

Additional Table 2. Correlation and Hypergeometric Distribution Scores for Complete Data Set with Correlation above 0.8

| COG | Gideon Lab | Correlation | Hypergeometric |
|------------|-------------------|--------------------|-----------------------|
| COG0763 | B01 | 0.945234 | 1.71E-09 |
| COG0774 | B01 | 0.945234 | 1.71E-09 |
| COG0811 | B01 | 0.945234 | 1.71E-09 |
| COG0848 | B01 | 0.945234 | 1.71E-09 |
| COG1043 | B01 | 0.945234 | 1.71E-09 |
| COG1044 | B01 | 0.945234 | 1.71E-09 |
| COG1212 | B01 | 0.945234 | 1.71E-09 |
| COG1519 | B01 | 0.945234 | 1.71E-09 |
| COG1663 | B01 | 0.945234 | 1.71E-09 |
| COG2877 | B01 | 0.945234 | 1.71E-09 |
| COG4775 | B01 | 0.944614 | 2.46E-09 |
| COG0795 | B01 | 0.944614 | 2.46E-09 |
| COG1137 | B01 | 0.944614 | 2.46E-09 |
| COG2204 | B01 | 0.887139 | 3.52E-08 |
| COG1538 | B01 | 0.846623 | 8.71E-08 |
| COG2885 | B01 | 0.838831 | 2.46E-07 |
| COG1495 | B01 | 0.83364 | 2.69E-07 |
| COG0823 | B01 | 0.801482 | 4.14E-07 |
| COG4105 | B01 | 0.801482 | 4.14E-07 |
| COG3764 | B02 | 0.997591 | 2.59E-08 |
| COG3887 | B02 | 0.917477 | 7.77E-07 |
| COG1098 | B02 | 0.917477 | 7.77E-07 |
| COG3857 | B02 | 0.917477 | 7.77E-07 |
| COG3935 | B02 | 0.917477 | 7.77E-07 |
| COG4109 | B02 | 0.917477 | 7.77E-07 |
| COG4463 | B02 | 0.917477 | 7.77E-07 |
| COG4465 | B02 | 0.917477 | 7.77E-07 |
| COG2344 | B02 | 0.917477 | 7.77E-07 |
| COG3601 | B02 | 0.917477 | 7.77E-07 |
| COG3906 | B02 | 0.917477 | 7.77E-07 |
| COG4466 | B02 | 0.917477 | 7.77E-07 |
| COG3599 | B02 | 0.843121 | 4.27E-06 |
| COG1511 | B02 | 0.843121 | 4.27E-06 |
| COG1358 | B02 | 0.836268 | 6.01E-06 |
| COG1476 | B02 | 0.836268 | 6.01E-06 |
| COG1323 | B02 | 0.836268 | 6.01E-06 |
| COG1939 | B02 | 0.836268 | 6.01E-06 |
| COG3481 | B02 | 0.836268 | 6.01E-06 |
| COG4224 | B02 | 0.836268 | 6.01E-06 |
| COG3966 | B02 | 0.835606 | 1.20E-05 |
| COG4473 | B02 | 0.835606 | 1.20E-05 |
| COG4477 | B02 | 0.835606 | 1.20E-05 |
| COG4537 | B02 | 0.835606 | 1.20E-05 |
| COG4839 | B02 | 0.835606 | 1.20E-05 |
| COG4862 | B02 | 0.835606 | 1.20E-05 |

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| COG5002 | B02 | 0.835606 | 1.20E-05 |
| COG4098 | B02 | 0.835606 | 1.20E-05 |
| COG1668 | B02 | 0.835606 | 1.20E-05 |
| COG3853 | B02 | 0.835606 | 1.20E-05 |
| COG2179 | B02 | 0.835606 | 1.20E-05 |
| COG2339 | B02 | 0.835606 | 1.20E-05 |
| COG3679 | B02 | 0.835606 | 1.20E-05 |
| COG3883 | B02 | 0.835606 | 1.20E-05 |
