Graphical summary of the study concept and analytical approaches



Water consumption monitoring (A) water and DSS, (B) nicotine, and (C) anatabine treatment groups. There was no difference in water consumption across the different treatment groups.



Differential gene expression results for pairwise comparisons capturing the pure effects of anatabine/nicotine exposure. The volcano plots (see Fig. 2B) represent the log2 fold changes on the horizontal axis and the corresponding statistical significance –log10 FDR on the vertical axis. The threshold for statistical significance indicated by the colored points is FDR \leq 0.05. Except for nicotine, the observed signals were rather weak.



Differential gene expression results for various contrasts involving the effects of anatabine/nicotine exposure. Volcano plots for individual gene differential expressions. The volcano plots (see Fig. 2B) represent the log2 fold changes on the horizontal axis and the corresponding statistical significance –log10 FDR on the vertical axis. Similar to the corresponding pure effects of anatabine/nicotine exposure described in Online Resource 2, the observed signals were weak and apparently unaffected by DSS treatment.



Hierarchical representation of the GSA results for all pathways contained in the top Reactome "Immune System" category and for the two-factor "Ana 20*DSS" interaction (larger unannotated version of Fig. 3C). The contents of this plot have been explained in the legends of Fig. 3C and Online Resource 3. Representing all the pathways from the Reactome "Immune System" category enables not only to identify the relevant biological mechanisms, but also to take into account their relationships (i.e. "mechanistic proximity") at various hierarchical levels, and, complementarily, to examine the parts of the hierarchy that are not involved in the response. The Reactome pathway names corresponding to the node labels are given in the lower part of the figure.

Immune System



Online Resource 5 continued

For more details please refer to Online Resource 12.

1:1	Immune System	3:4	MHC class II antigen presentation
2:1	Adaptive Immune System	3:5	Rap1 signalling
2:2	Cytokine Signaling in Immune system	3:6	Signaling by the B Cell Receptor (BCR)
2:3	Innate Immune System	3:7	TCR signaling
3:1	Class I MHC mediated antigen processing & presentation	3:8	Growth hormone receptor signaling
3:2	Costimulation by the CD28 family	3:9	Interferon Signaling
3:3	Immunoregulatory interactions between a Lymphoid and a non-Lymphoid cell	3:10	Prolactin receptor signaling

3:11	Signaling by Interleukins	3:18	DDX58/IFIH1-mediated induction of interferon-alpha/beta
3:12	TNFR2 non-canonical NF-kB pathway	3:19	Fc epsilon receptor (FCERI) signaling
3:13	Antimicrobial peptides	3:20	Fcgamma receptor (FCGR) dependent phagocytosis
3:14	C-type lectin receptors (CLRs)	3:21	Neutrophil degranulation
3:15	Complement cascade	3:22	Nucleotide-binding domain, leucine rich repeat containing receptor (NLR) signaling pathways
3:16	Cytosolic sensors of pathogen-associated DNA	3:23	ROS and RNS production in phagocytes
3:17	DAP12 interactions	3:24	Toll-like Receptor Cascades

Hierarchical representation of the GSA results for all pathways contained in the top Reactome "Signal Transduction" category and for the two-factor "Ana 20*DSS" interaction. The contents of this plot have been explained in the legends of Fig. 3C and Online Resource 3. The Reactome pathway names corresponding to the node labels are given in the lower part of the figure.



Signal Transduction

Online Resource 6 continued

For more details see Online Resource 12.

- 1:1 Signal Transduction2:1 Death Receptor Signalling
- 2:2 Intracellular signaling by second messengers
- 2:3 MAPK family signaling cascades
- 2:4 Integrin signaling
- 2:5 Signaling by Erythropoietin
- 2:6 Signaling by GPCR
- 2:7 Signaling by Hedgehog
- 2:8 Signaling by Hippo
- 2:9 Signaling by Leptin
- 2:10 Signaling by NOTCH
- 2:11 Signaling by Non-Receptor Tyrosine Kinases
- 2:12 Signaling by Nuclear Receptors
- 2:13 Signaling by Receptor Tyrosine Kinases
- 2:14 Signaling by Rho GTPases
- 2:15 Signaling by TGF-beta family members
- 2:16 Signaling by WNT
- 2:17 mTOR signalling

- 3:1 **TNF** signaling 3:2 p75 NTR receptor-mediated signalling 3:3 DAG and IP3 signaling PIP3 activates AKT signaling 3:4 MAPK1/MAPK3 signaling 3:5 MAPK6/MAPK4 signaling 3:6 Erythropoietin activates Phosphoinositide-3-kinase 3:7 (PI3K) Erythropoietin activates RAS 3:8 GPCR downstream signalling 3:9 GPCR ligand binding 3:10 Hedgehog 'off' state 3:11 Hedgehog 'on' state 3:12 Hedgehog ligand biogenesis 3:13 3:14 Pre-NOTCH Expression and Processing Signaling by NOTCH1 3:15 Signaling by NOTCH3 3:16 Signaling by NOTCH4 3:17 Signaling by PTK6 3:18
- 3:19 ESR-mediated signaling

Hierarchical representation of the GSA results for all pathways contained in the top Reactome "Extracellular matrix organization" category and for the two-factor "Ana 20*DSS" interaction. The contents of this plot have been explained in the legends of Fig. 3C and Online Resource 3. The Reactome pathway names corresponding to the node labels are given in the lower part of the figure.

