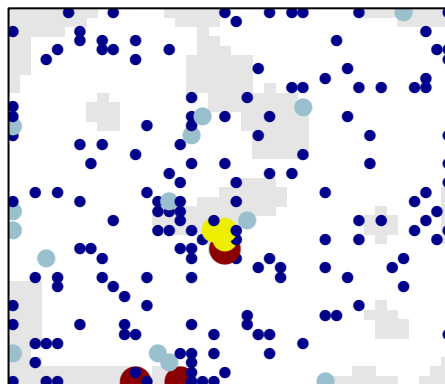


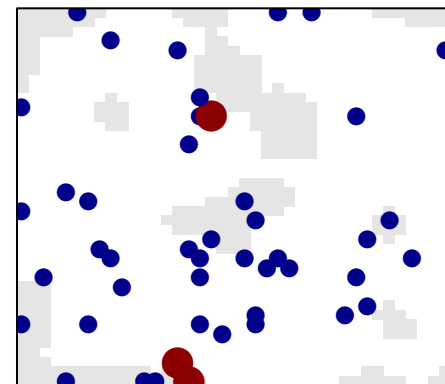
Small cell lung cancer

all genes

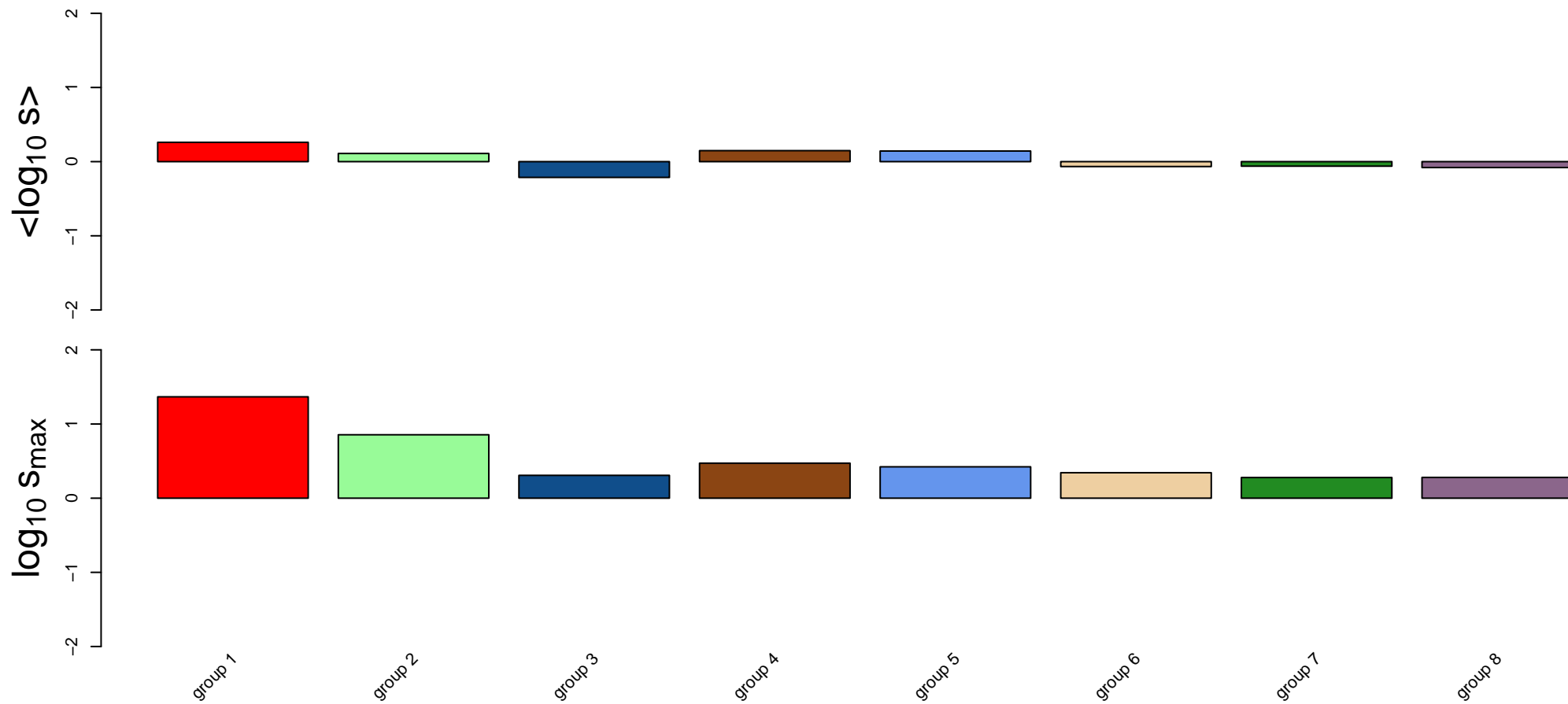


maximum = 4

sink node genes



maximum = 2



Small_cell_lung_cancer genes with data

Neuroendocrine epithelial cells

Pulmonary neuroendocrine epithelial cell

FHIT → ? → Reduced apoptosis
Cell-cycle progression

Overexpression

BCL2

Mitochondrion

BAX

CYCS

APAF1

Apoptosis

CASP9

CASP3

Inhibition of apoptosis

Genetic alterations

Oncogene :

