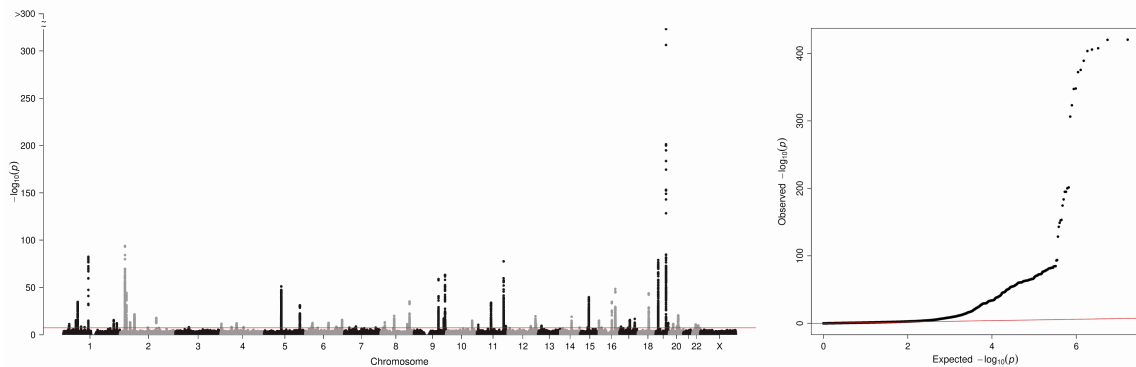
Figure S34. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for high-density-lipoprotein cholesterol (HDL-C), related to Figure 2A
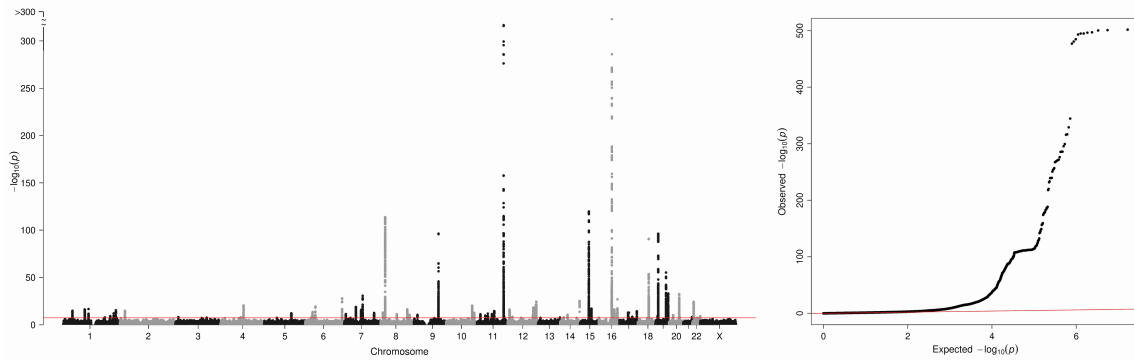

Figure S35. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for low-density-lipoprotein cholesterol (LDL-C), related to Figure 2A
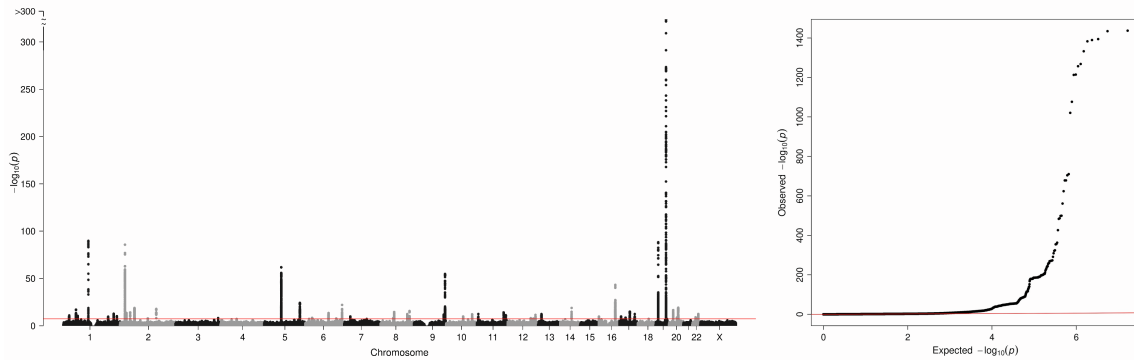

Figure S36. Manhattan plot and Q-Q plot for association tests in TWB (batch 1 and batch 2 meta-analysis) for triglyceride (TG), related to Figure 2A
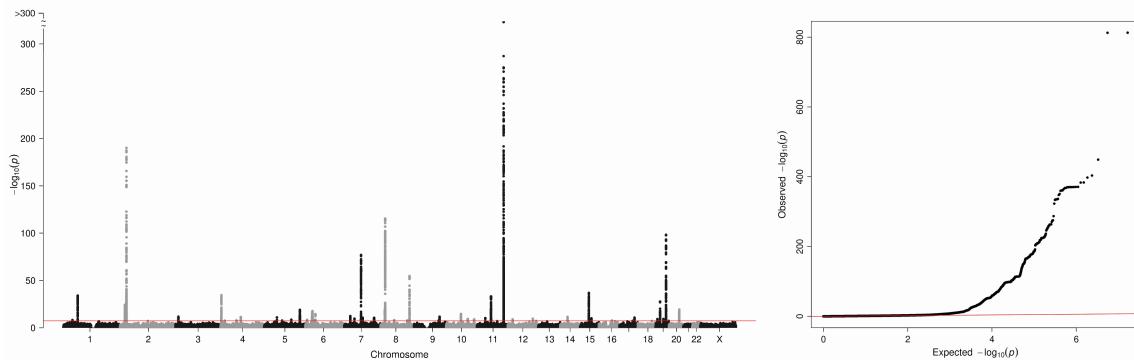
Figure S37. Genome-wide significant loci identified in the TWB and BBJ meta-analysis, tallied based on their significance in TWB, BBJ, and UKBB in samples of European ancestries (related to Figure 4A)
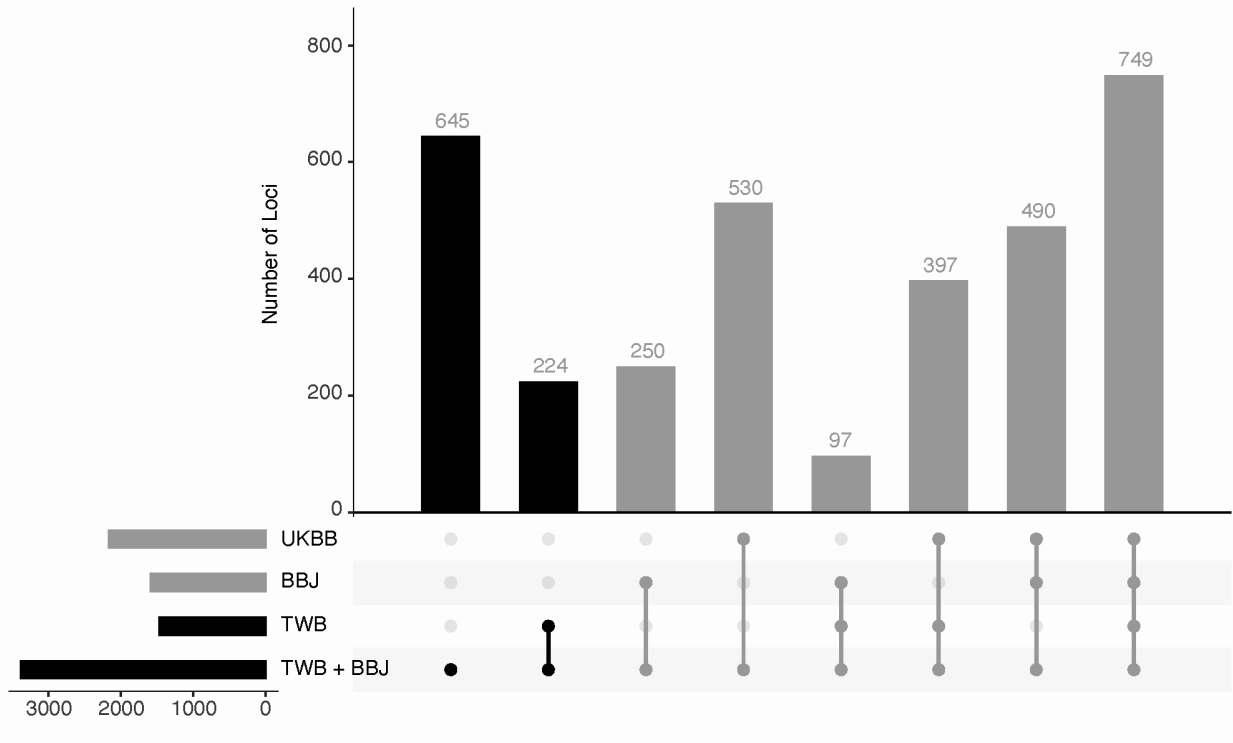
Figure S38. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for height (HT), related to Figure 4A