Extracellular matrix organization



Online Resource 7 continued

For more details see Online Resource 12.

- 3:1 Collagen biosynthesis and modifying enzymes
- 4:1 Collagen chain trimerization
- 2:1 Collagen formation
- 3:2 Assembly of collagen fibrils and other multimeric structures
- 2:2 Degradation of the extracellular matrix
- 3:3 Activation of Matrix Metalloproteinases
- 3:4 Collagen degradation
- 2:3 Elastic fibre formation
- 3:5 Molecules associated with elastic fibres
- 1:1 Extracellular matrix organization
- 2:4 ECM proteoglycans
- 2:5 Integrin cell surface interactions
- 2:6 Laminin interactions
- 2:7 Non-integrin membrane-ECM interactions
- 3:6 Syndecan interactions

Α

Membership heatmap for all pathways situated downstream of "Signaling by Interleukins" and "Toll-like Receptor Cascades" in the top Reactome "Immune System" category (nodes "3.11" and "3.24" in Fig. 3C and Online Resource 4). For a given pathway p (horizontal axis) and gene g (vertical axis), the values are either 0, 1, or 2. "0" means g does not belong to p; "1" means g belongs to p; and "2" means g is a leading-edge gene of p for the contrast "Ana 20*DSS". The membership heatmap enables us to explicitly check whether the GSA results (and, in particular, the statistical significance) of pathways situated downstream of a given high-level pathway are driven by the same set of genes and, therefore, do not specifically reflect the hierarchical relationships between the considered pathways. The figure shows that the pathways downstream of "Signaling by Interleukins" are rather independent, whereas the ones downstream of "Toll-like Receptor Cascades" are strongly overlapping and, therefore, reflect the differential expression of the same set of genes.

Membership and Leading-Edge gene heatmap

Signaling by Interleukins [3:11] (Immune System)



Signaling by Int

Interleukin-1 family

Interleukin-12 family

Interleukin-12

Interleukin receptor SHC

Interleukin-3, Interleukin-5 and GM-CSF

IL-6-type cytokine receptor ligand interactions [5:20] (size=15)

Interleukin–6 family

2 1 0 -1 -2

Membership and Leading–Edge gene heatmap Toll–like Receptor Cascades [3:24] (Immune System)

В

	top	4:53	4:53&4:57		4:54			4:56		1:56&4:54&4:54	&4:54&4:55&4: !	56&4:59&4:588	4:57
Tnip2													
Map3k8													
Ripk2													
Tab3													
Ube2n													
Nfkb1													
Map2k3													
Map3k7													
Map2k4													
Nod1													
Ager													
Rela Nfkb2													
Nfkbia													
Арр													
S100b													
Myd88													
Atf1													
Mapk10													
Mapkapk2													
Mapk14													
wapк/ Mapk11													
Dusp6													
Dusp7													
Atf2													
Mef2a													
Dusp3													
Mef2c													
Ppp2r1b													
Fos													
Ppp2ca Ppp2cb													
Elk1													
Mapk1													
Creb1													
Cd36 Irak3													
Tlr6													
Btk													
Tlr2													
Tlr4													
Cd14 S100a8													
S100a9													
Lgmn													
Ctsl													
Ctsk Ctsb													
Fgg													
Tlr7													
Fgb													
Pik3c3													
rga Itgam													
ltgb2													
Ly86													
Plcg2													
Dnm3 Dnm1													
Birc3													
Tank													
Birc2													
Ube2d3													
Ripk1													
Traf3													
Ptpn11													
Cd180	2	÷	÷	(<u>;</u>	2	2	Ê	2)	2	(;	÷	~	
	ize=132	size=71	size=71	size=82	size=82	size=82	ize=110	size=86	size=8£	size=82	size=54	size=27	size=71
	3:24] (s	[4:53] ([5:30] ([5:32] ([5:31] ([4:54] (4:56] (s	[5:34] (g [6:6] ([5:35] ([5:14] (is [6:3] ([4:57] (
	cades [ascade	nbrane	ascade	ascade	ascade	scade [ascade	signalin	nbrane	tivation	kinase	ascade
	for Case	R10) Cć	na mer	'LR2 C	TLR2 Cč	LR2) C?	R4) Ca:	TLR4 ci	TLR4 s	na mer	lase act	y MAP	LR5) Cĉ
	Recept	10 (TL	on plası	TLR6:1	TLR1:1	tor 2 (T	vr 4 (TL	, ndent	ediated	on plası	MAP kin	diated k	tor 5 (TI
	oll-like	sceptor	litiated .	sceptor	sceptor	Recep	Recepto	-indept	M1)-mi	litiated .	ć	ints me	Recep
	F	- Like R	scade in	Like R¢	Like R¢	foll Like	II Like F	MyD88	F(TICA	scade in		lear eve	foll Like
		Tol	D88 ca:	Toll	Toll	•	Ϋ́		TRI	'AP) cat		its/ Nuc	1 ⁽
			My							IAL(TIR		λk targe	
										yD88:N		MAF	
										Σ			

> -1 - -2

Membership heatmap for all the pathways situated downstream of "Signaling by GPCR" in the top Reactome "Signal Transduction" category (nodes "2.6" in Online Resource 5). The contents and utility of the membership heatmap have been explained in the legend of Figure S7. The figure shows that the pathways downstream of "Signaling by GPCR" are rather independent, although the fraction of specific genes are quite small in a few cases.



