**Malignant vs Non-malignant**

* First hit: Neoplasms by Site (DOID: 9005424): 169 associated genes, p-vlaue: 5.52 E-26, Bonferroni: 1.17E-22

Non-small cel lung carcinoma (DOID:3908)

* 15 associated genes, p-value: 1.37E-3, Bonferroni: 1.00E0

|  |  |
| --- | --- |
| CA9 | [ "lung non-small cell carcinoma" ] |
| CARD18 | [ "lung non-small cell carcinoma" ] |
| COL10A1 | [ "lung adenocarcinoma" ] |
| CYP24A1 | [ "lung adenocarcinoma" ] |
| FOXL2 | [ "lung non-small cell carcinoma" ] |
| GJB2 | [ "lung adenocarcinoma" ] |
| MAGEA6 | [ "lung non-small cell carcinoma" ] |
| MMP1 | [ "lung non-small cell carcinoma" ] |
| MMP11 | [ "lung non-small cell carcinoma" ] |
| PITX2 | [ "lung adenocarcinoma" ] |
| PRAME | [ "lung adenocarcinoma" ] |
| PTHLH | [ "lung non-small cell carcinoma" ] |
| SPP1 | [ "lung non-small cell carcinoma" ] |
| UCA1 | [ "lung non-small cell carcinoma" ] |
| UGT1A1 | [ "lung non-small cell carcinoma" ] |

**Control vs AC**

* First hit: Neoplasms by Site (DOID: 9005424): 169 associated genes, p-vlaue: 5.52 E-26, Bonferroni: 1.17E-22

Lung cancer associated

|  |  |
| --- | --- |
| ASCL1 | [ "lung small cell carcinoma" ] |
| CA9 | [ "lung non-small cell carcinoma" ] |
| CARD18 | [ "lung non-small cell carcinoma" ] |
| CNTNAP2 | [ "lung small cell carcinoma" ] |
| COL10A1 | [ "lung adenocarcinoma", "lung metastasis" ] |
| CYP24A1 | [ "lung adenocarcinoma", "lung non-small cell carcinoma", "lung carcinoma", "lung small cell carcinoma" ] |
| FOXL2 | [ "lung non-small cell carcinoma" ] |
| GJB2 | [ "lung adenocarcinoma" ] |
| MAGEA6 | [ "lung non-small cell carcinoma" ] |
| MMP1 | [ "lung non-small cell carcinoma" ] |
| MMP11 | [ "lung non-small cell carcinoma" ] |
| MMP3 | [ "lung cancer" ] |
| PITX2 | [ "lung adenocarcinoma" ] |
| PRAME | [ "lung non-small cell carcinoma", "lung adenocarcinoma" ] |
| PTHLH | [ "lung non-small cell carcinoma" ] |
| SERPINA4 | [ "DICER1 syndrome", "pleuropulmonary blastoma" ] |
| SPP1 | [ "lung non-small cell carcinoma" ] |
| UCA1 | [ "lung non-small cell carcinoma" ] |
| UGT1A1 | [ "lung non-small cell carcinoma" ] |

**Control vs SC**

* First hit: Neoplasms by Site (DOID: 9005424): 169 associated genes, p-vlaue: 5.52 E-26, Bonferroni: 1.17E-22