Figure S39. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for weight (WT), related to Figure 4A
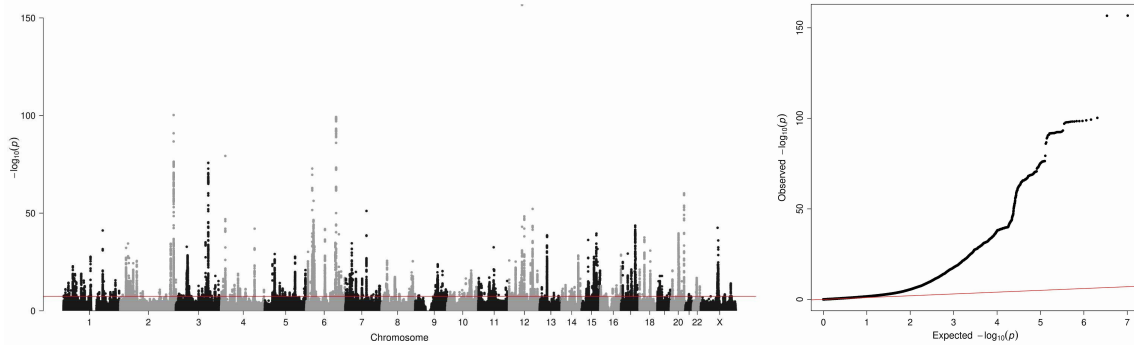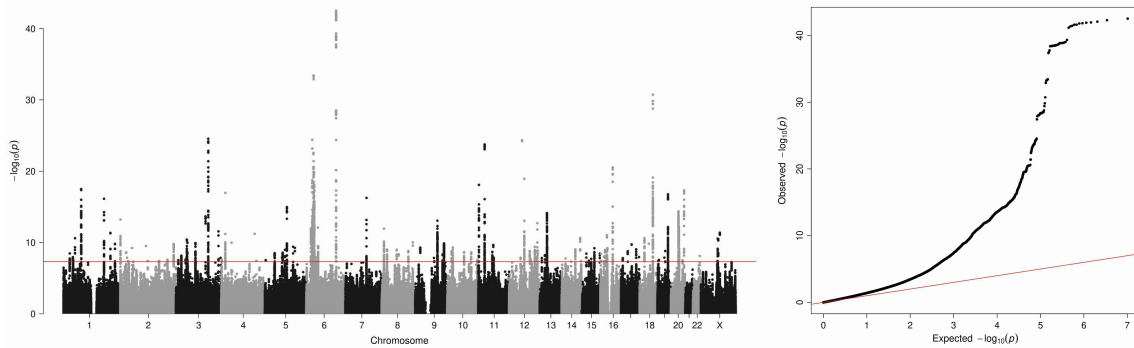

Figure S40. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for body mass index (BMI), related to Figure 4A
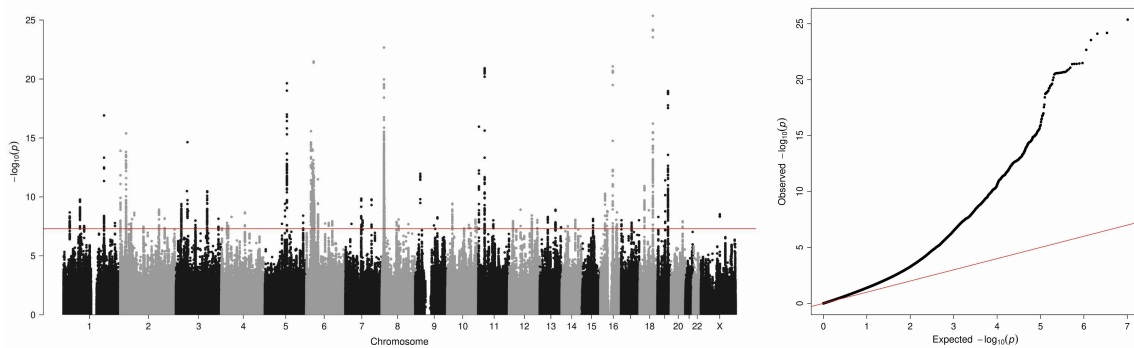
Figure S41. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB) and EUR (UKBB) genome-wide association tests for body fat rate (BFR), related to Figure 4A
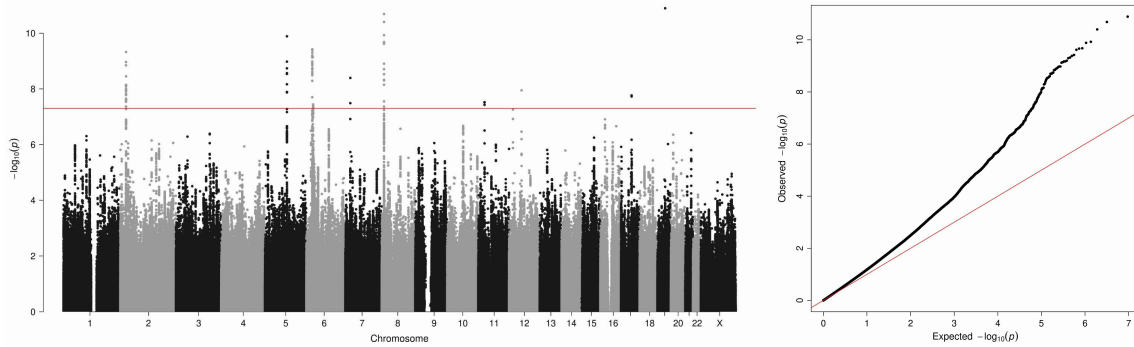