Membership and Leading-Edge gene heatmap Signaling by GPCR [2:6] (Signal Transduction)

Value 2 1 0 -1 -2

G D Eicosanoid

Membership heatmap for all pathways contained in the top "Extracellular matrix organization" category. For a given pathway p (horizontal axis) and gene g (vertical axis), the values are either 0, 1, or 2. "0" means g does not belong to p; "1" means g belongs to p; and "2" means g is a leading-edge gene of p for the contrast "Ana 20*DSS". The membership heatmap enables us to explicitly check whether the GSA results (and, in particular, the statistical significance) of pathways situated downstream of a given high-level pathway are driven by the same set of genes and, therefore, do not specifically reflect the hierarchical relationships between the considered pathways. The figure shows that the pathways contained in the top "Extracellular matrix organization" category are quite independent.

Membership and Leading-Edge gene heatmap

top 2:4 2:5 2:6 Lum Tnc ltga9 ltga2b Dmp1 Serpine1 Vcan Sparc Bgn Tnxb Aspn Ncam1 Musk Matn4 Lama5 Lamb1 Lamc1 Dcn Spp1 Cd44 lcam1 Thbs1 ltgb2 Itgam Pecam1 Fn1 Madcam1 lcam2 Vcam1 Jam3 Cd47 Itgal ltgb7 Fgg Jam2 Adamts9 Adamts1 Adamts5 Adam8 Adamts4 A2m Adamts8 Htra1 Adam12 Ddr2 Sdc4 Sdc1 Pdgfb Pdgfa Lamb2 Lama2 Lama1 Nid2 Lamc2 Nid1 ltga7 ltga1 Mmp8 Mmp10 Mmp2 Mmp14 Ctsk Adam9 Mmp12 Mmp19 Adam10 Furin

Extracellular matrix organization [1:1] (Extracellular matrix organization)

1 0

-1

-2



Assembly

Heatmap of the leading node perturbations for the TLR–IL1R–TNFR network model. The leading nodes correspond to the network model nodes making the highest contributions to the NPA shown in Fig. 3D. The displayed values correspond to the (positive) percentage NPA contributions (up to a cumulative value of 80%) multiplied by the sign \in {-1, 1} of the node-level perturbations. The annotated rank (starting at 1 for the highest contribution) enables us to identify the most relevant nodes.



Reactome labels

Immune System	Х
Adaptive Immune System	2:1
Class I MHC mediated antigen processing & presentation	3:1
Costimulation by the CD28 family	3:2
Immunoregulatory interactions between a Lymphoid and a non-Lymphoid cell	3:3
MHC class II antigen presentation	3:4
Rap1 signalling	3:5
Signaling by the B Cell Receptor (BCR)	3:6
TCR signaling	3:7
Antigen processing-Cross presentation	4:1
Cross-presentation of soluble exogenous antigens (endosomes)	5:1
ER-Phagosome pathway	5:2
Antimicrobial peptides	3:13
Defensins	4:30
Antiviral mechanism by IFN-stimulated genes	4:13
ISG15 antiviral mechanism	5:6
C-type lectin receptors (CLRs)	3:14
CD209 (DC-SIGN) signaling	4:31
CLEC7A (Dectin-1) signaling	4:32
Dectin-2 family	4:33
CD28 co-stimulation	4:4
CD28 dependent PI3K/Akt signaling	5:3
CD28 dependent Vav1 pathway	5:4
CLEC7A (Dectin-1) induces NFAT activation	5:24
Dectin-1 mediated noncanonical NF-kB signaling	5:25
Antigen Presentation: Folding, assembly and peptide loading of class I MHC	4:2
Antigen processing: Ubiquitination & Proteasome degradation	4:3
Complement cascade	3:15
Initial triggering of complement	4:34
Regulation of Complement cascade	4:35
CTLA4 inhibitory signaling	4:5
PD-1 signaling	4:6
Creation of C4 and C2 activators	5:26
Classical antibody-mediated complement activation	6:5
Cytokine Signaling in Immune system	2:2
Growth hormone receptor signaling	3:8
Interferon Signaling	3:9
Prolactin receptor signaling	3:10
Signaling by Interleukins	3:11
TNFR2 non-canonical NF-kB pathway	3:12
Cytosolic sensors of pathogen-associated DNA	3:16
Regulation of innate immune responses to cytosolic DNA	4:36
STING mediated induction of host immune responses	4:37
ZBP1(DAI) mediated induction of type I IFNs	4:38
DAP12 interactions	3:17
DAP12 signaling	4:39