Lung cancer associated

|  |  |
| --- | --- |
| ASCL1 | [ "lung small cell carcinoma" ] |
| CA9 | [ "lung non-small cell carcinoma" ] |
| CARD18 | [ "lung non-small cell carcinoma" ] |
| CNTNAP2 | [ "lung small cell carcinoma" ] |
| COL10A1 | [ "lung adenocarcinoma", "lung metastasis" ] |
| CYP24A1 | [ "lung adenocarcinoma", "lung non-small cell carcinoma", "lung carcinoma", "lung small cell carcinoma" ] |
| FOXL2 | [ "lung non-small cell carcinoma" ] |
| GJB2 | [ "lung adenocarcinoma" ] |
| MAGEA6 | [ "lung non-small cell carcinoma" ] |
| MMP1 | [ "lung non-small cell carcinoma" ] |
| MMP11 | [ "lung non-small cell carcinoma" ] |
| MMP3 | [ "lung cancer" ] |
| PITX2 | [ "lung adenocarcinoma" ] |
| PRAME | [ "lung non-small cell carcinoma", "lung adenocarcinoma" ] |
| PTHLH | [ "lung non-small cell carcinoma" ] |
| SERPINA4 | [ "DICER1 syndrome", "pleuropulmonary blastoma" ] |
| SPP1 | [ "lung non-small cell carcinoma" ] |
| UCA1 | [ "lung non-small cell carcinoma" ] |
| UGT1A1 | [ "lung non-small cell carcinoma" ] |

**Control vs LC**

* First hit: Neoplasms by Site (DOID: 9005424): 169 associated genes, p-vlaue: 5.52 E-26, Bonferroni: 1.17E-22

Lung cancer associated

|  |  |
| --- | --- |
| ASCL1 | [ "lung small cell carcinoma" ] |
| CA9 | [ "lung non-small cell carcinoma" ] |
| CARD18 | [ "lung non-small cell carcinoma" ] |
| CNTNAP2 | [ "lung small cell carcinoma" ] |
| COL10A1 | [ "lung adenocarcinoma", "lung metastasis" ] |
| CYP24A1 | [ "lung adenocarcinoma", "lung non-small cell carcinoma", "lung carcinoma", "lung small cell carcinoma" ] |
| FOXL2 | [ "lung non-small cell carcinoma" ] |
| GJB2 | [ "lung adenocarcinoma" ] |
| MAGEA6 | [ "lung non-small cell carcinoma" ] |
| MMP1 | [ "lung non-small cell carcinoma" ] |
| MMP11 | [ "lung non-small cell carcinoma" ] |
| MMP3 | [ "lung cancer" ] |
| PITX2 | [ "lung adenocarcinoma" ] |
| PRAME | [ "lung non-small cell carcinoma", "lung adenocarcinoma" ] |
| PTHLH | [ "lung non-small cell carcinoma" ] |
| SERPINA4 | [ "DICER1 syndrome", "pleuropulmonary blastoma" ] |
| SPP1 | [ "lung non-small cell carcinoma" ] |
| UCA1 | [ "lung non-small cell carcinoma" ] |
| UGT1A1 | [ "lung non-small cell carcinoma" ] |

**AC vs SC**

* First hit: Neoplasms by Site (DOID: 9005424): 169 associated genes, p-vlaue: 5.52 E-26, Bonferroni: 1.17E-22

|  |  |
| --- | --- |
| ASCL1 | [ "lung small cell carcinoma" ] |
| CA9 | [ "lung non-small cell carcinoma" ] |
| CARD18 | [ "lung non-small cell carcinoma" ] |
| CNTNAP2 | [ "lung small cell carcinoma" ] |
| COL10A1 | [ "lung adenocarcinoma", "lung metastasis" ] |
| CYP24A1 | [ "lung adenocarcinoma", "lung non-small cell carcinoma", "lung carcinoma", "lung small cell carcinoma" ] |
| FOXL2 | [ "lung non-small cell carcinoma" ] |
| GJB2 | [ "lung adenocarcinoma" ] |
| MAGEA6 | [ "lung non-small cell carcinoma" ] |
| MMP1 | [ "lung non-small cell carcinoma" ] |
| MMP11 | [ "lung non-small cell carcinoma" ] |
| MMP3 | [ "lung cancer" ] |
| PITX2 | [ "lung adenocarcinoma" ] |
| PRAME | [ "lung non-small cell carcinoma", "lung adenocarcinoma" ] |
| PTHLH | [ "lung non-small cell carcinoma" ] |
| SERPINA4 | [ "DICER1 syndrome", "pleuropulmonary blastoma" ] |
| SPP1 | [ "lung non-small cell carcinoma" ] |
| UCA1 | [ "lung non-small cell carcinoma" ] |
| UGT1A1 | [ "lung non-small cell carcinoma" ] |