Figure S42. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB) and EUR (UKBB) genome-wide association tests for waist circumference (WC), related to Figure 4A
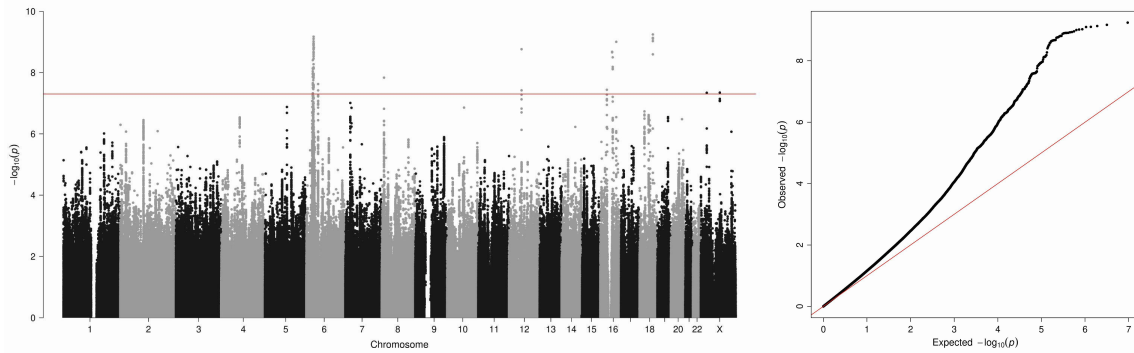

Figure S43. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB) and EUR (UKBB) genome-wide association tests for hip circumference (HC), related to Figure 4A
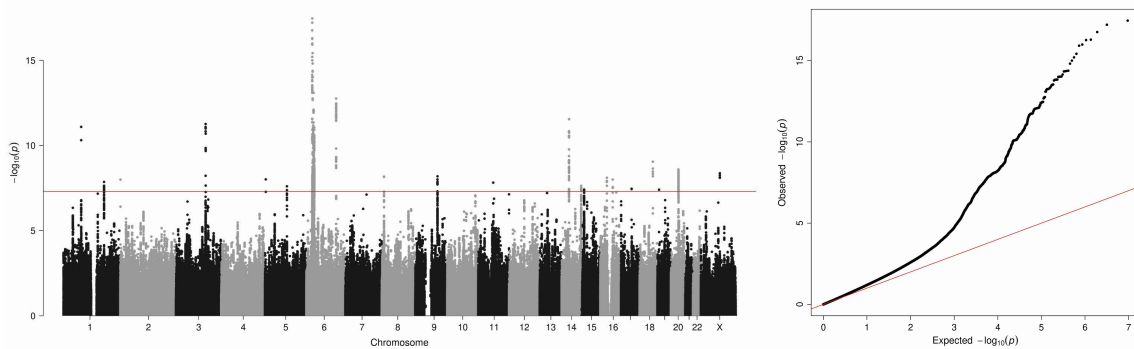
Figure S44. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB) and EUR (UKBB) genome-wide association tests for bone mineral density T-score (BMD-T), related to Figure 4A
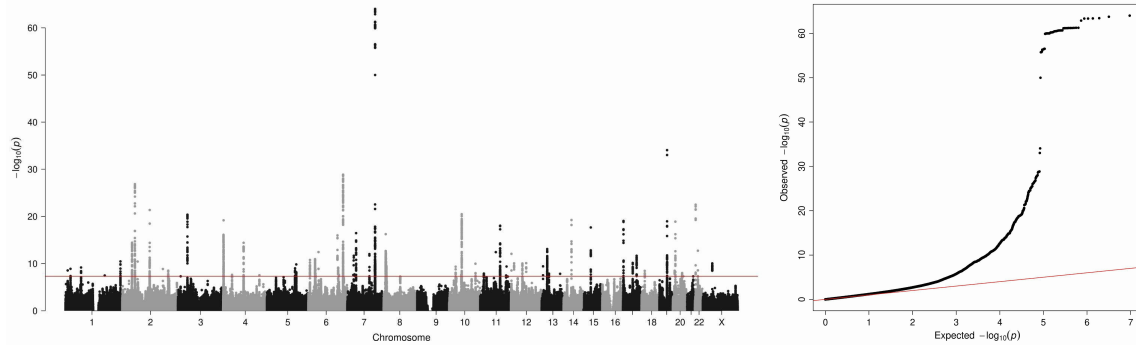

Figure S45. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for diastolic blood pressure (DBP), related to Figure 4A

Figure S46. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for systolic blood pressure (SBP), related to Figure 4A
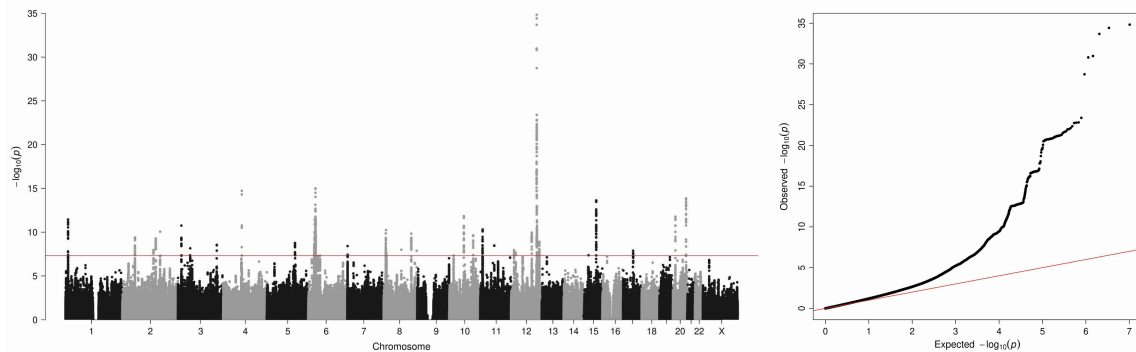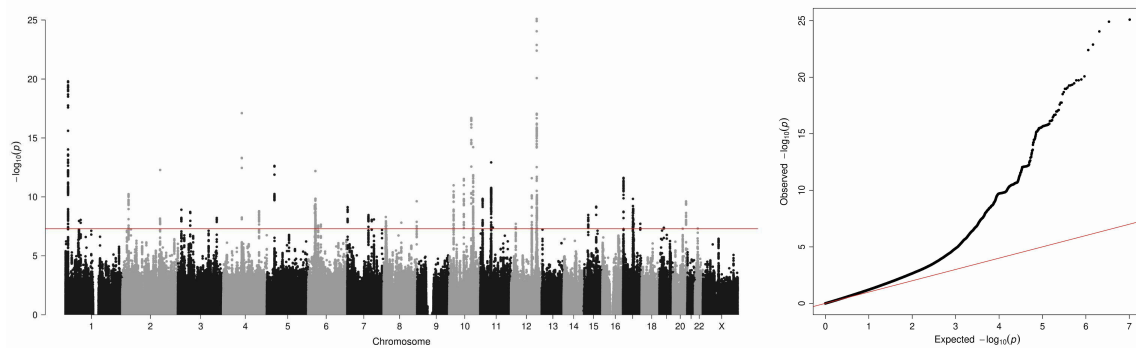
Figure S47. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for white blood cell (WBC), related to Figure 4A