Myc

Tumor suppressors : RARβ, FHIT, p53, RB, PTEN

Primary small cell carcinoma

ECM-receptor interaction

LAMC3

ITGA6
ITGB1

PTK2

PIK3CA

PIP3

AKT3

CHUK

NFKBIA

Degradation

NFKB1

Focal adhesion

PTEN

PI3K-Akt signaling pathway

Metastatic small cell carcinoma

Retinoic acid
p53 signaling pathway

RARB
RXRA

DNA

Tumour progression

DNA damage

TP53

DNA

CDKN1A
BAX
DDB2
GADD45G
BAK1
POLK

Uncontrolled proliferation
Increased survival
Genomic instability

CDKN2B

CDK4
CCND1

DNA

CDKN1B

CDK2
CCNE1

DNA

SKP2

CKS1B

DNA

MYC
MAX

ZBTB17

+p

RB1

+p

E2F1

Cell cycle

DNA

G1/S progression

CCND1 → Proliferation

BIRC8 → Resistance to apoptosis signal

BCL2L1 → Resistance to apoptosis signal

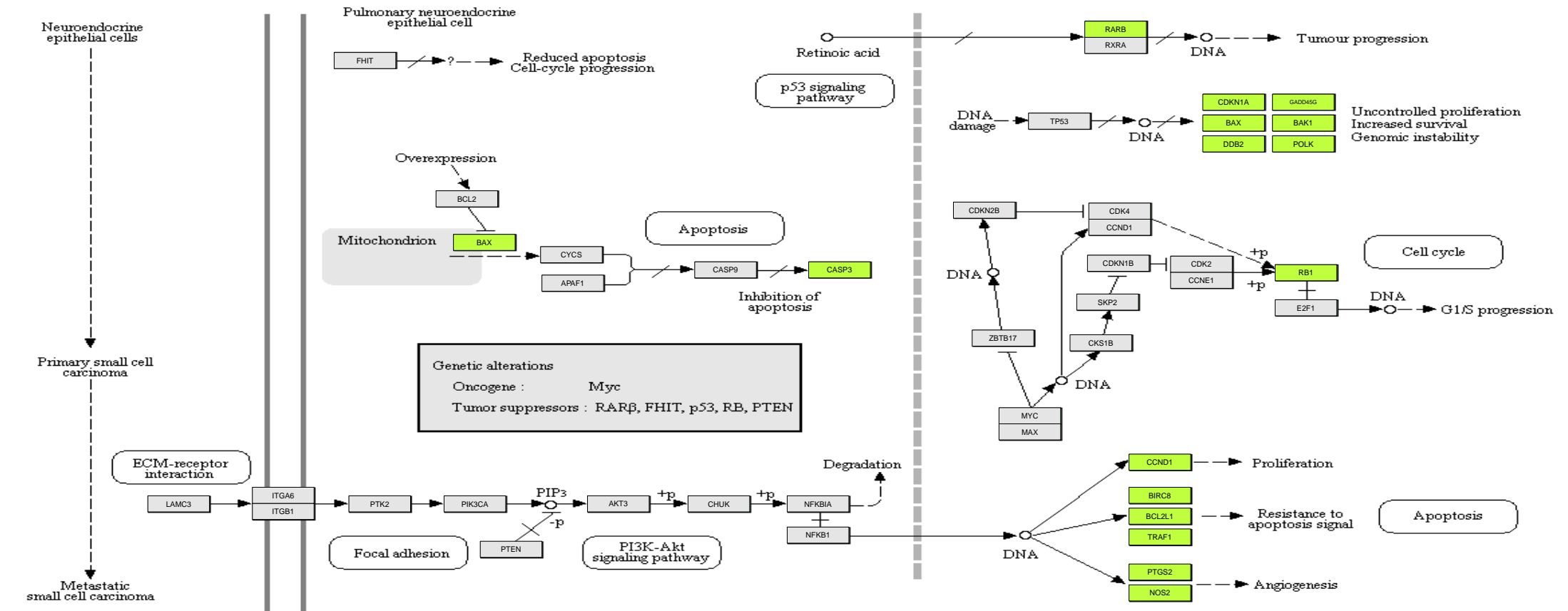
TRAF1 → Resistance to apoptosis signal

PTGS2 → Angiogenesis

NOS2 → Angiogenesis

Apoptosis

Small_cell_lung_cancer sink nodes



Small_cell_lung_cancer group 1

Neuroendocrine epithelial cells

Pulmonary neuroendocrine epithelial cell

FHIT → ? → Reduced apoptosis
Cell-cycle progression

Overexpression

BCL2

Mitochondrion

BAX

CYCS

APAF1

Apoptosis

CASP9

CASP3

Inhibition of apoptosis

Genetic alterations

Oncogene : Myc

Tumor suppressors : RARβ, FHIT, p53, RB, PTEN