| COG4116 | B02 | 0.835606 | 1.20E-05 |
| COG4199 | B02 | 0.835606 | 1.20E-05 |
| COG4467 | B02 | 0.835606 | 1.20E-05 |
| COG4469 | B02 | 0.835606 | 1.20E-05 |
| COG4470 | B02 | 0.835606 | 1.20E-05 |
| COG4471 | B02 | 0.835606 | 1.20E-05 |
| COG4472 | B02 | 0.835606 | 1.20E-05 |
| COG4474 | B02 | 0.835606 | 1.20E-05 |
| COG4476 | B02 | 0.835606 | 1.20E-05 |
| COG4479 | B02 | 0.835606 | 1.20E-05 |
| COG4483 | B02 | 0.835606 | 1.20E-05 |
| COG4758 | B02 | 0.835606 | 1.20E-05 |
| COG4768 | B02 | 0.835606 | 1.20E-05 |
| COG4856 | B02 | 0.835606 | 1.20E-05 |
| COG5503 | B02 | 0.835606 | 1.20E-05 |
| COG2357 | B02 | 0.828591 | 4.27E-06 |
| COG3014 | B22 | 1 | 1.51E-05 |
| COG3018 | B22 | 1 | 1.51E-05 |
| COG1188 | B28 | 0.94018 | 7.02E-09 |
| COG0826 | B28 | 0.880267 | 8.76E-08 |
| COG2264 | B28 | 0.880267 | 8.76E-08 |
| COG0673 | B28 | 0.842956 | 1.57E-07 |
| COG0458 | B28 | 0.836567 | 8.21E-07 |
| COG0505 | B28 | 0.836567 | 8.21E-07 |
| COG0818 | B28 | 0.825486 | 5.88E-07 |
| COG1135 | B28 | 0.823724 | 8.21E-07 |
| COG1464 | B28 | 0.823724 | 8.21E-07 |
| COG2011 | B28 | 0.823724 | 8.21E-07 |
| COG2252 | B28 | 0.823724 | 8.21E-07 |
| COG1576 | B28 | 0.818336 | 1.01E-06 |
| COG3852 | B29 | 0.989446 | 8.04E-09 |
| COG2967 | B29 | 0.989446 | 8.04E-09 |
| COG3127 | B29 | 0.989446 | 8.04E-09 |
| COG3154 | B29 | 0.989446 | 8.04E-09 |
| COG4206 | B29 | 0.989446 | 8.04E-09 |
| COG4651 | B29 | 0.989446 | 8.04E-09 |
| COG3242 | B29 | 0.989446 | 8.04E-09 |
| COG3313 | B29 | 0.989446 | 8.04E-09 |
| COG4783 | B29 | 0.989446 | 8.04E-09 |
| COG3143 | B29 | 0.970157 | 2.33E-07 |
| COG4787 | B29 | 0.970157 | 2.33E-07 |

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| COG4181 | B29 | 0.970157 | 2.33E-07 |
| COG3123 | B29 | 0.970157 | 2.33E-07 |
| COG3147 | B29 | 0.970157 | 2.33E-07 |
| COG3157 | B29 | 0.970157 | 2.33E-07 |
| COG3164 | B29 | 0.970157 | 2.33E-07 |
| COG4172 | B29 | 0.921125 | 8.04E-08 |
| COG3895 | B29 | 0.911335 | 2.33E-07 |
| COG3605 | B29 | 0.909745 | 2.33E-07 |
| COG3311 | B29 | 0.909745 | 2.33E-07 |
| COG3126 | B29 | 0.909745 | 2.33E-07 |
| COG3150 | B29 | 0.897923 | 2.03E-06 |
| COG3159 | B29 | 0.897923 | 2.03E-06 |
| COG3678 | B29 | 0.894872 | 2.03E-06 |
| COG3951 | B29 | 0.894872 | 2.03E-06 |
| COG2105 | B29 | 0.894872 | 2.03E-06 |
| COG5006 | B29 | 0.894872 | 2.03E-06 |
| COG4579 | B29 | 0.893708 | 3.50E-06 |
| COG3228 | B29 | 0.893708 | 3.50E-06 |