DDX58/IFIH1-mediated induction of interferon-alpha/beta	3:18
Negative regulators of DDX58/IFIH1 signaling	4:40
TRAF3-dependent IRF activation pathway	4:41
TRAF6 mediated IRF7 activation	4:42
TRAF6 mediated NF-kB activation	4:43
Beta defensins	5:23
Downstream signaling events of B Cell Receptor (BCR)	4:7
Activation of NF-kappaB in B cells	5:5
Fc epsilon receptor (FCERI) signaling	3:19
FCERI mediated Ca+2 mobilization	4:44
FCERI mediated MAPK activation	4:45
FCERI mediated NF-kB activation	4:46
Role of LAT2/NTAL/LAB on calcium mobilization	4:47
Fcgamma receptor (FCGR) dependent phagocytosis	3:20
FCGR activation	4:48
Regulation of actin dynamics for phagocytic cup formation	4:49
Role of phospholipids in phagocytosis	4:50
Immune System	1:1
Innate Immune System	2:3
Inflammasomes	4:51
The NLRP3 inflammasome	5:29
Neutrophil degranulation	3:21
Nucleotide-binding domain, leucine rich repeat containing receptor (NLR) signaling pathways	3:22
ROS and RNS production in phagocytes	3:23
Toll-like Receptor Cascades	3:24
Interferon alpha/beta signaling	4:14
Interferon gamma signaling	4:15
Regulation of IFNA signaling	5:7
Regulation of IFNG signaling	5:8
Interleukin-1 family signaling	4:16
Interleukin-1 signaling	5:9
Interleukin-37 signaling	5:10
MAP3K8 (TPL2)-dependent MAPK1/3 activation	6:1
TAK1 activates NFkB by phosphorylation and activation of IKKs complex	5:33
Interleukin-12 family signaling	4:17
Interleukin-12 signaling	5:11
Interleukin-27 signaling	5:12
Interleukin-35 Signalling	5:13
Interleukin-17 signaling	4:18
MAP kinase activation	5:14
Interleukin-2 family signaling	4:19
Interleukin receptor SHC signaling	5:15
Interleukin-15 signaling	5:16
Interleukin-2 signaling	5:17
Interleukin-21 signaling	5:18
Interleukin-3, Interleukin-5 and GM-CSF signaling	4:20
Regulation of signaling by CBL	5:19
Interleukin-6 family signaling	4:21
IL-6-type cytokine receptor ligand interactions	5:20

Interleukin-6 signaling	5:21
JNK (c-Jun kinases) phosphorylation and activation mediated by activated human TAK1	6:2
MAPK targets/ Nuclear events mediated by MAP kinases	6:3
activated TAK1 mediates p38 MAPK activation	6:4
MyD88 cascade initiated on plasma membrane	5:30
MyD88 dependent cascade initiated on endosome	5:36
TRAF6 mediated induction of NFkB and MAP kinases upon TLR7/8 or 9 activation	6:7
MyD88-independent TLR4 cascade	5:34
TRIF(TICAM1)-mediated TLR4 signaling	6:6
MyD88:MAL(TIRAP) cascade initiated on plasma membrane	5:35
NOD1/2 Signaling Pathway	4:52
Other interleukin signaling	4:22
FLT3 Signaling	5:22
IRF3-mediated induction of type I IFN	5:27
Interleukin-10 signaling	4:23
Interleukin-20 family signaling	4:24
Interleukin-4 and Interleukin-13 signaling	4:25
Interleukin-7 signaling	4:26
Antigen activates B Cell Receptor (BCR) leading to generation of second messengers	4:8
Downstream TCR signaling	4:9
Generation of second messenger molecules	4:10
Phosphorylation of CD3 and TCR zeta chains	4:11
Translocation of ZAP-70 to Immunological synapse	4:12
NIK>noncanonical NF-kB signaling	4:27
TNF receptor superfamily (TNFSF) members mediating non-canonical NF-kB pathway	4:28
TNFs bind their physiological receptors	4:29
IRAK2 mediated activation of TAK1 complex upon TLR7/8 or 9 stimulation	7:4
Activation of IRF3/IRF7 mediated by TBK1/IKK epsilon	7:1
IKK complex recruitment mediated by RIP1	7:2
TRAF6-mediated induction of TAK1 complex within TLR4 complex	7:3
Toll Like Receptor 10 (TLR10) Cascade	4:53
Toll Like Receptor 2 (TLR2) Cascade	4:54
Toll Like Receptor TLR1:TLR2 Cascade	5:31
Toll Like Receptor TLR6:TLR2 Cascade	5:32
Toll Like Receptor 3 (TLR3) Cascade	4:55
Toll Like Receptor 4 (TLR4) Cascade	4:56
Toll Like Receptor 5 (TLR5) Cascade	4:57
Toll Like Receptor 7/8 (TLR7/8) Cascade	4:58
Toll Like Receptor 9 (TLR9) Cascade	4:59
Regulation of TLR by endogenous ligand	4:60
Trafficking and processing of endosomal TLR	4:61
RIP-mediated NFkB activation via ZBP1	5:28

Extracellular matrix organization	х
Collagen biosynthesis and modifying enzymes	3:1
Collagen chain trimerization	4:1
Collagen formation	2:1
Assembly of collagen fibrils and other multimeric structures	3:2
Degradation of the extracellular matrix	2:2
Activation of Matrix Metalloproteinases	3:3
Collagen degradation	3:4
Elastic fibre formation	2:3
Molecules associated with elastic fibres	3:5
Extracellular matrix organization	1:1
ECM proteoglycans	2:4
Integrin cell surface interactions	2:5
Laminin interactions	2:6
Non-integrin membrane-ECM interactions	2:7
Syndecan interactions	3:6