Figure S48. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for red blood cell (RBC), related to Figure 4A
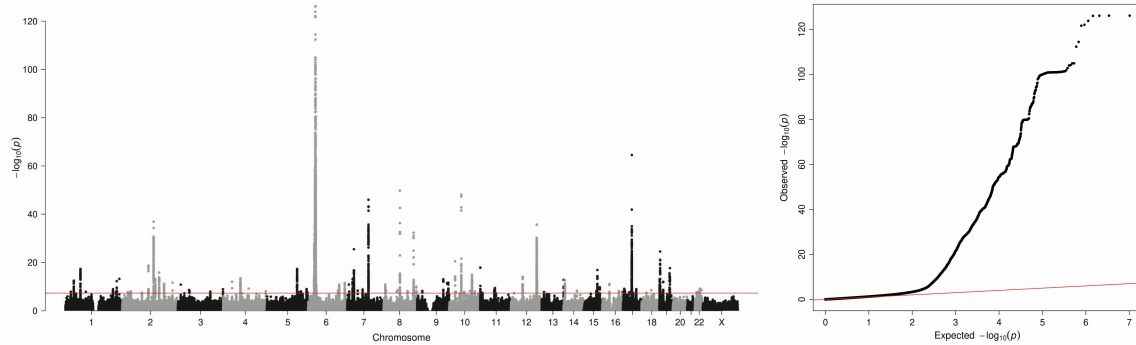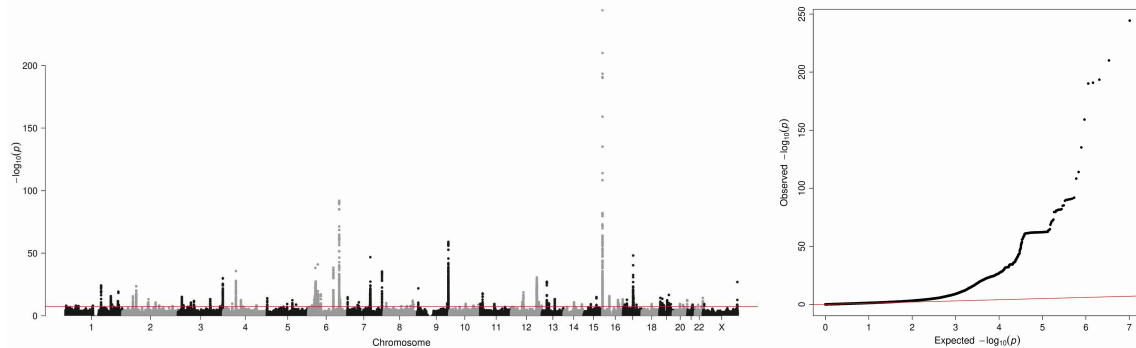

Figure S49. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for hemoglobin (HB), related to Figure 4A
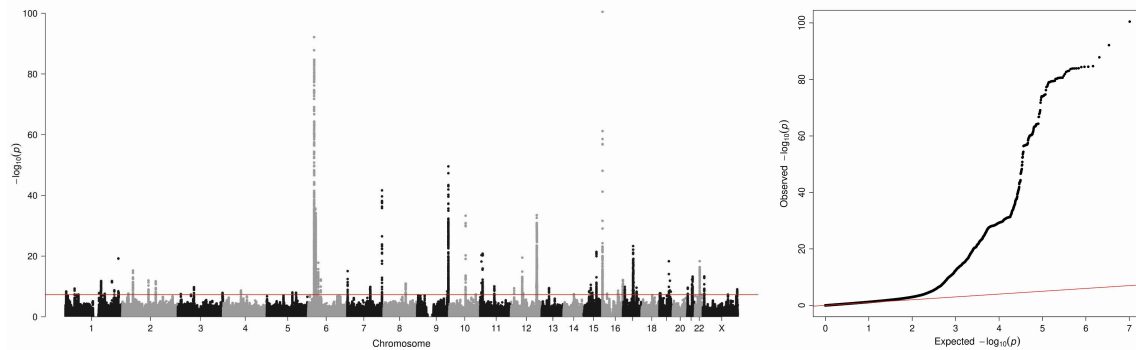
Figure S50. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for hematocrit (HCT), related to Figure 4A
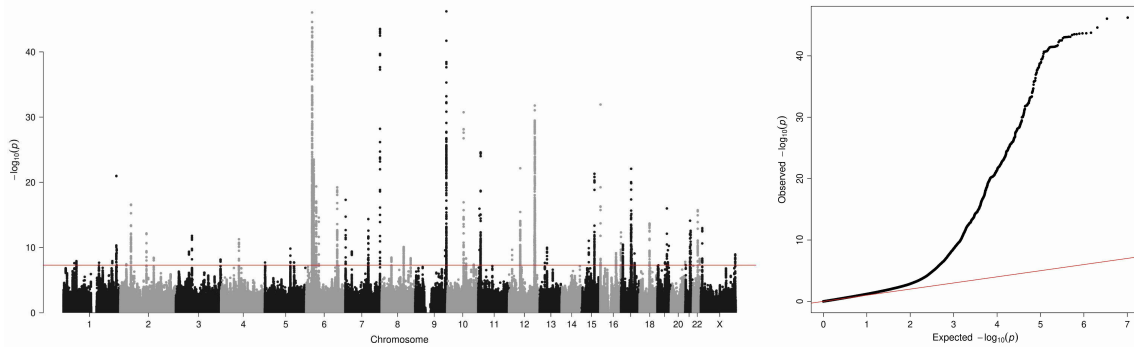

Figure S51. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for platelet (PLT), related to Figure 4A
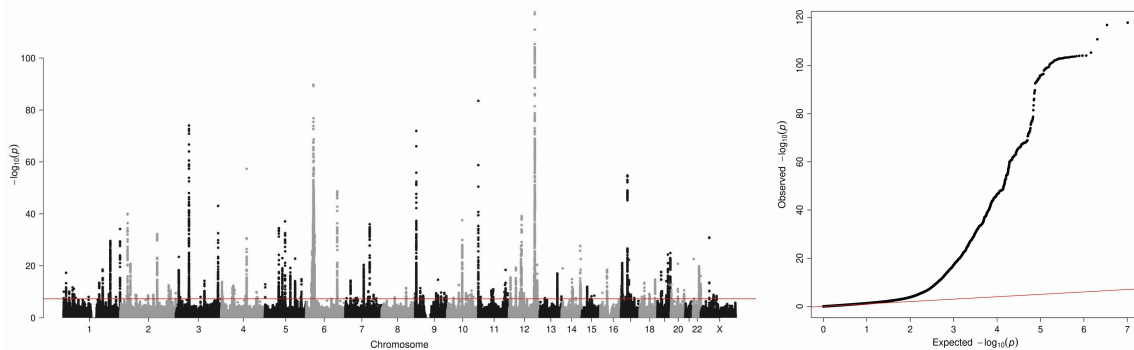

