Supplementary Figure S1. An overview of data structure of TWAS Atlas.
Supplementary Figure S2. TWAS ontology hierarchical structure and key ontological terms.
Supplementary Table S1. The number of curated elements for each trait category collected in TWAS Atlas

| Trait categories | Trait subcategories       | #Traits | #Associations | #Genes | #Tissues | #Publications |
|------------------|---------------------------|---------|---------------|--------|----------|---------------|
| Disease          | cancer                    | 21      | 3095          | 1351   | 69       | 37            |
|                  | nervous system disease    | 18      | 14909         | 3972   | 82       | 55            |
|                  | immune system disease     | 12      | 13159         | 3088   | 61       | 15            |
|                  | musculoskeletal system disease | 11   | 4764          | 2668   | 57       | 8             |
|                  | cardiovascular disease    | 10      | 9052          | 3243   | 81       | 26            |
|                  | respiratory system disease | 10     | 4640          | 1320   | 62       | 16            |
|                  | disease of visual system  | 9       | 3751          | 614    | 49       | 5             |
|                  | genetic disorder          | 8       | 7118          | 1132   | 76       | 14            |
|                  | digestive system disease  | 6       | 11855         | 1389   | 72       | 18            |
|                  | chronic disease           | 5       | 396           | 276    | 45       | 7             |
|                  | endocrine system disease  | 4       | 11547         | 1982   | 65       | 13            |
|                  | hematologic disease       | 4       | 3437          | 1475   | 54       | 3             |
|                  | metabolic disease         | 4       | 544           | 421    | 53       | 4             |
|                  | central nervous system disease | 3   | 1016          | 559    | 64       | 14            |
|                  | urinary system disease    | 3       | 1241          | 348    | 61       | 7             |
|                  | psychiatric disorder      | 1       | 1001          | 683    | 50       | 8             |
|                  | other disease             | 9       | 43002         | 4545   | 61       | 10            |
| Measurement      | body weights and measures | 18      | 174294        | 15,907 | 63       | 18            |
|                  | hematological measurement | 17      | 22592         | 6500   | 63       | 16            |
|                  | others measurement        | 14      | 7297          | 2570   | 66       | 12            |
|                  | diabetes mellitus         | 5       | 3465          | 1145   | 55       | 11            |
| Biomarker                                      | 4   | 1667 | 926 | 49 | 5   |
|-----------------------------------------------|-----|------|-----|----|-----|
| brain measurement                             | 4   | 893  | 355 | 44 | 3   |
| metabolite measurement                       | 4   | 5157 | 1556| 53 | 7   |
| temporal measurement                          | 3   | 6451 | 1522| 56 | 4   |
| cardiovascular measurement                   | 3   | 1873 | 1263| 54 | 5   |
| sleep measurement                             | 3   | 606  | 386 | 42 | 6   |
| smoking behaviour measurement                | 2   | 15228| 1854| 53 | 8   |
| bone measurement                              | 2   | 24   | 20  | 2  | 1   |
| infectious disease biomarker                  | 2   | 1298 | 730 | 25 | 2   |
| abnormality of connective tissue             | 2   | 11   | 5   | 10 | 1   |
| abnormality of the cardiovascular system     | 2   | 4768 | 1292| 47 | 3   |
| abnormal inflammatory response               | 1   | 1401 | 934 | 54 | 3   |
| abnormal of the respiratory system           | 1   | 1    | 1   | 1  | 1   |
| abnormality of blood and blood-forming tissues| 1   | 119  | 78  | 36 | 2   |
| abnormality of head or neck                  | 1   | 47   | 5   | 36 | 1   |
| chemical entity                               | 28  | 8002 | 2060| 67 | 16  |
| material entity                               | 7   | 4485 | 1838| 61 | 16  |
| vital signs                                   | 6   | 16428| 3349| 51 | 7   |
| nutrient intake | 4  | 1886 | 469 | 44 | 1 |
|-----------------|----|------|-----|----|---|
| process         | 4  | 1785 | 763 | 55 | 5 |
| Total           | -  | 257  | 401266 | 22247 | 135 | 200 |