Amine ligand-binding receptors517Serotonin receptors6.7Beta-catenin independent WNT signaling3.37Ca2+ pathway4.75Ca-dependent events8.11CaM pathway4.75Ca-dependent events8.11CaM pathway4.75Ca-dependent events8.11CaM pathway4.75Calmodulin induced events5.55PKA-mediated phosphorylation of CREB6.11Cell death signalling via NRAGE, NRIF and NADE4.44NRAGE signals death through JNK5.11NRAGE signals death through JNK5.12Class A/1 (Rhodopsin-like receptors)4.18Eicosanoid ligand-binding receptors5.12Deditide-like (purinergic) receptors5.20Class B/2 (Sceretin family receptors)4.21Calcitonin-like ligand receptors5.22DAG and IP3 signaling3.1p75 NTR receptor signaling3.1p75 NTR receptor signaling3.21Degradation of beta-catenin by the destruction complex3.28Destractor Signaling6.10P1-3K cascade:FGFR16.11Phospholipase C-mediated cascade: FGFR16.12P1-3K cascade:FGFR16.13Downstream signaling of activated FGFR26.14P1-3K cascade:FGFR36.23P1-3K cascade:FGFR16.12P1-3K cascade:FGFR16.12P1-3K cascade:FGFR26.14P1-3K cascade:FGFR36.23P1-3K cascade:FGFR36.24P1-3K cascade:FGFR36.24<	Signal Transduction	x
Serotonin receptors6.7Beta-catenin independent WNT signalling3.37Ca2+ pathway4.75PCP/CF pathway4.75Ca-dependent events8.11CAM pathway4.77Calmodulin induced events5.55PKA-mediated phosphorylation of CREB6.11Cell death signalling via NRAGE, NNF and NADE4.44NRAGE signals death through JNK5.11NRAF signals cell death from the nucleus5.22Class A/1 (Rhodopsin-like receptors)4.18Eicosanoid ligand-binding receptors5.12Nucleotid-like (purinergic) receptors5.22Class D/2 (Secretin family receptors)5.21Seltonin-like ligand receptors5.22Class D/2 (Secretin family receptors)5.21Glucagon-type ligand receptors5.22DAG and IP3 signaling3.1pry Signaling3.1pry Signaling3.1pry Signaling3.1pry Signaling3.1pry Signaling3.1pry Signaling3.1pry Signaling of beta-catenin by the destruction complex3.28Beta-catenin phosphorylation cascade4.77Repression of WNT target genes4.78Downstream signaling of activated FGFR16.11Pi-3V cascade:FGFR26.12Pi-3V cascade:FGFR26.12Pi-3Pospholipase C-mediated cascade: FGFR36.22Phospholipase C-mediated cascade: FGFR36.22Phospholipase C-mediated cascade: FGFR36.22Phospholipase C-mediated cascade:	Amine ligand-binding receptors	5:17
Beta-catenin independent WNT signaling377Ca2+ pathway475Ca2-betaway475CPC/PC pathway476Ca-dependent events811CaA pathway475Cad-dependent events55PK-mediated phosphorylation of CREB611Cell death signaling via NRAGE, NRIF and NADE44NRAGE signals death through JNK511NRAGE signals death through JNK511NRIF signals cell death from the nucleus522Class A/1 (Rhodopsin-like receptors)418Eccosanoid lignad-binding receptors519Peptide lignad-binding receptors521Glass D2 (Secretin family receptors)521Calcitonin-like lignad receptors522Glucagon-type lignad receptors522Glucagon-type lignad receptors522Degradation of beta-catenin by the destruction complex333Death Receptor Signalling31TNF signaling31Dy SNT receptor-mediated signaling512Pertediated Cascade: FGFR1512PRO-stealing of activated FGFR1512Phospholipase C-mediated cascade: FGFR1611Phospholipase C-mediated cascade: FGFR1612SHC-mediated Cascade: FGFR1613Phospholipase C-mediated cascade: FGFR3612Phospholipase C-mediate	Serotonin receptors	6:7
Ca2+ pathway4.75PCP/CE pathway4.76Ca-dependent events8.11CaM pathway4.77Calmodulin induced events5.55PKA-mediated phosphorylation of CREB6.11Cell death signalling via NRAGE, NRIF and NADE4.44NRAGE signals cell death from the nucleus5.12NRF signals cell death from the nucleus5.12Class A/1 (Rhodopsin-like receptors)5.18Nucleotide-like (purinergic) receptors5.19Peptide ligand-binding receptors5.20Class B/2 (Secretin family receptors)5.21Glucagon-type ligand receptors5.22DAG and IP3 signaling3.31Desth Receptor Signalling3.11Tyf Synalling3.12Dyf Son of beta-catenin by the destruction complex3.28Degradation of beta-catenin by the destruction complex3.28Degradation of beta-catenin by the destruction complex5.28PAK Receptor-mediated signalling5.21Dwonstream signaling of activated FGFR16.11Phospholipase C-mediated cascade: FGFR16.12Phospholipase C-mediated cascade: FGFR16.13Downstream signaling of activated FGFR26.13Downstream signaling of activated FGFR36.22Phospholipase C-mediated cascade: FGFR36.22Phospholipase	Beta-catenin independent WNT signaling	3:37