| COG4681 | B29 | 0.893708 | 3.50E-06 |
| COG5393 | B29 | 0.893708 | 3.50E-06 |
| COG5544 | B29 | 0.893708 | 3.50E-06 |
| COG2943 | B29 | 0.892037 | 3.50E-06 |
| COG3418 | B29 | 0.892037 | 3.50E-06 |
| COG0417 | B29 | 0.892037 | 3.50E-06 |
| COG3130 | B29 | 0.892037 | 3.50E-06 |
| COG3160 | B29 | 0.892037 | 3.50E-06 |
| COG4568 | B29 | 0.892037 | 3.50E-06 |
| COG2716 | B29 | 0.892037 | 3.50E-06 |
| COG2988 | B29 | 0.892037 | 3.50E-06 |
| COG3131 | B29 | 0.892037 | 3.50E-06 |
| COG3138 | B29 | 0.892037 | 3.50E-06 |
| COG3155 | B29 | 0.892037 | 3.50E-06 |
| COG4580 | B29 | 0.892037 | 3.50E-06 |
| COG4592 | B29 | 0.892037 | 3.50E-06 |
| COG4598 | B29 | 0.892037 | 3.50E-06 |
| COG3124 | B29 | 0.892037 | 3.50E-06 |
| COG3129 | B29 | 0.892037 | 3.50E-06 |
| COG3132 | B29 | 0.892037 | 3.50E-06 |
| COG3136 | B29 | 0.892037 | 3.50E-06 |
| COG3139 | B29 | 0.892037 | 3.50E-06 |
| COG3141 | B29 | 0.892037 | 3.50E-06 |
| COG3148 | B29 | 0.892037 | 3.50E-06 |
| COG3151 | B29 | 0.892037 | 3.50E-06 |
| COG3217 | B29 | 0.892037 | 3.50E-06 |
| COG3266 | B29 | 0.892037 | 3.50E-06 |
| COG3272 | B29 | 0.892037 | 3.50E-06 |
| COG3455 | B29 | 0.892037 | 3.50E-06 |
| COG3501 | B29 | 0.892037 | 3.50E-06 |
| COG3515 | B29 | 0.892037 | 3.50E-06 |

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| COG3516 | B29 | 0.892037 | 3.50E-06 |
| COG3517 | B29 | 0.892037 | 3.50E-06 |
| COG3518 | B29 | 0.892037 | 3.50E-06 |
| COG3519 | B29 | 0.892037 | 3.50E-06 |
| COG3520 | B29 | 0.892037 | 3.50E-06 |
| COG3521 | B29 | 0.892037 | 3.50E-06 |
| COG3522 | B29 | 0.892037 | 3.50E-06 |
| COG3523 | B29 | 0.892037 | 3.50E-06 |
| COG3776 | B29 | 0.892037 | 3.50E-06 |
| COG4582 | B29 | 0.892037 | 3.50E-06 |
| COG0408 | B29 | 0.861205 | 4.42E-07 |
| COG2391 | B29 | 0.861205 | 4.42E-07 |
| COG2960 | B29 | 0.861205 | 4.42E-07 |
| COG3045 | B29 | 0.861205 | 4.42E-07 |
| COG4174 | B29 | 0.861205 | 4.42E-07 |
| COG3206 | B29 | 0.839958 | 2.03E-06 |
| COG1953 | B29 | 0.838432 | 2.03E-06 |
| COG3026 | B29 | 0.832705 | 9.77E-06 |
| COG3073 | B29 | 0.832705 | 9.77E-06 |
| COG3116 | B29 | 0.832705 | 9.77E-06 |
| COG4795 | B29 | 0.832705 | 9.77E-06 |
| COG2925 | B29 | 0.832705 | 9.77E-06 |
| COG3025 | B29 | 0.832705 | 9.77E-06 |
| COG4117 | B29 | 0.83021 | 3.50E-06 |
| COG5281 | B29 | 0.83021 | 3.50E-06 |
| COG2747 | B29 | 0.829758 | 9.77E-06 |
| COG3144 | B29 | 0.829758 | 9.77E-06 |
| COG3166 | B29 | 0.829758 | 9.77E-06 |
| COG4967 | B29 | 0.829758 | 9.77E-06 |