**AC vs LC**

* First hit: Neoplasms by Site (DOID: 9005424): 169 associated genes, p-vlaue: 5.52 E-26, Bonferroni: 1.17E-22

Lung cancer associated

|  |  |
| --- | --- |
| ASCL1 | [ "lung small cell carcinoma" ] |
| CA9 | [ "lung non-small cell carcinoma" ] |
| CARD18 | [ "lung non-small cell carcinoma" ] |
| CNTNAP2 | [ "lung small cell carcinoma" ] |
| COL10A1 | [ "lung adenocarcinoma", "lung metastasis" ] |
| CYP24A1 | [ "lung adenocarcinoma", "lung non-small cell carcinoma", "lung carcinoma", "lung small cell carcinoma" ] |
| FOXL2 | [ "lung non-small cell carcinoma" ] |
| GJB2 | [ "lung adenocarcinoma" ] |
| MAGEA6 | [ "lung non-small cell carcinoma" ] |
| MMP1 | [ "lung non-small cell carcinoma" ] |
| MMP11 | [ "lung non-small cell carcinoma" ] |
| MMP3 | [ "lung cancer" ] |
| PITX2 | [ "lung adenocarcinoma" ] |
| PRAME | [ "lung non-small cell carcinoma", "lung adenocarcinoma" ] |
| PTHLH | [ "lung non-small cell carcinoma" ] |
| SERPINA4 | [ "DICER1 syndrome", "pleuropulmonary blastoma" ] |
| SPP1 | [ "lung non-small cell carcinoma" ] |
| UCA1 | [ "lung non-small cell carcinoma" ] |
| UGT1A1 | [ "lung non-small cell carcinoma" ] |

Conclusion

* For the Malignant,non-malignant, we chose to search on Lung non small cell carcinoma
* It also does not matter/there is no change in the different comparison for the histology variable
* All functional enrichment analysis provide the same results
  + First hit: Neoplasms by Site (DOID: 9005424): 169 associated genes, p-vlaue: 5.52 E-26, Bonferroni: 1.17E-22
  + 19 associated genes with lung cancer:

|  |  |
| --- | --- |
| ASCL1 | [ "lung small cell carcinoma" ] |
| CA9 | [ "lung non-small cell carcinoma" ] |
| CARD18 | [ "lung non-small cell carcinoma" ] |
| CNTNAP2 | [ "lung small cell carcinoma" ] |
| COL10A1 | [ "lung adenocarcinoma", "lung metastasis" ] |
| CYP24A1 | [ "lung adenocarcinoma", "lung non-small cell carcinoma", "lung carcinoma", "lung small cell carcinoma" ] |
| FOXL2 | [ "lung non-small cell carcinoma" ] |
| GJB2 | [ "lung adenocarcinoma" ] |
| MAGEA6 | [ "lung non-small cell carcinoma" ] |
| MMP1 | [ "lung non-small cell carcinoma" ] |
| MMP11 | [ "lung non-small cell carcinoma" ] |
| MMP3 | [ "lung cancer" ] |
| PITX2 | [ "lung adenocarcinoma" ] |
| PRAME | [ "lung non-small cell carcinoma", "lung adenocarcinoma" ] |
| PTHLH | [ "lung non-small cell carcinoma" ] |
| SERPINA4 | [ "DICER1 syndrome", "pleuropulmonary blastoma" ] |
| SPP1 | [ "lung non-small cell carcinoma" ] |
| UCA1 | [ "lung non-small cell carcinoma" ] |
| UGT1A1 | [ "lung non-small cell carcinoma" ] |