**Table 10** Functional enrichment analysis of protein complexes detected by different methods in different datasets

| Method | <E-20 | [E-20,E-15) | [E-15,E-10) | [E-10,E-5) | [E-5,0.01) | ≤0.01 |
|---|---|---|---|---|---|---|
| | | | String dataset | | | |
| MCL | 28(19.05%) | 16(10.88%) | 26(17.69%) | 66(44.9%) | 3(2.04%) | 139(94.56%) |
| IPCA | 64(21.84%) | 22(7.51%) | 48(16.38%) | 96(32.76%) | 9(3.07%) | 239(81.57%) |
| COACH | 30(15.23%) | 19(9.64%) | 33(16.75%) | 82(41.62%) | 1(0.51%) | 165(83.76%) |
| CMC | 30(20.83%) | 7(4.86%) | 15(10.42%) | 66(45.83%) | 20(13.89%) | 138(95.83%) |
| SPICi | 39(34.21%) | 11(9.65%) | 20(17.54%) | 39(34.21%) | 1(0.88%) | 110(96.49%) |
| ClusterONE | 55(26.57%) | 19(9.18%) | 35(16.91%) | 86(41.55%) | 3(1.45%) | 198(95.65%) |
| PEWCC | 74(22.09%) | 64(19.1%) | 67(20.0%) | 123(36.72%) | 7(2.09%) | 335(100.0%) |
| WPNCA | 22(15.17%) | 10(6.9%) | 27(18.62%) | 78(53.79%) | 7(4.83%) | 144(99.31%) |
| WEC | 61(10.25%) | 83(13.95%) | 93(15.63%) | 157(26.39%) | 62(10.42%) | 456(76.64%) |
| ClusterEPs | 23(7.72%) | 25(8.39%) | 89(29.87%) | 155(52.01%) | 3(1.01%) | 295(98.99%) |
| ClusterSS | 44(11.52%) | 29(7.59%) | 47(12.3%) | 111(29.06%) | 45(11.78%) | 276(72.25%) |
| | 53(27.32%) | 17(8.76%) | 31(15.98%) | 71(36.6%) | 7(3.61%) | 179(92.27%) |
| SE-DMTG | 37(21.76%) | 21(12.35%) | 35(20.59%) | 70(41.18%) | 4(2.35%) | 167(98.24%) |
| MPC-C | 54(24.22%) | 30(13.45%) | 30(13.45%) | 61(27.35%) | 10(4.48%) | 185(82.96%) |
| GCC-v | 6(2.99%) | 7(3.48%) | 32(15.92%) | 128(63.68%) | 11(5.47%) | 184(91.54%) |
| MP-AHSA | 56(20.82%) | 36(13.38%) | 52(19.33%) | 116(43.12%) | 9(3.35%) | **269(100.0%)**[1st] |
| | | | DIP dataset | | | |
| MCL | 40(6.88%) | 32(5.51%) | 73(12.56%) | 210(36.14%) | 48(8.26%) | 403(69.36%) |
| IPCA | 112(7.47%) | 137(9.14%) | 223(14.88%) | 518(34.56%) | 149(9.94%) | 1139(75.98%) |
| COACH | 68(7.53%) | 68(7.53%) | 137(15.17%) | 349(38.65%) | 92(10.19%) | 714(79.07%) |
| CMC | 86(7.85%) | 47(4.29%) | 96(8.76%) | 309(28.19%) | 141(12.86%) | 679(61.95%) |
| SPICi | 110(27.92%) | 48(12.18%) | 62(15.74%) | 116(29.44%) | 25(6.35%) | 361(91.62%) |
| ClusterONE | 22(6.23%) | 56(15.86%) | 51(14.45%) | 100(28.33%) | 26(7.37%) | 255(72.24%) |
| PEWCC | 78(22.1%) | 57(16.15%) | 57(16.15%) | 92(26.06%) | 17(4.82%) | 301(85.27%) |