| COG0429 | B29 | 0.829758 | 9.77E-06 |
| COG3009 | B29 | 0.829758 | 9.77E-06 |
| COG4147 | B29 | 0.829758 | 9.77E-06 |
| COG4150 | B29 | 0.828539 | 3.50E-06 |
| COG2109 | B29 | 0.821864 | 1.77E-06 |
| COG4575 | B29 | 0.815948 | 2.61E-05 |
| COG3726 | B29 | 0.814358 | 2.61E-05 |
| COG3539 | B29 | 0.813958 | 3.61E-05 |
| COG3725 | B29 | 0.813958 | 3.61E-05 |
| COG4650 | B29 | 0.813958 | 3.61E-05 |
| COG4790 | B29 | 0.813958 | 3.61E-05 |
| COG5404 | B29 | 0.813958 | 3.61E-05 |
| COG0430 | B29 | 0.813958 | 3.61E-05 |
| COG3724 | B29 | 0.813958 | 3.61E-05 |
| COG4573 | B29 | 0.813958 | 3.61E-05 |
| COG3122 | B29 | 0.813958 | 3.61E-05 |
| COG3134 | B29 | 0.813958 | 3.61E-05 |
| COG3497 | B29 | 0.813958 | 3.61E-05 |
| COG3500 | B29 | 0.813958 | 3.61E-05 |
| COG3784 | B29 | 0.813958 | 3.61E-05 |

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| COG3960 | B29 | 0.813958 | 3.61E-05 |
| COG4269 | B29 | 0.813958 | 3.61E-05 |
| COG4672 | B29 | 0.813958 | 3.61E-05 |
| COG4718 | B29 | 0.813958 | 3.61E-05 |
| COG4723 | B29 | 0.813958 | 3.61E-05 |
| COG4733 | B29 | 0.813958 | 3.61E-05 |
| COG5435 | B29 | 0.813958 | 3.61E-05 |
| COG3121 | B29 | 0.812768 | 2.61E-05 |
| COG3188 | B29 | 0.812768 | 2.61E-05 |
| COG3137 | B29 | 0.812182 | 3.61E-05 |
| COG3248 | B29 | 0.812182 | 3.61E-05 |
| COG4238 | B29 | 0.812182 | 3.61E-05 |
| COG4999 | B29 | 0.812182 | 3.61E-05 |
| COG1446 | B29 | 0.812182 | 3.61E-05 |
| COG3954 | B29 | 0.812182 | 3.61E-05 |
| COG4138 | B29 | 0.812182 | 3.61E-05 |
| COG4139 | B29 | 0.812182 | 3.61E-05 |
| COG1986 | B29 | 0.812182 | 3.61E-05 |
| COG2425 | B29 | 0.812182 | 3.61E-05 |
| COG3530 | B29 | 0.812182 | 3.61E-05 |
| COG3788 | B29 | 0.812182 | 3.61E-05 |
| COG3604 | B29 | 0.811178 | 2.61E-05 |
| COG2356 | B29 | 0.811178 | 2.61E-05 |
| COG2515 | B29 | 0.811178 | 2.61E-05 |
| COG4771 | B29 | 0.811178 | 2.61E-05 |
| COG4779 | B29 | 0.811178 | 2.61E-05 |
| COG0397 | B29 | 0.811178 | 2.61E-05 |
| COG3047 | B29 | 0.810679 | 1.77E-06 |
| COG3038 | B29 | 0.810679 | 1.77E-06 |
| COG1261 | B29 | 0.807883 | 1.77E-06 |
| COG2063 | B29 | 0.807883 | 1.77E-06 |
| COG2360 | B29 | 0.807883 | 1.77E-06 |
| COG1838 | B29 | 0.807883 | 1.77E-06 |
| COG1951 | B29 | 0.807883 | 1.77E-06 |
| COG2066 | B29 | 0.807883 | 1.77E-06 |
| COG3158 | B29 | 0.807883 | 1.77E-06 |
| COG4239 | B29 | 0.807883 | 1.77E-06 |
| COG3278 | B30 | 0.851245 | 7.84E-06 |
| COG2993 | B30 | 0.851245 | 7.84E-06 |