Figure S52. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for creatinine (CR), related to Figure 4A
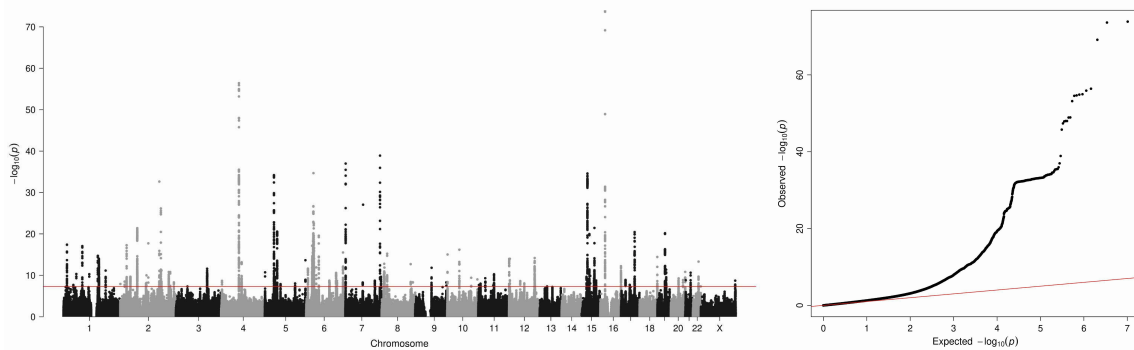
Figure S53. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB) and EUR (UKBB) genome-wide association tests for microalbumin urine (mALB), related to Figure 4A
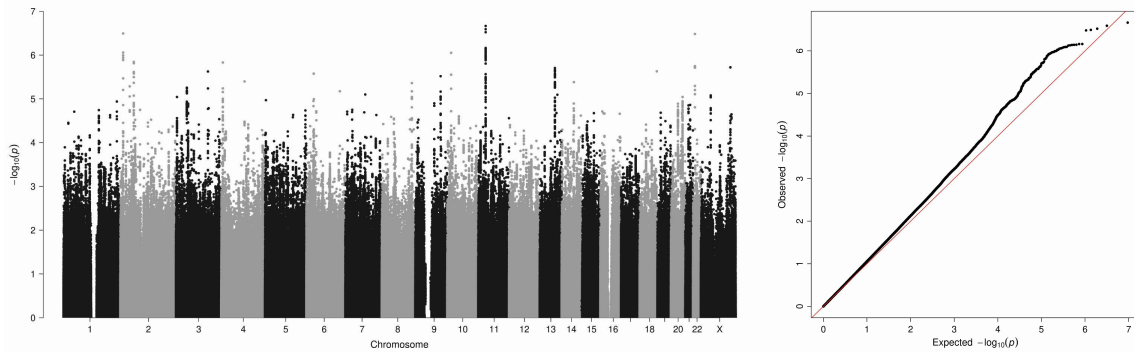

Figure S54. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for uric acid (UA), related to Figure 4A
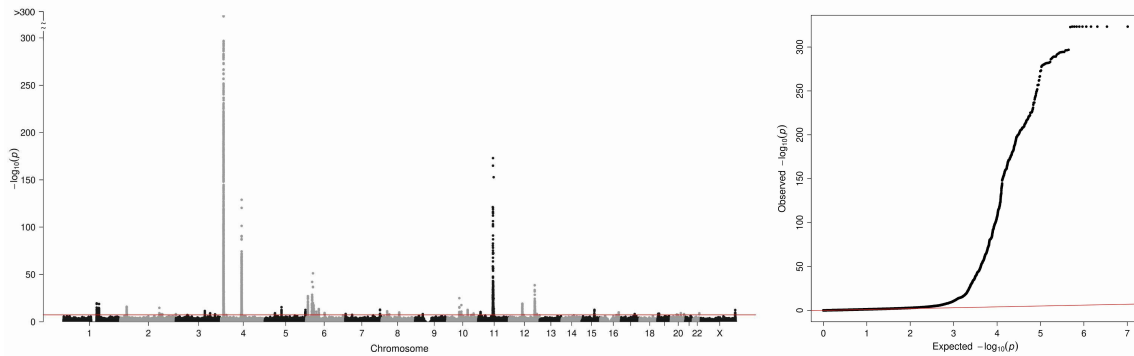

Figure S55. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for total bilirubin (T-BIL), related to Figure 4A
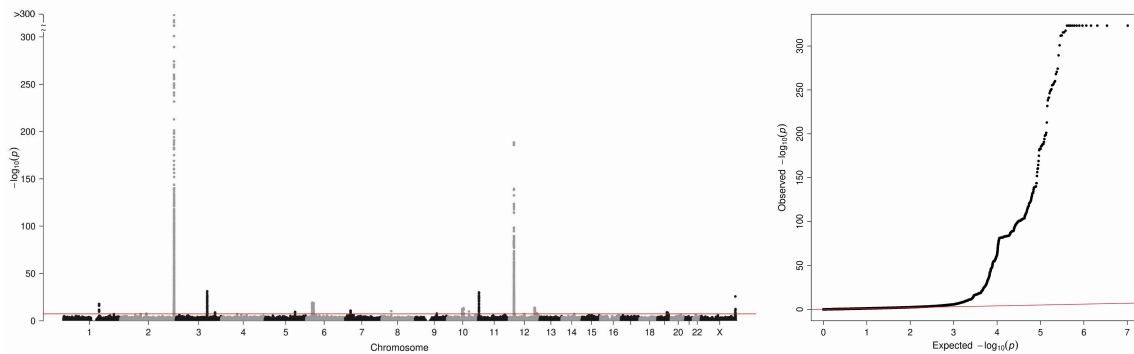
Figure S56. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for alanine aminotransferease (ALT), related to Figure 4A

