## Table S1. COMPARE analysis of LamN

| Rank | JCI# | Chemical name                  | Mode of action/Target                     | Exp.-ID | Pearson | P value  |
|------|------|--------------------------------|------------------------------------------|---------|---------|----------|
| 1    | -99  | SN-38                          | DNA topoisomerase I inhibitor             | S05703  | 0.77    | 8.5E-09  |
| 2    | -98  | TAS-103 dihydrochloride        | DNA topoisomerase I/II inhibitor          | S06822  | 0.69    | 1.0E-06  |
| 3    | -30  | Camptothecin                   | DNA topoisomerase I inhibitor             | S06512  | 0.68    | 2.2E-06  |
| 4    | -15  | Epirubicin hydrochloride       | DNA topoisomerase II inhibitor            | S02217  | 0.67    | 2.6E-06  |
| 5    | -14  | Doxorubicin hydrochloride      | DNA topoisomerase II inhibitor            | S01405  | 0.66    | 4.5E-06  |
| 6    | -1453| IMD-0354                       | IKK-2 (IKK-beta) inhibitor                | S06313  | 0.66    | 5.5E-06  |
| 7    | -1558| TAS-102                        | Thymidylate synthase inhibitor            | S06912  | 0.65    | 6.1E-06  |
| 8    | -1213| Idarubicin hydrochloride       | DNA topoisomerase II inhibitor            | S06016  | 0.65    | 6.3E-06  |
| 9    | -1111| Topotecan                      | DNA topoisomerase I inhibitor             | S04803  | 0.65    | 6.9E-06  |
| 10   | -86  | Gemcitabine hydrochloride      | Antimetabolite                            | S06821  | 0.65    | 8.2E-06  |
| 11   | -13  | Daunorubicin hydrochloride     | DNA intercalator                          | S06504  | 0.65    | 9.3E-06  |
| 12   | -1537| Gemcitabine                    | Antimetabolite                            | S06828  | 0.64    | 9.9E-06  |
| 13   | -1   | Carboquone                     | DNA alkylating agent                      | S03508  | 0.64    | 1.2E-05  |
| 14   | -116 | Aphidicolin                    | DNA polymerase α inhibitor                | S06522  | 0.64    | 1.3E-05  |
| 15   | -31  | Irinotecan hydrochloride       | DNA topoisomerase I inhibitor             | S03302  | 0.63    | 1.6E-05  |
| 16   | -1408| P276-00                        | CDK1/4/9 inhibitor                        | S06119  | 0.63    | 1.9E-05  |
| 17   | -17  | Etoposide                      | DNA topoisomerase II inhibitor            | S02517  | 0.62    | 2.3E-05  |
| 18   | -1538| Gemcitabine monophosphate      | Antimetabolite                            | S06829  | 0.62    | 2.3E-05  |
| 19   | -11  | Actinomycin D                  | DNA-directed RNA polymerase inhibitor     | S01704  | 0.60    | 4.8E-05  |
| 20   | -33  | Cisplatin                      | DNA alkylating agent                      | S04332  | 0.60    | 5.2E-05  |
| 21   | -1015| Resveratrol                    | Polyphenol (multi-target)                 | S04345  | 0.60    | 5.7E-05  |
| 22   | -777 | SB 225002                      | CXCR2 antagonist                          | S03627  | 0.60    | 6.3E-05  |
| 23   | -944 | P13K-alfa inhibitor IV         | P13Ka inhibitor                           | S04029  | 0.60    | 6.5E-05  |
| 24   | -12  | Bleomycin hydrochloride        | DNA damaging agent                        | S06705  | 0.59    | 6.7E-05  |
| 25   | -26  | Neocarzinostatin               | DNA damaging agent                        | S02219  | 0.59    | 7.2E-05  |
| 26   | -1524| Trabectedin                    | DNA damaging agent                        | S06714  | 0.59    | 8.4E-05  |
| 27   | -69  | Genistein                      | Isoflavone (multi-target)                 | S06520  | 0.58    | 1.2E-04  |
| 28   | -91  | Clofarabine                    | Antimetabolite                            | S01210  | 0.57    | 1.3E-04  |
| 29   | -5   | Cytarabine                     | Antimetabolite                            | S02521  | 0.57    | 1.6E-04  |
| 30   | -28  | Pirarubicin                    | DNA intercalator                          | S02220  | 0.57    | 1.7E-04  |
| Rank | JCI#  | Chemical name                      | Mode of action/Target                        | Exp.-ID  | Pearson | P value  |
|------|-------|------------------------------------|---------------------------------------------|----------|---------|----------|