ECM-receptor interaction

LAMC3

ITGA6

ITGB1

Focal adhesion

PTEN

PTK2

PIK3CA

PIP3

AKT3

CHUK

NFKBIA

NFKB1

+p

+p

-p

PI3K-Akt signaling pathway

Degradation

Retinoic acid

p53 signaling pathway

RARB
RXRA

DNA

Tumour progression

DNA damage

TP53

DNA

CDKN1A

BAX

DOB2

GADD45G

BAK1

POLK

Uncontrolled proliferation
Increased survival
Genomic instability

CDKN2B

CDK4

CCND1

DNA

CDKN1B

CDK2

CCNE1

+p

+p

RB1

E2F1

Cell cycle

DNA

G1/S progression

ZBTB17

MYC

MAX

DNA

CCND1

Proliferation

BIRC8

BCL2L1

TRAF1

Resistance to apoptosis signal

Apoptosis

PTGS2

NOS2

Angiogenesis

DNA

Primary small cell carcinoma

Metastatic small cell carcinoma

Small_cell_lung_cancer group 2

Neuroendocrine epithelial cells

Pulmonary neuroendocrine epithelial cell

FHIT → ? → Reduced apoptosis
Cell-cycle progression

Primary small cell carcinoma

Metastatic small cell carcinoma

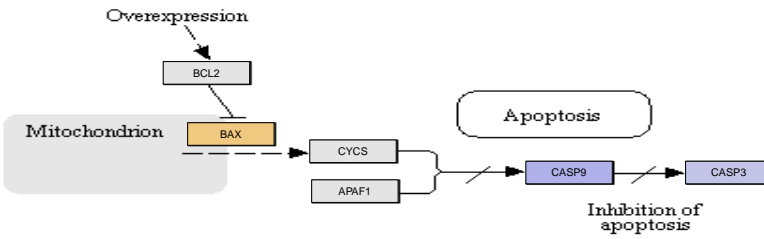
ECM-receptor interaction

LAMC3 → ITGA6/ITGB1

Focal adhesion

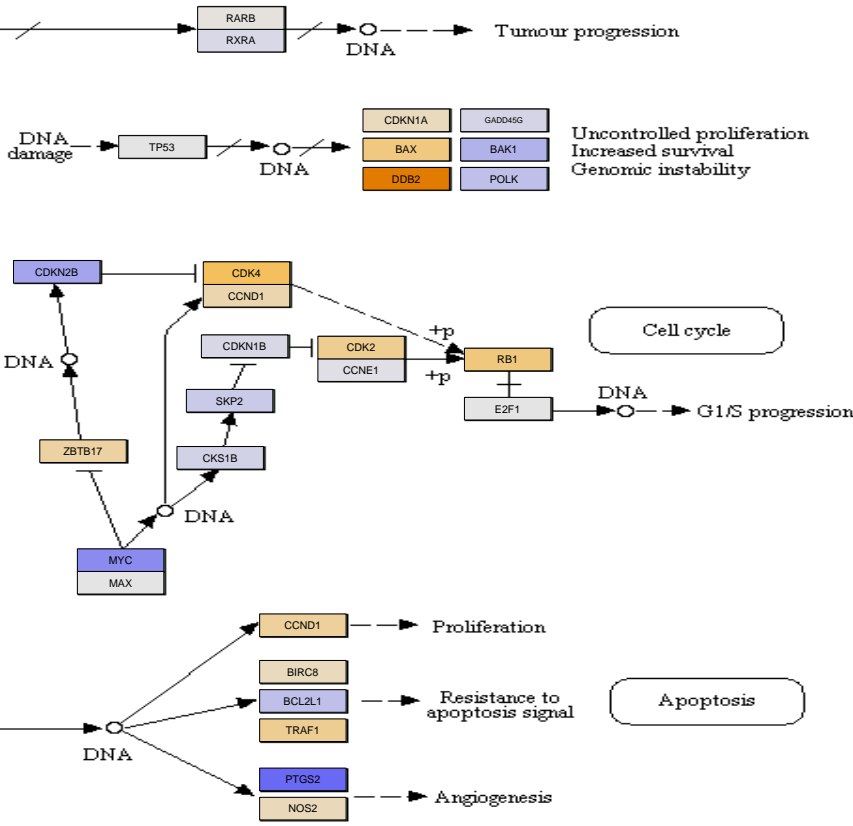
PI3K-Akt signaling pathway

Genetic alterations
Oncogene : Myc
Tumor suppressors : RARβ, FHIT, p53, RB, PTEN



p53 signaling pathway

Retinoic acid



Uncontrolled proliferation
Increased survival