PCP/CE pathway476Ca-dependent events811CAM pathway477Calmodulin induced events555PKA-mediated phosphorylation of CRB611Cell death signalling via NRAGE, NNIF and NADE444NRAGE signals cell death from the nucleus511NRIF signals cell death from the nucleus521Class A/1 (Rhodopsin-like receptors)418Eicosanoid ligand-binding receptors519Peptide ligand-binding receptors510Peptide ligand-binding receptors520Class B/2 (Secretin family receptors)419Calcitonin-like ligand receptors521Glucagon-type ligand receptors522OG and IP 3 signaling33Deat Receptor Signaling31pr Signaling31pr Signaling321Degradation of beta-catenin by the destruction complex338Beta-catenin phosphorylation cascade477Repression of WNT target genes478Downstream signaling of activated FGFR1611Phospholipase C-mediated cascade: FGFR1613Downstream signaling of activated FGFR2618SHC-mediated cascade: FGFR3622Phospholipase C-mediated cascade: FGFR3623Phospholipase C-mediated cascade: FGFR3623SHC-mediated cascade: FGFR3624Phospholipase C-mediated cascade: FGFR3624Phospholipase C-mediated cascade: FGFR3624Phospholipase C-mediated cascade: FGFR3624Phospholipase C-mediated cascade: FGFR3624 <td>Ca2+ pathway</td> <td>4:75</td>	Ca2+ pathway	4:75
Ca-dependent events8.1CaM pathway4.7Calmodulin induced events5.5PKA-mediated phosphorylation of CREB6.1Cell death signalling via NRAGE, NRIF and NADE4.4NRAGE signals death through JNK5.1NRIF signals cell death from the nucleus5.2Class A/1 (Rhodopsin-like receptors)4.18Eicosanoid ligand-binding receptors5.19Nucleotide-like (purinergic) receptors5.20Class B/2 (Secretin family receptors)5.20Claston-like ligand receptors5.20Clatonin-like ligand receptors5.21Glucagon-type ligand receptors5.22DAG and IP3 signaling3.3Death Receptor Signalling3.1p75 NTR receptor signalling3.1p75 NTR receptor-mediated signalling3.2Degradation of beta-catenin by the destruction complex3.38Beta-catenin phosphorylation cascade4.77Repression of WNT target genes4.78Downstream signaling of activated FGFR16.11Phospholipase C-mediated cascade: FGFR16.12SHC-mediated cascade: FGFR16.13Phospholipase C-mediated cascade: FGFR26.18SHC-mediated cascade: FGFR36.22Phospholipase C-mediated cascade: FGFR36.23SHC-mediated cascade: FGFR36.23SHC-mediated cascade: FGFR36.24Phospholipase C-mediated cascade: FGFR36.21Phospholipase C-mediated cascade: FGFR36.26Phospholipase C-mediated cascade: FGFR36.23	PCP/CE pathway	4:76
CaM pathway4.7Calmodulin induced events5.5PKA-mediated phosphorylation of CREB6.11Cell death signalling via NRAGE, NRIF and NADE4.4NRAGE signals cell death from the nucleus5.2Class A/1 (Rhodopsin-like receptors)4.18Eicosanold ligand-binding receptors5.18Nucleotide-like (purinergic) receptors5.20Class A/2 (Secretin family receptors)5.21Peptide ligand-binding receptors5.20Class A/2 (Secretin family receptors)5.21Clacitonin-like ligand receptors5.22DAG and IP3 signalling3.3Death Receptor Signalling3.1Pris Signalling3.1Pris Signalling3.1Pris Signalling3.1Pris Signalling3.1Pris Signalling3.1Pris Signalling3.2Degradation of beta-catenin by the destruction complex3.38Beta-catenin phosphorylation cascade4.77Repression of WNT target genes4.78Downstream signalling of activated FGFR16.11Phospholipase C-mediated cascade: FGFR26.18PHOspholipase C-mediated cascade: FGFR36.12Phospholipase C-mediated cascade: FGFR36.22Phospholipase C-mediated cascade: FGFR36.23Phospholipase C-mediated cascade: FGFR36.24Phospholipase C-mediated cascade: FGFR36.24Phospholipase C-mediated cascade: FGFR36.24Phospholipase C-mediated cascade: FGFR36.24Phospholipase C-mediated cascade: F	Ca-dependent events	8:1
Calmodulin induced events5.5PKA-mediated phosphorylation of CREB6.1VRAGE signalling via NRAGF, NRF and NADE4.4NRAGE signals death through JNK5.1NRF signals cell death from the nucleus5.2Class A/1 (Rhodopsin-like receptors)4.18Ecosanoid ligand-binding receptors5.18Nucleotide-like (purinergic) receptors5.19Peptide ligand-binding receptors5.20Class B/2 (Secretin family receptors)4.19Calcitonin-like ligand receptors5.21Glucagon-type ligand receptors5.22DAG and IP3 signaling3.3Death Receptor Signalling3.1p75 NTR receptor-mediated signalling3.1p75 NTR receptor-mediated signalling3.1p75 NTR receptor-mediated signalling3.2Downstream signaling of activated FGFR15.24PN-smediated FGFR16.11Phospholipase C-mediated cascade: FGFR16.13Downstream signaling of activated FGFR25.28FRS-mediated fGFR3 signaling6.16P1-3K cascade: FGFR16.13Downstream signaling of activated FGFR26.18SHC-mediated cascade: FGFR36.22Phospholipase C-mediated cascade	CaM pathway	4:7