| 1    | -1540 | Tetrahydrouridine                  | Cytidine deaminase inhibitor                 | S06831   | 0.66    | 4.8E-06  |
| 2    | -1153 | Lenalidomide                       | Immunomodulatory imide drug (IMiDs)          | S04946   | 0.66    | 4.9E-06  |
| 3    | -705  | Warfarin                           | Anticoagulant                                | S03513   | 0.65    | 6.6E-06  |
| 4    | -713  | Oltipraz                           | Schistosomicide                              | S03521   | 0.65    | 6.7E-06  |
| 5    | -703  | Thalidomide(+)                     | Immunomodulatory imide drug (IMiDs)          | S03511   | 0.65    | 8.5E-06  |
| 6    | -285  | SB203580                           | p38 MAPK Inhibitor                          | S01627   | 0.64    | 9.3E-06  |
| 7    | -714  | Theophylline                       | Phosphodiesterase III/IV Inhibitor          | S03522   | 0.64    | 9.4E-06  |
| 8    | -1527 | CB 1954                            | DNA damaging agent                          | S06715   | 0.64    | 9.6E-06  |
| 9    | -717  | PP-H hydrochloride                 | Superoxide radical detector                 | S03525   | 0.64    | 1.1E-05  |
| 10   | -710  | N, N-diethyl-meta-toluamide        | Insect repellent                            | S03518   | 0.64    | 1.3E-05  |
| 11   | -679  | Coenzyme Q10                       | Antioxidant                                  | S03514   | 0.63    | 1.5E-05  |
| 12   | -904  | Rp-8-Br-PET-cGMPS, sodium salt     | Protein Kinase G Inhibitor                  | S03955   | 0.63    | 1.8E-05  |
| 13   | -846  | Splitomicin                        | Inhibitor of class III HDACs (sirtuins)      | S03828   | 0.63    | 1.8E-05  |
| 14   | -1644 | Trigonelline hydrochloride         | Nicotinic acid metabolite (multi-target)     | S07302   | 0.63    | 2.0E-05  |
| 15   | -718  | Dideoxyadenosine                   | Adenylate cyclase inhibitor                  | S03526   | 0.62    | 2.1E-05  |
| 16   | -1241 | Jervine                            | Hedgehog (Hg) signaling inhibitor            | S05402   | 0.62    | 2.4E-05  |
| 17   | -395  | Bortezomib                         | Proteasome inhibitor                         | S02412   | 0.62    | 2.6E-05  |
| 18   | -1539 | Pentostatin                        | Antimetabolite                               | S06830   | 0.62    | 2.6E-05  |
| 19   | -896  | L-NIL dihydrochloride              | iNOS (inducible nitric oxide synthase-2) inhibitor | S03947   | 0.62    | 2.8E-05  |
| 20   | -549  | 4-Ethynitrobenzene                 | Unknown                                      | S03046   | 0.61    | 3.4E-05  |
| 21   | -1633 | Indoximod                          | Indoleamine 2,3-dioxygenase 1 inhibitor      | S07234   | 0.61    | 3.5E-05  |
| 22   | -801  | Monastrol                          | Kinesin-5 (Eg5) inhibitor                    | S03652   | 0.61    | 3.8E-05  |
| 24   | -715  | Sodium salicylate                  | Non-steroidal anti-inflammatory drug         | S03523   | 0.61    | 4.3E-05  |
| 25   | -516  | TMPyP                              | Telomerase inhibitor                         | S03012   | 0.60    | 4.7E-05  |
| 26   | -1652 | Rac1 Inhibitor W56                 | Rac1 inhibitor                               | S07318   | 0.60    | 4.8E-05  |
| 27   | -908  | DL-AP3                             | Phosphoserine phosphatase inhibitor          | S03965   | 0.60    | 4.8E-05  |
| 28   | -1713 | Rbin-1                             | Midasin (Mdn1) inhibitor                     | S07452   | 0.60    | 5.0E-05  |
| 29   | -14   | Doxorubicin hydrochloride          | DNA topoisomerase II Inhibitor              | S01401   | 0.60    | 5.0E-05  |
| 30   | -709  | Pregnenolone-16a-carbonitrile (PCN)| PXR (Pregnane X receptor) ligand             | S03517   | 0.60    | 5.3E-05  |
| 31   | -99   | SN-38                              | DNA topoisomerase I inhibitor                | S05703   | 0.53    | 5.8E-04  |
### Table S3. COMPARE analysis of Lam14

| Rank | JCI#   | Chemical name          | Mode of action/Target                                      | Exp.-ID | Pearson | P value   |
|------|--------|------------------------|------------------------------------------------------------|---------|---------|-----------|