Genomic instability

Cell cycle

Apoptosis

Small_cell_lung_cancer group 3

Neuroendocrine epithelial cells

Pulmonary neuroendocrine epithelial cell

FHIT → ? → Reduced apoptosis
Cell-cycle progression

Overexpression

BCL2

Mitochondrion

BAX

CYCS

APAF1

Apoptosis

CASP9

CASP3

Inhibition of apoptosis

Genetic alterations

Oncogene : Myc

Tumor suppressors : RARβ, FHIT, p53, RB, PTEN

ECM-receptor interaction

LAMC3

ITGA6
ITGB1

Focal adhesion

PTK2

PIK3CA

PIP3

-p

AKT3

+p

CHUK

+p

NFKBIA

Degradation

NFKB1

PI3K-Akt signaling pathway

Retinoic acid

p53 signaling pathway

RARB
RXRA

DNA

Tumour progression

DNA damage

TP53

DNA

CDKN1A

BAX

DDB2

GADD45G

BAK1

POLK

Uncontrolled proliferation
Increased survival
Genomic instability

CDKN2B

CDK4
CCND1

DNA

DNA

ZBTB17

MYC
MAX

SKP2

SKS1B

CDKN1B

CDK2
CCNE1

+p

+p

RB1

E2F1

DNA

G1/S progression

Cell cycle

Apoptosis

CDND1 → Proliferation

BIRC8 → Resistance to apoptosis signal

BCL2L1 → Resistance to apoptosis signal

TRAF1 → Resistance to apoptosis signal

PTGS2 → Angiogenesis

NOS2 → Angiogenesis

Primary small cell carcinoma

Metastatic small cell carcinoma

Small_cell_lung_cancer group 4

Neuroendocrine epithelial cells

Pulmonary neuroendocrine epithelial cell