| WPNCA | 128(26.45%) | 32(6.61%) | 100(20.66%) | 158(32.64%) | 19(3.93%) | 437(90.29%) |
| WEC | 51(19.62%) | 33(12.69%) | 41(15.77%) | 63(24.23%) | 17(6.54%) | 205(78.85%) |
| ClusterEPs | 38(5.33%) | 100(14.03%) | 176(24.68%) | 244(34.22%) | 51(7.15%) | 609(85.41%) |
| ClusterSS | 115(4.78%) | 135(5.62%) | 232(9.65%) | 669(27.83%) | 320(13.31%) | 1471(61.19%) |
| | 87(4.04%) | 120(5.57%) | 304(14.1%) | 737(34.18%) | 233(10.81%) | 1481(68.69%) |
| SE-DMTG | 96(11.75%) | 73(8.94%) | 132(16.16%) | 324(39.66%) | 62(7.59%) | 687(84.09%) |
| MPC-C | 144(8.77%) | 160(9.74%) | 343(20.89%) | 592(36.05%) | 136(8.28%) | 1375(83.74%) |
| GCC-v | 9(1.78%) | 11(2.17%) | 56(11.07%) | 209(41.3%) | 57(11.26%) | 342(67.59%) |
| MP-AHSA | 133(14.94%) | 75(8.43%) | 135(15.17%) | 416(46.74%) | 71(7.98%) | **830(93.26%)**[1st] |
| | | | Biogrid dataset | | | |
| MCL | 0(0.0%) | 0(0.0%) | 0(0.0%) | 84(100.0%) | 0(0.0%) | 84(100.0%) |
| IPCA | 119(4.64%) | 104(4.05%) | 195(7.6%) | 1361(53.04%) | 174(6.78%) | 1953(76.11%) |
| COACH | 0(0.0%) | 0(0.0%) | 0(0.0%) | 403(100.0%) | 0(0.0%) | 403(100.0%) |
| CMC | 0(0.0%) | 0(0.0%) | 0(0.0%) | 0(0.0%) | 468(100.0%) | 468(100.0%) |
| SPICi | 0(0.0%) | 0(0.0%) | 0(0.0%) | 194(100.0%) | 0(0.0%) | 194(100.0%) |
| ClusterONE | 0(0.0%) | 0(0.0%) | 0(0.0%) | 268(100.0%) | 0(0.0%) | 268(100.0%) |
| PEWCC | 121(6.12%) | 133(6.73%) | 153(7.74%) | 1172(59.28%) | 98(4.96%) | 1677(84.83%) |
| WPNCA | 25(3.35%) | 24(3.21%) | 28(3.75%) | 625(83.67%) | 12(1.61%) | 714(95.58%) |
| WEC | 0(0.0%) | 0(0.0%) | 0(0.0%) | 408(100.0%) | 0(0.0%) | 408(100.0%) |
| ClusterEPs | N/A | N/A | N/A | N/A | N/A | N/A |
| ClusterSS | 108(4.3%) | 111(4.42%) | 173(6.89%) | 1425(56.75%) | 175(6.97%) | 1992(79.33%) |
| | 126(5.31%) | 92(3.88%) | 233(9.83%) | 1276(53.82%) | 169(7.13%) | 1896(79.97%) |
| SE-DMTG | 41(2.91%) | 40(2.84%) | 57(4.05%) | 1002(71.16%) | 53(3.76%) | 1193(84.73%) |
| MPC-C | 91(4.23%) | 70(3.25%) | 160(7.43%) | 1106(51.37%) | 161(7.48%) | 1588(73.76%) |
| GCC-v | 5(2.03%) | 13(5.28%) | 54(21.95%) | 115(46.75%) | 29(11.79%) | 216(87.8%) |
| MP-AHSA | 0(0.0%) | 0(0.0%) | 0(0.0%) | 535(100.0%) | 0(0.0%) | **535(100.0%)**[1st] |

Note: the highest score of each row are shown in bold. N/A means that we fails to obtain the results under given code or software.