Figure S57. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for aspartate aminotransferase (AST), related to Figure 4A
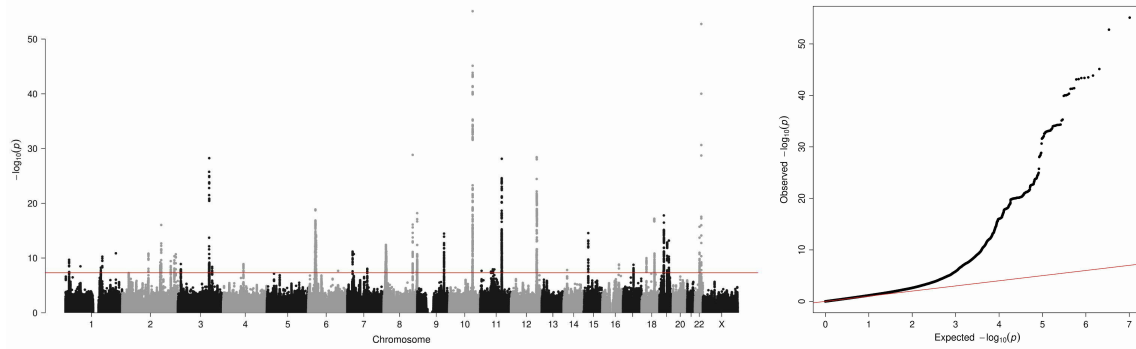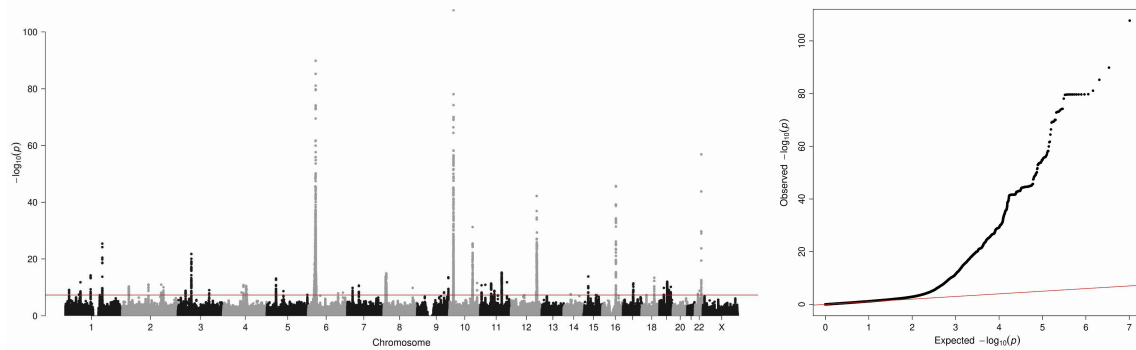

Figure S58. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for gamma-glutamyltransferase (GGT), related to Figure 4A
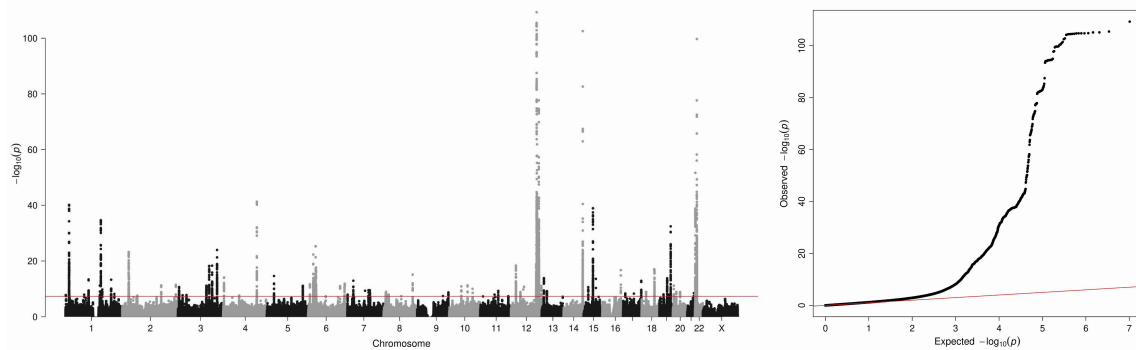
Figure S59. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for albumin (ALB), related to Figure 4A
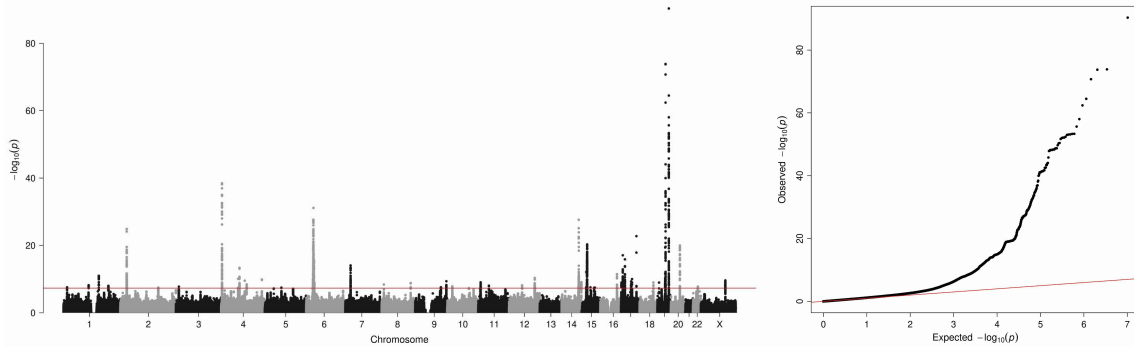

Figure S60. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB) and EUR (UKBB) genome-wide association tests for forced expiratory flow (FEV1), related to Figure 4A
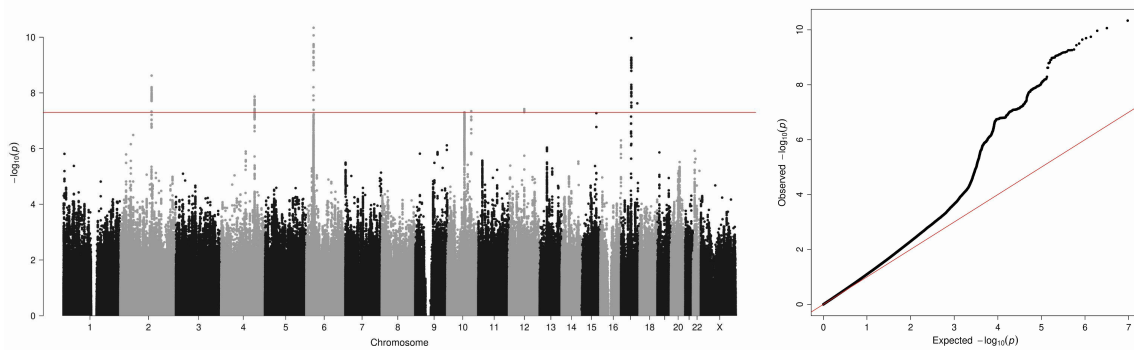