FHIT → ? → Reduced apoptosis
Cell-cycle progression

Overexpression

BCL2

Mitochondrion

BAX

CYCS

APAF1

Apoptosis

CASP9

CASP3

Inhibition of apoptosis

Genetic alterations

Oncogene : Myc

Tumor suppressors : RARβ, FHIT, p53, RB, PTEN

ECM-receptor interaction

LAMC3

ITGA6

ITGB1

Focal adhesion

PTK2

PIK3CA

PIP3

AKT3

CHUK

NFKBIA

NFKB1

PTEN

PI3K-Akt signaling pathway

Degradation

p53 signaling pathway

Retinoic acid

RARB

RXRA

DNA

Tumour progression

DNA damage

TP53

DNA

CDKN1A

BAX

DDB2

GADD45G

BAK1

POLK

Uncontrolled proliferation
Increased survival
Genomic instability

DNA

CDKN2B

MYC

MAX

DNA

DNA

CDKN1B

SKP2

CKS1B

CCND1

BIRC6

BCL2L1

TRAF1

PTGS2

NOS2

CDK4

CCND1

CDK2

CCNE1

RB1

E2F1

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

DNA

Cell cycle

G1/S progression

Proliferation

Resistance to apoptosis signal

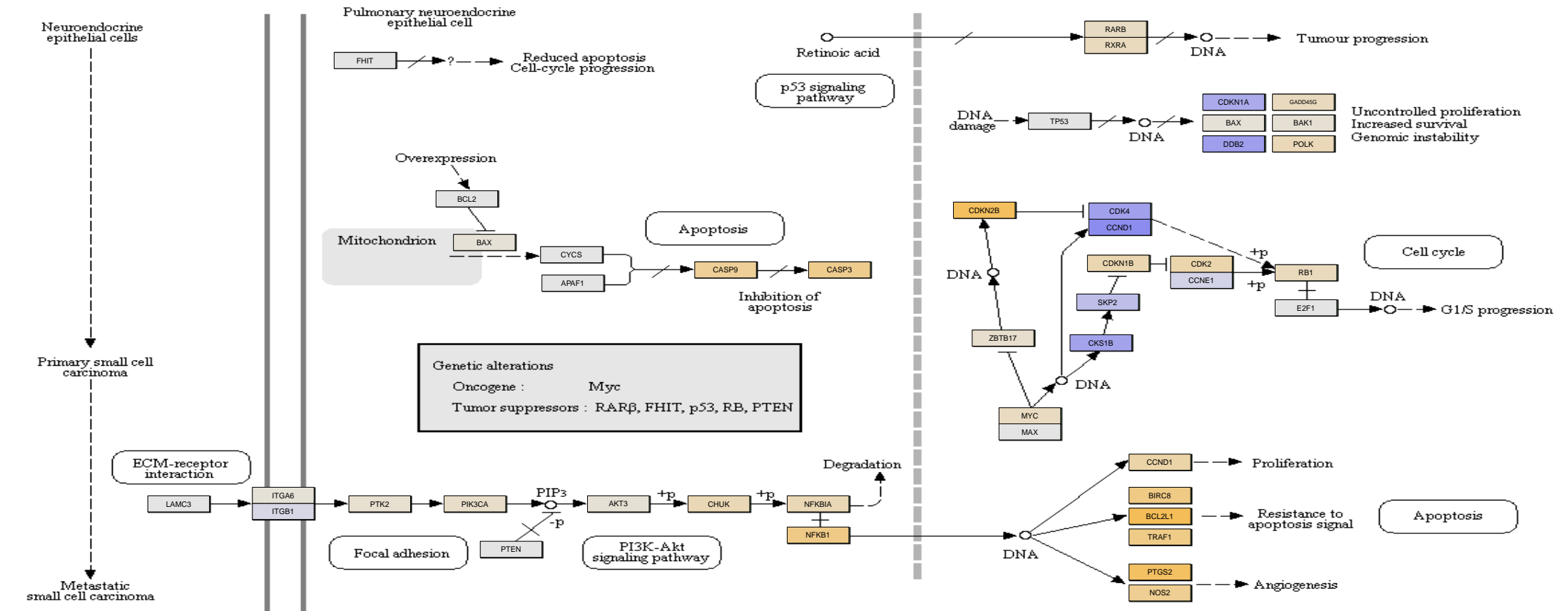
Apoptosis

Angiogenesis

Primary small cell carcinoma

Metastatic small cell carcinoma

Small_cell_lung_cancer group 5



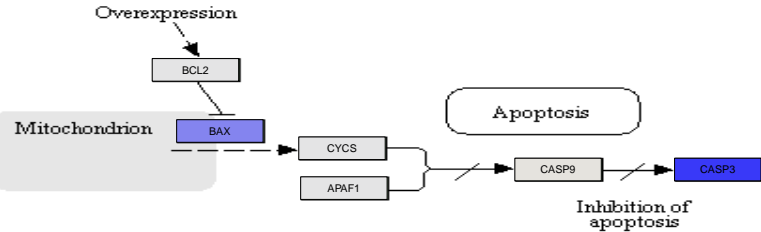
Small_cell_lung_cancer group 6

Neuroendocrine epithelial cells

Pulmonary neuroendocrine epithelial cell

FHIT → ? → Reduced apoptosis