| 1    | -1229  | PHA 793887             | CDK Inhibitor                                              | S05216  | 0.65    | 7.2E-06   |
| 2    | -1163  | Danusertib             | Aurora kinase inhibitor                                     | S04956  | 0.62    | 3.1E-05   |
| 3    | -774   | Z-GLF-CMK              | Cathepsin G inhibitor                                      | S03624  | 0.61    | 4.5E-05   |
| 4    | -1344  | Alectinib              | EML4-ALK inhibitor                                         | S05807  | 0.60    | 5.5E-05   |
| 5    | -1244  | Quizartinib            | FLT3 inhibitor                                             | S05405  | 0.58    | 9.6E-05   |
| 6    | -396   | Chromomycin A3         | Inhibitor of DNA replication and transcription             | S02403  | 0.58    | 1.1E-04   |
| 7    | -1266  | PKI-587                | PI3K/mTOR inhibitor                                        | S05505  | 0.58    | 1.2E-04   |
| 8    | -520   | Epoxomicin             | Proteasome inhibitor                                       | S03016  | 0.57    | 1.4E-04   |
| 9    | -1064  | Kazusamycin A          | Exportin1/CRM1 Inhibitor                                   | S04810  | 0.57    | 1.5E-04   |
| 10   | -1647  | FIN56                  | GPX4 degrader                                              | S07313  | 0.57    | 1.7E-04   |
| 11   | -1248  | AT-7519                | CDK inhibitor                                              | S07420  | 0.57    | 1.7E-04   |
| 12   | -179   | Dopamine hydrochloride | Neurotransmitter                                           | S01326  | 0.56    | 2.2E-04   |
| 13   | -835   | Masoprocol             | Antioxidant                                                | S03817  | 0.55    | 2.5E-04   |
| 14   | -1507  | Olmutinib              | EGFR inhibitor                                             | S06643  | 0.55    | 2.5E-04   |
| 15   | -876   | Syk inhibitor          | Spleen tyrosine kinase inhibitor                            | S03923  | 0.55    | 2.6E-04   |
| 16   | -1408  | P276-00                | CDK inhibitor                                              | S06119  | 0.55    | 3.3E-04   |
| 17   | -1312  | Apatinib               | VEGFR2 inhibitor                                           | S05526  | 0.54    | 3.5E-04   |
| 18   | -318   | Cadmium chloride       | Carcinogen                                                 | S01724  | 0.54    | 3.9E-04   |
| 19   | -1100  | SNS-032                | CDK inhibitor                                              | S07416  | 0.54    | 4.4E-04   |
| 20   | -736   | Cyclopamine            | Hedgehog (Hg) signaling inhibitor                          | S03545  | 0.54    | 4.4E-04   |
| 21   | -814   | Puromycin dihydrochloride | Transferase inhibitor                               | S03665  | 0.54    | 4.5E-04   |
| 22   | -280   | Tiapafant              | Platelet-activating factor receptor antagonist              | S01709  | 0.53    | 4.6E-04   |
| 23   | -521   | DRB                    | Casein kinase II (CK2) Inhibitor                          | S03017  | 0.53    | 4.7E-04   |
| 24   | -1059  | Chaetocin              | Histone lysine methyltransferase inhibitor                 | S04805  | 0.53    | 5.2E-04   |
| 25   | -881   | TX-1918                | eEF-2 kinase inhibitor                                     | S03932  | 0.53    | 5.3E-04   |
| 26   | -742   | NSC23766               | Rac-1 inhibitor                                            | S03971  | 0.53    | 5.7E-04   |
| 27   | -56    | Herbimycin A           | Pan protein kinase inhibitor                               | S01105  | 0.53    | 5.9E-04   |
| 28   | -1168  | SNS-314                | Aurora kinase inhibitor                                    | S04961  | 0.52    | 6.0E-04   |
| 29   | -640   | Methyl 2,5-dihydroxycinnamate | EGFR inhibitor Erbstatin analogue                           | S03340  | 0.52    | 6.1E-04   |
| 30   | -395   | Bortezomib             | Proteasome inhibitor                                       | S02412  | 0.52    | 6.4E-04   |
|      | -99    | SN-38                  | DNA topoisomerase I inhibitor                              | S05703  | 0.23    | 1.6E-01   |