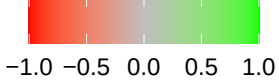

CHEMICAL CARCINOGENESIS - RECEPTOR ACTIVATION

Carcinogen (IARC Group No.)

Non-small-cell lung cancer
Small-cell lung cancer
Bladder cancer
Colon cancer

Nicotine
(Group 1) NNK
(Group 1) NNN
nAchRs
α7nAchR
α4β2
α3β4
α3β2
VGCC
Ca^{2+} influx
ARRB
c-Src
Raf-1
Rb
E2F1
DNA
Survivin
XIAP
cdc6
cdc25a
Survival
Proliferation
JAK2
STAT3
IKBKE
CyclinD1
Proliferation
Chemoresistance
PI3K
PIP3
Akt
mTOR
NFκB
Survivin
Survival/apoptotic inhibition
Proliferation
PI3K-Akt signaling pathway
Ras
Raf
MEK
ERK1/2
FOS
JUN
MYC
BCL2
Proliferation
Apoptotic inhibition
Invasion & migration
MAPK signaling pathway
Serotonin
Bombesin
(Autocrine)
PKC
VEGF
FGF2
VEGF signaling pathway
Angiogenesis
cAMP signaling pathway
Adrenaline
Noradrenaline
β-AR
Gs
AC
cAMP
PKA
pCREB
Proliferation
Migration
Gi
Bad
Survival/
apoptotic inhibition
Breast cancer
PSK
ER
VDR/AP1
cyclinD3
Cell proliferation
Transformation
Migration
Invasion
Abnormal differentiation
Apoptosis
BPA
(Group 1) E2
Estrogen signaling pathway
EGFR
Grb2
SOS
Proliferation
Survival
Non-small-cell lung cancer
Small-cell lung cancer
(Group 1) Arsenic
mTOR signaling pathway
4EBP1
S6K1
Increase in
cell growth
Breast cancer
mPR
Apoptosis
inhibition
Migration,
invasion
PR
c-Src
CyclinD1
RANKL
Proliferation
STAT5
BCL6
KLF5
KLF4
Wnt-1
NOTCH2
JAG1
P4
(Group 2B) MPA
Ligand
miR-141
miR-29abc
let-7
MicroRNAs in cancer
Estrogen-progestogen
menopausal therapy
(Group 1)
mRNA
E2
EGF
DLL
FGF
Increased cancer
stem cell (CSC)
activity
Lung cancer
Liver cancer
Skin cancer
(Group 1)
TCDD
B[α]P
p23
AIP
Importin
AhR
hsp90
ARNT
Xenobiotic metabolism
induction
CYP1A1
CYP1B1
EPHX
GST
UDPgT
Chemical carcinogenesis
- DNA adducts
Metabolism of xenobiotics
by cytochrome P450
Breast cancer
(Group 2B)
HCB
(Group 1)
PCB
CYP2Bs
Genotoxicity
ROS production
Liver cancer (Rodents)
(Group 2A)
DDT
(Group 2B)
PB
CAR
RXR
CYP3As
CYP1As
Chemical carcinogenesis -
Reactive oxygen species
(Group 1)
TCE
TCA
(Group 2B)
DEHP
Nafenopin
(Group 3)
DEHA
Clofibrate
Gemfibrozil
Metabolism of xenobiotics
by cytochrome P450
PPAR signaling pathway
PPARα
Oxidative stress
Proliferation

05207 6/1/21
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