Cell-cycle progression

Primary small cell carcinoma



Genetic alterations
Oncogene : Myc
Tumor suppressors : RARβ, FHIT, p53, RB, PTEN

Metastatic small cell carcinoma

ECM-receptor interaction

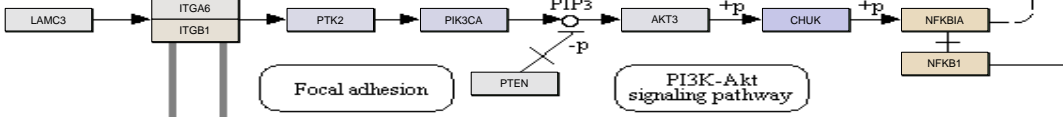
LAMC3 → ITGA6/ITGB1

Focal adhesion

PTEN

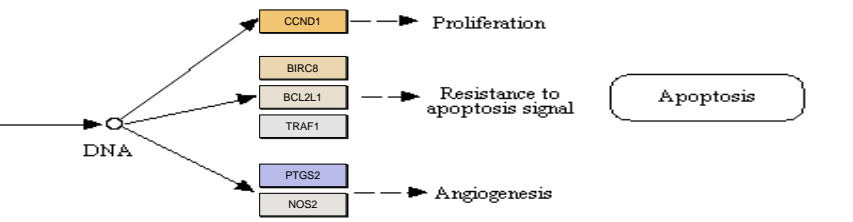
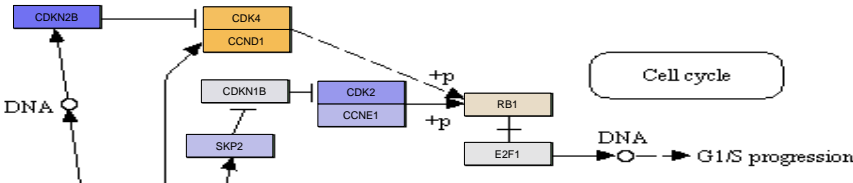
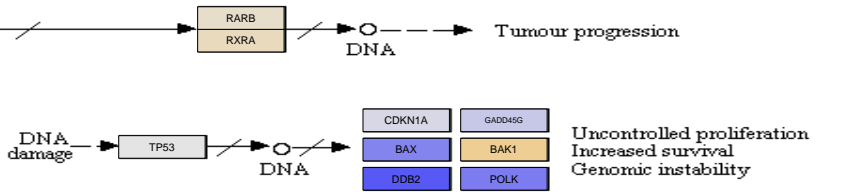
PI3K-Akt signaling pathway

Degradation



p53 signaling pathway

Retinoic acid



Small_cell_lung_cancer group 7

Neuroendocrine epithelial cells

Pulmonary neuroendocrine epithelial cell

FHIT → ? → Reduced apoptosis
Cell-cycle progression

Overexpression

BCL2

Mitochondrion

BAX

CYCS

APAF1

Apoptosis

CASP9

CASP3

Inhibition of apoptosis

Genetic alterations

Oncogene : Myc

Tumor suppressors : RARβ, FHIT, p53, RB, PTEN

Primary small cell carcinoma

ECM-receptor interaction

LAMC3

ITGA6
ITGB1

Focal adhesion

PTK2

PIK3CA

PIP3

AKT3

CHUK

NFKBIA

NFKB1

Degradation

PTEN

PI3K-Akt signaling pathway

Metastatic small cell carcinoma

Retinoic acid
p53 signaling pathway

RARB
RXRA

DNA

Tumour progression

DNA damage

TP53

DNA

CDKN1A
BAX
DDB2

GADD45G
BAK1
POLK

Uncontrolled proliferation
Increased survival
Genomic instability

