

**Table S1**

The likelihood ratio of six data sources

| Yeast   | Gold-standard overlap |       |              |               |        |
|---------|-----------------------|-------|--------------|---------------|--------|
| E(#Dmn) | Obs                   | Nobs  | P(yeast Obs) | P(yeast Nobs) | L      |
| 0--1    | 2354                  | 47508 | 0.9121       | 0.9651        | 0.945  |
| 2--3    | 179                   | 1562  | 0.0694       | 0.0317        | 2.186  |
| 4--5    | 17                    | 73    | 0.0066       | 0.0015        | 4.441  |
| 6--7    | 14                    | 41    | 0.0054       | 0.0008        | 6.512  |
| 8--9    | 4                     | 14    | 0.0016       | 0.0003        | 5.449  |
| 10--11  | 3                     | 3     | 0.0012       | 0.0001        | 19.072 |
| 12--inf | 10                    | 24    | 0.0039       | 0.0005        | 7.947  |
| Sum     | 2581                  | 49225 |              |               |        |

| Worm    | Gold-standard overlap |       |             |              |        |
|---------|-----------------------|-------|-------------|--------------|--------|
| E(#Dmn) | Obs                   | Nobs  | P(worm Obs) | P(worm Nobs) | L      |
| 0--1    | 2524                  | 48472 | 0.9779      | 0.9847       | 0.993  |
| 2--3    | 38                    | 549   | 0.0147      | 0.0112       | 1.320  |
| 4--5    | 12                    | 152   | 0.0046      | 0.0031       | 1.506  |
| 6--7    | 0                     | 36    | 0.0000      | 0.0007       | 0.000  |
| 8--9    | 2                     | 4     | 0.0008      | 0.0001       | 9.536  |
| 10--11  | 0                     | 8     | 0.0000      | 0.0002       | 0.000  |
| 12--inf | 5                     | 4     | 0.0019      | 0.0001       | 23.840 |
| Sum     | 2581                  | 49225 |             |              |        |

| Fruitfly | Gold-standard overlap |       |                 |                  |        |
|----------|-----------------------|-------|-----------------|------------------|--------|
| E(#Dmn)  | Obs                   | Nobs  | P(fruitfly Obs) | P(fruitfly Nobs) | L      |
| 0--1     | 2522                  | 48184 | 0.9771          | 0.9789           | 0.998  |
| 2--3     | 38                    | 916   | 0.0147          | 0.0186           | 0.791  |
| 4--5     | 6                     | 60    | 0.0023          | 0.0012           | 1.907  |
| 6--7     | 7                     | 40    | 0.0027          | 0.0008           | 3.338  |
| 8--9     | 1                     | 11    | 0.0004          | 0.0002           | 1.734  |
| 10--11   | 2                     | 5     | 0.0008          | 0.0001           | 7.629  |
| 12--inf  | 5                     | 9     | 0.0019          | 0.0002           | 10.596 |
| Sum      | 2581                  | 49225 |                 |                  |        |

| Human   | Gold-standard overlap |       |              |               |        |
|---------|-----------------------|-------|--------------|---------------|--------|
| E(#Dmn) | Obs                   | Nobs  | P(human Obs) | P(human Nobs) | L      |
| 0--1    | 2223                  | 47560 | 0.8613       | 0.9662        | 0.891  |
| 2--3    | 208                   | 1354  | 0.0806       | 0.0275        | 2.930  |
| 4--5    | 39                    | 148   | 0.0151       | 0.0030        | 5.026  |
| 6--7    | 34                    | 79    | 0.0132       | 0.0016        | 8.208  |
| 8--9    | 12                    | 31    | 0.0046       | 0.0006        | 7.383  |
| 10--11  | 13                    | 18    | 0.0050       | 0.0004        | 13.774 |
| 12--inf | 52                    | 35    | 0.0201       | 0.0007        | 28.336 |
| Sum     | 2581                  | 49225 |              |               |        |

| Coexist | Gold-standard overlap |       |                |                 |        |
|---------|-----------------------|-------|----------------|-----------------|--------|
| CE(Dmn) | Obs                   | Nobs  | P(coexist Obs) | P(coexist Nobs) | LR     |
| 0       | 1440                  | 46697 | 0.5579         | 0.9486          | 0.588  |
| 1--9    | 323                   | 1668  | 0.1251         | 0.0339          | 3.693  |
| 10--19  | 92                    | 339   | 0.0356         | 0.0069          | 5.176  |
| 20--29  | 70                    | 111   | 0.0271         | 0.0023          | 12.027 |
| 30--39  | 42                    | 78    | 0.0163         | 0.0016          | 10.270 |
| 40--49  | 48                    | 49    | 0.0186         | 0.0010          | 18.683 |
| 50--99  | 176                   | 133   | 0.0682         | 0.0027          | 25.238 |

|          |      |       |        |        |        |
|----------|------|-------|--------|--------|--------|
| 100--149 | 116  | 62    | 0.0449 | 0.0013 | 35.683 |
| 150--inf | 274  | 88    | 0.1062 | 0.0018 | 59.383 |
| Sum      | 2581 | 49225 |        |        |        |

SameGO Gold-standard overlap

| SG(Dmn) | Obs  | Nobs  | P(SameGO Obs) | P(SameGO Nobs) | L      |
|---------|------|-------|---------------|----------------|--------|
| 0       | 1279 | 34465 | 0.4955        | 0.7002         | 0.708  |
| 1--9    | 355  | 222   | 0.1375        | 0.0045         | 30.498 |
| 10--19  | 91   | 153   | 0.0353        | 0.0031         | 11.344 |
| 20--29  | 40   | 161   | 0.0155        | 0.0033         | 4.738  |
| 30--39  | 17   | 52    | 0.0066        | 0.0011         | 6.235  |
| 40--inf | 799  | 14172 | 0.3096        | 0.2879         | 1.075  |
| Sum     | 2581 | 49225 |               |                |        |