Figure S61. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB) and EUR (UKBB) genome-wide association tests for forced vital capacity (FVC), related to Figure 4A
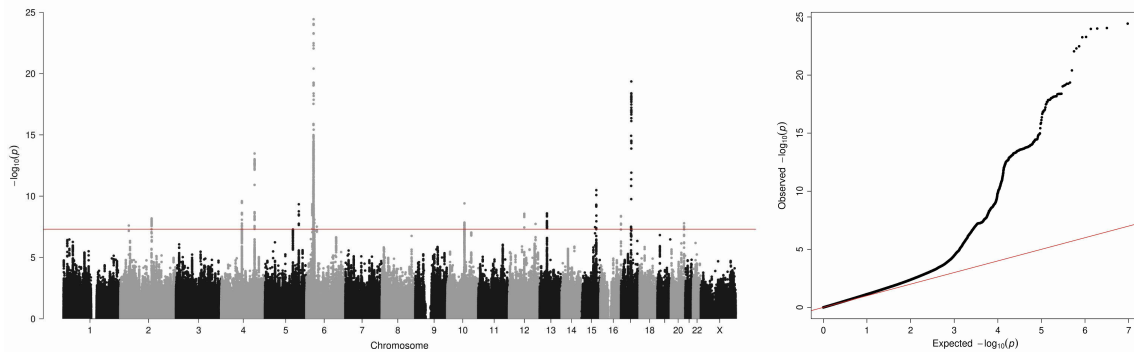
Figure S62. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for fasting glucose (FG), related to Figure 4A
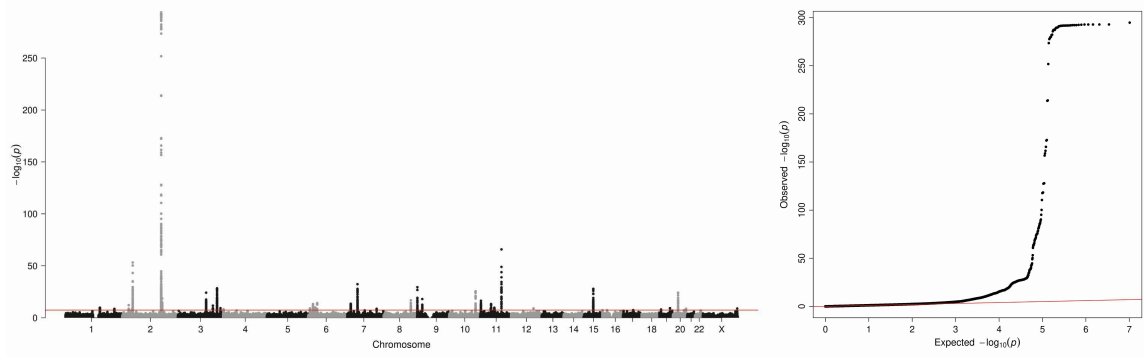

Figure S63. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for hemoglobin A1c (HbA1c), related to Figure 4A
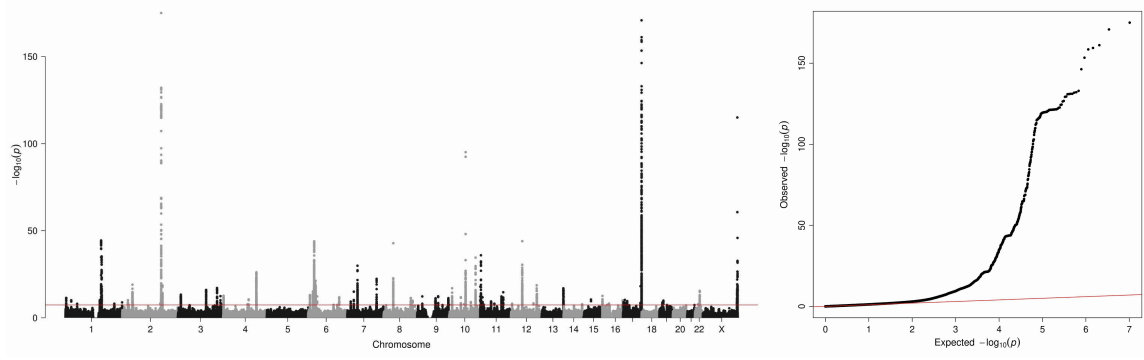

Figure S64. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for total cholesterol (TC), related to Figure 4A
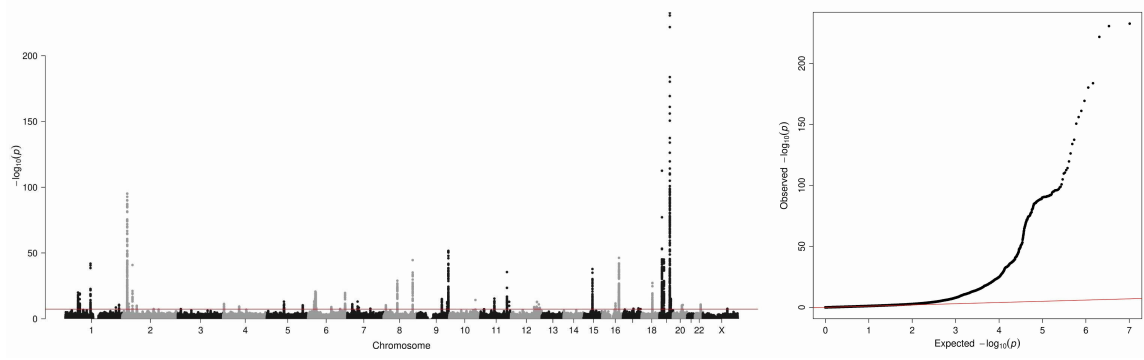
Figure S65. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for high-density-lipoprotein cholesterol (HDL-C), related to Figure 4A

Figure S66. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for low-density-lipoprotein cholesterol (LDL-C), related to Figure 4A
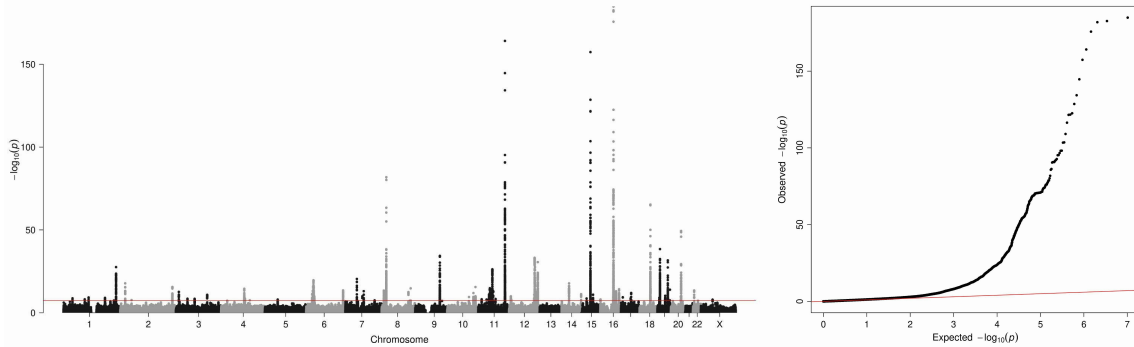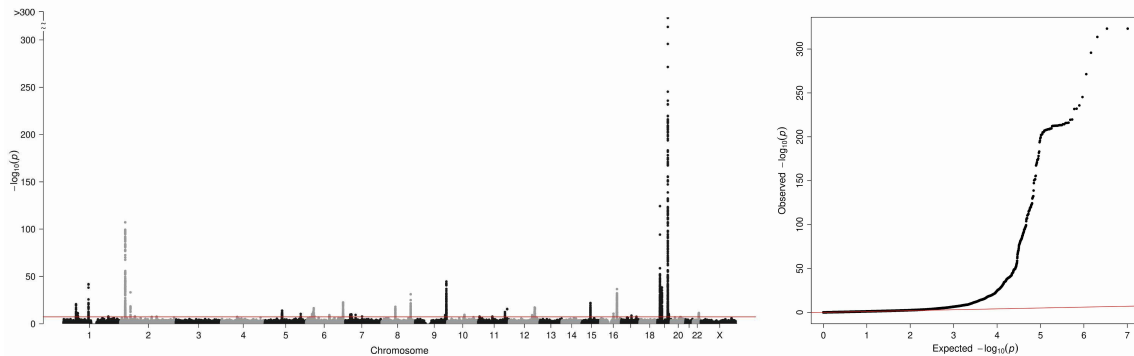