CDKN2B

CDK4
CCND1

DNA

CDKN1B

CDK2
CCNE1

DNA

SKP2

CKS1B

MYC
MAX

ZBTB17

RB1

E2F1

Cell cycle

DNA

G1/S progression

DNA

CCND1

Proliferation

BIRC8

BCL2L1

TRAF1

Resistance to apoptosis signal

Apoptosis

PTGS2

NOS2

Angiogenesis

Small_cell_lung_cancer group 8

Neuroendocrine epithelial cells

Pulmonary neuroendocrine epithelial cell

FHIT → ? → Reduced apoptosis
Cell-cycle progression

Overexpression

BCL2

Mitochondrion

BAX

CYCS

APAF1

Apoptosis

CASP9

CASP3

Inhibition of apoptosis

Genetic alterations

Oncogene : Myc

Tumor suppressors : RARβ, FHIT, p53, RB, PTEN

Primary small cell carcinoma

ECM-receptor interaction

LAMC3

ITGA6
ITGB1

PTK2

PIK3CA

PIP3

AKT3

CHUK

NFKBIA

NFKB1

Degradation

Focal adhesion

PTEN

PI3K-Akt signaling pathway

Metastatic small cell carcinoma

Retinoic acid

RARB
RXRA

DNA

Tumour progression

DNA damage

TP53

DNA

CDKN1A
BAX
DDB2

GADD45G
BAK1
POLK

Uncontrolled proliferation
Increased survival
Genomic instability

DNA

CDKN2B

CDK4
CCND1

CDKN1B

CDK2
CCNE1

SKP2

CKS1B

+p

+p

RB1

E2F1

Cell cycle

DNA

G1/S progression

MYC
MAX

DNA

DNA

CCND1

Proliferation

BIRC8

BCL2L1

TRAF1

Resistance to apoptosis signal

Apoptosis

PTGS2

NOS2

Angiogenesis