| COG0753 | B31 | 0.967324 | 7.69E-06 |
| COG1607 | B31 | 0.967324 | 7.69E-06 |
| COG0805 | B31 | 0.906479 | 1.71E-07 |
| COG1651 | B31 | 0.906479 | 1.71E-07 |
| COG1826 | B31 | 0.906479 | 1.71E-07 |
| COG0328 | B31 | 0.906479 | 1.71E-07 |
| COG1825 | B31 | 0.906479 | 1.71E-07 |
| COG0114 | B31 | 0.906479 | 1.71E-07 |
| COG0861 | B31 | 0.829295 | 3.93E-06 |
| COG0407 | B31 | 0.828355 | 1.54E-06 |

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| COG0755 | B31 | 0.820158 | 1.54E-06 |
| COG0479 | B31 | 0.820158 | 1.54E-06 |
| COG0746 | B31 | 0.820158 | 1.54E-06 |
| COG3717 | FAC | 0.970445 | 3.95E-05 |
| COG2850 | FAC | 0.800014 | 7.49E-05 |
| COG3684 | FAJ | 0.838533 | 9.22E-05 |
| COG3723 | FAJ | 0.810417 | 9.22E-05 |
| COG4570 | FAJ | 0.810417 | 9.22E-05 |
| COG1801 | FAL | 0.827708 | 4.92E-05 |
| COG3726 | FAL | 0.827142 | 5.31E-05 |
| COG2356 | FAL | 0.818329 | 5.31E-05 |
| COG0246 | FAM | 0.849961 | 4.69E-05 |
| COG1175 | FAM | 0.849961 | 4.69E-05 |
| COG1263 | FAM | 0.849961 | 4.69E-05 |
| COG1264 | FAM | 0.849961 | 4.69E-05 |
| COG3730 | FAP | 0.953977 | 2.58E-05 |
| COG3731 | FAP | 0.953977 | 2.58E-05 |
| COG3717 | FAR | 0.871545 | 6.93E-05 |
| COG2182 | FAT | 0.938041 | 3.40E-05 |
| COG3833 | FAT | 0.938041 | 3.40E-05 |
| COG1956 | FAT | 0.902745 | 4.42E-05 |
| COG3091 | FAT | 0.902745 | 4.42E-05 |
| COG2850 | FAU | 0.945358 | 3.37E-06 |
| COG3133 | FAU | 0.8475 | 2.69E-05 |
| COG0643 | G03 | 0.935693 | 4.93E-09 |
| COG0835 | G03 | 0.935693 | 4.93E-09 |
| COG0840 | G03 | 0.935693 | 4.93E-09 |
| COG1345 | G03 | 0.935693 | 4.93E-09 |
| COG1516 | G03 | 0.935693 | 4.93E-09 |
| COG1256 | G03 | 0.882266 | 4.19E-08 |
| COG1291 | G03 | 0.882266 | 4.19E-08 |
| COG1344 | G03 | 0.882266 | 4.19E-08 |
| COG1360 | G03 | 0.882266 | 4.19E-08 |
| COG1558 | G03 | 0.882266 | 4.19E-08 |
| COG1677 | G03 | 0.882266 | 4.19E-08 |
| COG1684 | G03 | 0.882266 | 4.19E-08 |
| COG1766 | G03 | 0.882266 | 4.19E-08 |
| COG1815 | G03 | 0.882266 | 4.19E-08 |
| COG1843 | G03 | 0.882266 | 4.19E-08 |
| COG1868 | G03 | 0.882266 | 4.19E-08 |
| COG1987 | G03 | 0.882266 | 4.19E-08 |
| COG4786 | G03 | 0.882266 | 4.19E-08 |
| COG1580 | G03 | 0.870082 | 9.24E-08 |
| COG1749 | G03 | 0.83331 | 7.02E-07 |
| COG1352 | G03 | 0.806357 | 9.05E-07 |
| COG2166 | G14 | 0.851828 | 3.37E-05 |
| COG1169 | G14 | 0.827001 | 6.12E-05 |
| COG0679 | G36 | 0.878941 | 8.08E-05 |
| COG2327 | G44 | 0.99665 | 4.91E-05 |