Figure S67. Manhattan plot and Q-Q plot for heterogeneity tests between EAS (TWB and BBJ meta-analysis) and EUR (UKBB) genome-wide association tests for triglyceride (TG), related to Figure 4A
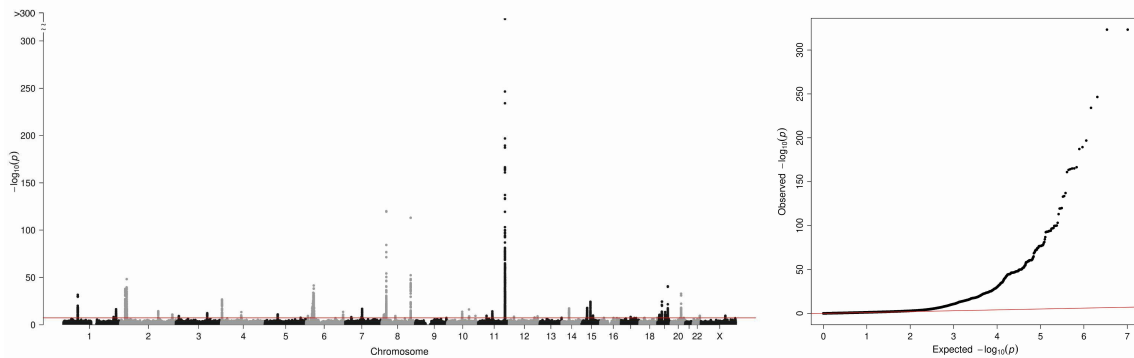
Figure 68. Distribution of polygenic risk scores (PRS) in Taiwan Biobank sub-populations (related to Figure 5). PRS were calculated based on summary statistics from eight external GWAS in samples of European or East Asian ancestries (see Methods). The three sub-populations in TWB were defined by self-reported paternal and maternal place of ancestral origin, where samples in each group have the same paternal and maternal place of ancestral origin (see Feng et al. for details) [1].
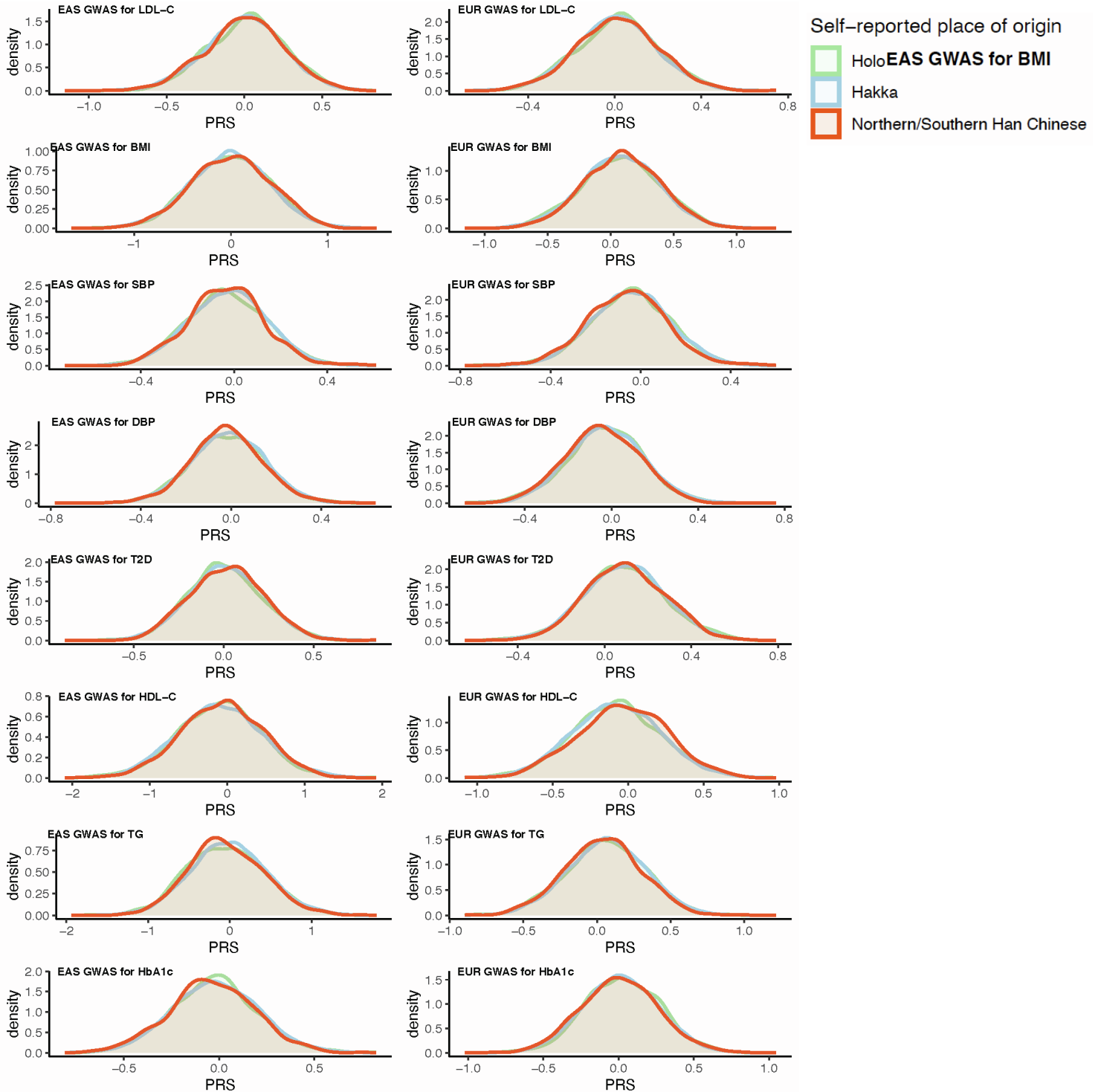
References

1. Feng, Y.-C.A., Chen, C.-Y., Chen, T.-T., Kuo, P.-H., Hsu, Y.-H., Yang, H.-I., Chen, W.J., Su, M.-W., Chu, H.-W., Shen, C.-Y., et al. (2022). Taiwan Biobank: A rich biomedical research database of the Taiwanese population. Cell Genom 2, 100197.