

Additional File 5: Rules of Table 7 in their original representation, i.e., with statistics, discretized values for variables, and labels of their source of origin. Each row contains the ID of the rule in Table 7 in addition to its corresponding dataset and original version, respectively. Explanation for interpreting the rules and their statistics can be found in the manuscript, ‘KARL rule model’ subsection.

| Rule's ID in Table 7 | Dataset (ID/ Series ID) | Patterns |
|-------------------------|----------------------------|---|
| 01 | B/GEO1993 | Pr. IF (COL4A2 = -inf..8.226) THEN (@Class = Control) CF=0.93, TP=13, FP=1, Pos=19, Neg=39 |
| | B/GEO1993 | Pr. IF (COL1A1 = -inf..5.706) THEN (@Class = Control) CF=0.88, TP=14, FP=2, Pos=19, Neg=39 |
| | A/GEO16011 | Nr. IF (COL6A1 = -inf..6.448) THEN (@Class = Control) CF=0.86, TP=7, FP=1, Pos=16, Neg=159 |
| 02 | B/GEO1993 | Pr. IF (COL6A3 = 6.661..inf) THEN (@Class = Case) CF=0.90, TP=27, FP=3, Pos=39, Neg=19 |
| 03 | B/GEO1993 | Pr. IF (VEGFA = -inf..8.676) THEN (@Class = Control) CF=0.93, TP=13, FP=1, Pos=19, Neg=39 |
| 04 | D/GEO4290 | Pr. IF (VEGFA = 12.671..inf) THEN (@Class = Case) CF=0.91, TP=53, FP=5, Pos=81, Neg=19 |
| 05 | B/GEO1993 | Pr. IF (LDHA = -inf..10.110) THEN (@Class = Control) CF=0.88, TP=14, FP=2, Pos=19, Neg=39 |
| 06 | E/GEO4412 | Nr. IF (LDHA = 13.840..inf) THEN (@Class = Control) CF=0.92, TP=10, FP=1, Pos=26, Neg=59 |
| | A/GEO16011 | Nr. IF (LDHA = 12.670..inf) THEN (@Class = Case) CF=0.99, TP=109, FP=1, Pos=159, Neg=16 |
| 07 | B/GEO1993 | Pr. IF (IGFBP2 = -inf..6.238) THEN (@Class = Control) CF=0.92, TP=11, FP=1, Pos=19, Neg=39 |
| | C/GEO4271 | Pr. IF (IGFBP2 = -inf..7.401) THEN (@Class = Control) CF=0.85, TP=10, FP=2, Pos=24, Neg=76 |
| | D/GEO4290 | Pr. IF (IGFBP4 = -inf..7.710) THEN (@Class = Control) CF=0.82, TP=7, FP=2, Pos=19, Neg=81 |
| 08 | A/GEO16011 | Pr. IF (IGFBP2 = 11.040..inf) THEN (@Class = Case) CF=0.99, TP=102, FP=1, Pos=159, Neg=16 |
| 09 | B/GEO1993 | Pr. IF (SERPINH1 = -inf..7.591) THEN (@Class = Control) CF=0.91, TP=14, FP=1, Pos=19, Neg=39 |