PKA-mediated phosphorylation of CREB6.1Cell death signalling via NRAGE, NRIF and NADE44Cell death signalling via NRAGE, NRIF and NADE5.1NRAGE signals death through JNK5.1NRIF signals cell death from the nucleus5.2Class A/1 (Rhodopsin-like receptors)5.18Eicosanoid ligand-binding receptors5.19Peptide ligand-binding receptors5.20Class B/2 (Secretin family receptors)5.21Calcitonin-like ligand receptors5.22DAG and IP3 signaling3.3Death Receptor Signaling3.3Death Receptor Signaling3.1p75 NTR receptor-mediated signalling3.2Degradation of beta-catenin by the destruction complex3.38Beta-catenin phosphorylation cascade4.77Repression of WNT target genes4.78Downstream signaling of activated FGFR16.11P1-3K cascade:FGFR16.12P1-3K cascade:FGFR16.12P1-3K cascade:FGFR16.13Downstream signaling of activated FGFR26.18SHC-mediated Cascade: FGFR16.12SHC-mediated Gascade: FGFR26.18P1-3K cascade:FGFR36.22P1-3K casca	Calmodulin induced events	5:5
Cell death signalling via NRAGE, NIF and NADE4.4NRAGE signals death through JNK5.12NRF signals cell death from the nucleus5.22Class A/1 (Rhodopsin-like receptors)4.18Eicosanoid ligand-binding receptors5.18Nucleotide-like (purinergic) receptors5.20Class B/2 (Secretin family receptors)4.19Calitonin-like ligand receptors5.21Glucagon-type ligand receptors5.22OBG and IP3 signaling3.1Death Receptor Signalling3.1TNF signaling3.2Degradation of beta-catenin by the destruction complex3.38Beta-catenin phosphorylation cascade4.77Repression of WNT target genes4.24FNS-mediated FGFR1 signaling6.10PI-3K cascade:FGFR16.11Phospholipase C-mediated cascade: FGFR16.12SHC-mediated cascade: FGFR16.13Downstream signaling of activated FGFR26.18SHC-mediated fGFR3 signaling6.10PI-3K cascade: FGFR36.22FRS-mediated FGFR3 signaling6.12SHC-mediated cascade: FGFR16.13Downstream signaling of activated FGFR36.22FRS-mediated FGFR3 signaling6.12PI-3K cascade: FGFR36.22PI-3K cascade: FGFR36.22<	PKA-mediated phosphorylation of CREB	6:1
NRAGE signals death through JNK5:1NRIF signals cell death from the nucleus5:2Class A/1 (Rhodopsin-like receptors)4:18Eicosanoid ligand-binding receptors5:19Nucleotide-like (purinergic) receptors5:10Nucleotide-like (purinergic) receptors)4:19Class B/2 (Secretin family receptors)5:21Glucagon-type ligand receptors5:22DAG and IP3 signaling3:3Death Receptor Signalling3:1TNF signaling3:1p75 NTR receptor-mediated signalling3:2Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:19Downstream signaling of activated FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated fGFR1 signaling6:12SHC-mediated fGFR16:13Downstream signaling of activated FGFR26:16P1-3K cascade: FGFR16:12SHC-mediated fGFR26:16P1-3K cascade: FGFR26:17Phospholipase C-mediated cascade; FGFR36:22SHC-mediated Gascade; FGFR36:23SHC-mediated Gascade; FGFR36:23SHC-mediated Gascade; FGFR36:23SHC-mediated Gascade; FGFR36:24Downstream signaling of activated FGFR36:24Phospholipase C-mediated Cascade; FGFR36:24Downstream signaling of activated FGFR36:25SHC-mediated Gascade; FGFR36:24Downstream signaling of activat	Cell death signalling via NRAGE, NRIF and NADE	4:4
NRIF signals cell death from the nucleus5.2Class A/1 (Rhodopsin-like receptors)4.18Eicosanoid ligand-binding receptors5.19Peptide ligand-binding receptors5.20Class B/2 (Secretin family receptors)4.19Calctonin-like ligand receptors5.21Glucagon-type ligand receptors5.22DAG and IP3 signaling3.3Death Receptor Signalling2.1TNF signaling3.1p75 NTR receptor-mediated signalling3.2Degradation of beta-catenin by the destruction complex3.38Beta-catenin phosphorylation cascade4.77Repression of WNT target genes4.78Downstream signaling of activated FGFR15.24P1-3K cascade:FGFR16.11Phospholipase C-mediated cascade: FGFR16.12SHC-mediated cascade: FGFR16.12SHC-mediated cascade: FGFR26.16P1-3K cascade: FGFR36.12SHC-mediated Cascade: FGFR16.12P1-3K cascade: FGFR36.12SHC-mediated Cascade: FGFR36.12SHC-mediated Cascade: FGFR36.12P1-3K cascade: FGFR36.22Phospholipase C-mediated Cascade: FGFR36.22Phospholipase C-mediated Cascade: FGFR36.22Phospholipase C-mediated Cascade: FGFR36.22Phospholipase C-mediated FGFR36.23P1-3K cascade: FGFR36.22P1-3K cascade: FGFR36.22P1-3K cascade: FGFR36.22P1-3K cascade: FGFR36.22P1-3K cascade: FGFR36.22 <td>NRAGE signals death through JNK</td> <td>5:1</td>	NRAGE signals death through JNK	5:1