| | | |
|----|------------|--|
| | E/GEO4412 | Pr. IF (SERPINA3 = -inf..12.788) THEN (@Class = Control) CF=0.83, TP=15, FP=3, Pos=26, Neg=59 |
| 10 | A/GEO16011 | Nr. IF (SERPINH1 = 8.732..inf) THEN (@Class = Case) CF=0.90, TP=103, FP=11, Pos=159, Neg=16 |
| 11 | P/GEO10072 | Pr. IF (EDNRB = 7.480..inf) THEN (@Class = Control) CF=0.98, TP=49, FP=1, Pos=49, Neg=58 |
| 12 | P/GEO10072 | Pr. IF (EDNRB = -inf..7.480) THEN (@Class = Case) CF=0.98, TP=58, FP=1, Pos=58, Neg=49 |
| | P/GEO10072 | Nr. IF (EDNRB = -inf..7.480) THEN (@Class = Case) CF=0.98, TP=52, FP=1, Pos=58, Neg=49 |
| 13 | P/GEO10072 | Pr. IF (PECAM1 = 10.741..inf) THEN (@Class = Control) CF=0.98, TP=44, FP=1, Pos=49, Neg=58 |
| 14 | P/GEO10072 | Pr. IF (PECAM1 = -inf..10.741) THEN (@Class = Case) CF=0.98, TP=52, FP=1, Pos=58, Neg=49 |
| 15 | Q/GEO18842 | Nr. IF (PLK4 = -inf..5.412) THEN (@Class = Control) CF=0.98, TP=40, FP=1, Pos=45, Neg=46 |
| 16 | Q/GEO18842 | Pr. IF (PLK4 = 5.412..inf) THEN (@Class = Case) CF=0.98, TP=42, FP=1, Pos=46, Neg=45 |
| 17 | Q/GEO18842 | Nr. IF (AQP4 = 10.455..inf) THEN (@Class = Control) CF=0.98, TP=41, FP=1, Pos=45, Neg=46 |
| 18 | Q/GEO18842 | Nr. IF (AQP4 = -inf..10.455) THEN (@Class = Case) CF=0.98, TP=41, FP=1, Pos=46, Neg=45 |
| | R/GEO19188 | Pr. IF (AQP1 = -inf..11.015) THEN (@Class = Case) CF=0.99, TP=84, FP=1, Pos=91, Neg=65 |
| 19 | S/GEO19804 | Pr. IF (AGER = 9.445..inf) THEN (@Class = Control) CF=0.95, TP=58, FP=3, Pos=60, Neg=60 |
| 20 | S/GEO19804 | Pr. IF (AGER = -inf..9.445) THEN (@Class = Case) CF=0.95, TP=58, FP=3, Pos=60, Neg=60 |
| 21 | S/GEO19804 | Pr. IF (CDH3 = -inf..6.161) THEN (@Class = Control) CF=0.98, TP=39, FP=1, Pos=60, Neg=60 |
| 22 | S/GEO19804 | Pr. IF (CDH3 = 7.506..inf) THEN (@Class = Case) CF=0.97, TP=38, FP=1, Pos=60, Neg=60 |
| 23 | Q/GEO18842 | Nr. IF (CCNB1 = -inf..6.983) THEN (@Class = Control) CF=0.98, TP=45, FP=1, Pos=45, Neg=46 |

| | | |
|----|------------|--|
| 24 | S/GEO19804 | Pr. IF (CCNB1 = 6.633..inf) THEN (@Class = Case) CF=0.97, TP=37, FP=1, Pos=60, Neg=60 |
| 25 | W/GEO46602 | Pr. IF (HPN = -inf..7.963) THEN (@Class = Control) CF=0.94, TP=14, FP=1, Pos=14, Neg=36 |
| | Y/GEO82188 | Pr. IF (HPN = -inf..7.605) THEN (@Class = Control) CF=0.98, TP=46, FP=1, Pos=71, Neg=65 |
| 26 | W/GEO46602 | Pr. IF (HPN = 7.963..inf) THEN (@Class = Case) CF=0.97, TP=36, FP=1, Pos=36, Neg=14 |
| | U/GEO17951 | Pr. IF (HPN = 7.807..inf) THEN (@Class = Case) CF=0.97, TP=59, FP=2, Pos=68, Neg=69 |
| | Y/GEO82188 | Pr. IF (HPN = 8.949..inf) THEN (@Class = Case) CF=0.95, TP=52, FP=3, Pos=65, Neg=71 |
| 27 | Y/GEO82188 | Pr. IF (TRPM4 = -inf..8.995) THEN (@Class = Control) CF=0.91, TP=64, FP=6, Pos=71, Neg=65 |
| 28 | Y/GEO82188 | Pr. IF (TRPM4 = 8.995..inf) THEN (@Class = Case) CF=0.89, TP=60, FP=7, Pos=65, Neg=71 |
| 29 | V/GEO32448 | Nr. IF (CYP3A5 = 6.448..inf) THEN (@Class = Control) CF=0.94, TP=29, FP=2, Pos=40, Neg=40 |
| 30 | W/GEO46602 | Nr. IF (CYP3A5 = -inf..6.786) THEN (@Class = Case) CF=0.97, TP=32, FP=1, Pos=36, Neg=14 |
| 31 | V/GEO32448 | Pr. IF (ID4 = 9.140..inf) THEN (@Class = Control) CF=0.91, TP=20, FP=2, Pos=40, Neg=40 |
| 32 | Y/GEO82188 | Pr. IF (ID4 = -inf..7.554) THEN (@Class = Case) CF=0.96, TP=23, FP=1, Pos=65, Neg=71 |