Class A/1 (Rhodopsin-like receptors)4:18Eicosanoid ligand-binding receptors5:19Nucleotide-like (purinergic) receptors5:10Peptide ligand-binding receptors5:20Class B/2 (Secretin family receptors)4:19Calcitonin-like ligand receptors5:21Glucagon-type ligand receptors5:22DAG and IP3 signaling3:1Death Receptor Signalling3:1p75 NTR receptor-mediated signalling3:2Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated Acascade: FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated GFR2 signaling6:16PI-3K cascade: FGFR16:17Phospholipase C-mediated FGFR36:18SHC-mediated FGFR26:19Downstream signaling of activated FGFR36:22Phospholipase C-mediated Cascade; FGFR36:22Phospholipase C-mediated Cascade; FGFR36:22Phospholipase C-mediated Cascade; FGFR36:23SHC-mediated Cascade; FGFR36:24Phospholipase C-mediated FGFR36:24Phospholipase C-mediated Cascade; FGFR36:22Phospholipase C-mediated Cascade; FGFR36:22Phospholipase C-mediated Cascade; FGFR36:22Phospholipase C-mediated Cascade; FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 si	NRIF signals cell death from the nucleus	5:2
Eicosanoid ligand-binding receptors5:18Nucleotide-like (purinergic) receptors5:20Class B/2 (Scretin family receptors)4:19Calcitonin-like ligand receptors5:21Glucagon-type ligand receptors5:22DAG and IP3 signaling3:3Death Receptor Signalling2:11TNF signaling3:12Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:12ShC-mediated cascade: FGFR16:13Downstream signaling of activated FGFR26:16PI-3K cascade:FGFR36:16PI-3K cascade:FGFR46:17Phospholipase C-mediated cascade: FGFR16:12ShC-mediated cascade: FGFR26:18ShC-mediated cascade: FGFR36:22PI-3K cascade: FGFR36:22Phospholipase C-mediated FGFR36:26Phospholipase C-mediated cascade; FGFR36:26Phospholipase C-mediated cascade; FGFR36:26Phospholipase C-mediated cascade; FGFR36:27Phospholipase C-mediated cascade; FGFR36:26Phospholipase C-mediated cascade; FGFR36:26PhosP	Class A/1 (Rhodopsin-like receptors)	4:18
Nucleotide-like (purinergic) receptors5:19Peptide ligand-binding receptors5:20Class B/2 (Secretin family receptors)4:19Galctonin-like ligand receptors5:21Glucagon-type ligand receptors5:22DAG and IP3 signaling3:3Death Receptor Signalling3:1p75 NTR receptor-mediated signalling3:2Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24PNS-mediated cascade: FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated Gascade: FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR26:16PI-3K cascade: FGFR36:17Phospholipase C-mediated cascade: FGFR36:22Phospholipase C-mediated cascade: FGFR36:23SHC-mediated cascade: FGFR36:23SHC-mediated fGFR3 signaling6:21PI-3K cascade: FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade: FGFR36:23SHC-mediated cascade: FGFR36:22Phospholipase C-mediated cascade; FGFR36:22Phospholipase C-mediated cascade; FGFR36:24Downstream signaling of activated FGFR46:35FRS-mediated FGFR46:35FRS-mediated FGFR46:35FRS-mediated FGFR46:37Phospholipase C-mediated cascade; FGFR4<	Eicosanoid ligand-binding receptors	5:18
Peptide ligand-binding receptors5:20Class B/2 (Secretin family receptors)4:19Calcionin-like ligand receptors5:22Glucagon-type ligand receptors5:22DAG and IP3 signaling3:3Death Receptor Signalling3:1p75 NTR receptor-mediated signalling3:2Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated cascade: FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR26:19Phospholipase C-mediated cascade: FGFR26:18SHC-mediated cascade: FGFR36:19Downstream signaling of activated FGFR36:32Phospholipase C-mediated cascade: FGFR46:12SHC-mediated fGFR2 signaling6:12Phospholipase C-mediated cascade: FGFR36:22Phospholipase C-mediated cascade: FGFR36:22Phospholipase C-mediated cascade: FGFR36:22Phospholipase C-mediated cascade: FGFR36:23SHC-mediated GFGR36:23Phospholipase C-mediated cascade: FGFR36:23Phospholipase C-mediated cascade: FGFR36:24Downstream signaling of activated FGFR36:22Phospholipase C-mediated cascade: FGFR36:23Phospholipase C-mediated cascade: FGFR36:24Phospholipase C-mediated cascade: FGFR36:24 <t< td=""><td>Nucleotide-like (purinergic) receptors</td><td>5:19</td></t<>	Nucleotide-like (purinergic) receptors	5:19
Class B/2 (Secretin family receptors)4:19Calcitonin-like ligand receptors5:21Glucagon-type ligand receptors5:22DAG and IP3 signaling3:32Death Receptor Signalling3:11p75 NTR receptor-mediated signalling3:22Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated Acacade: FGFR16:10PI-3K cascade: FGFR16:11Phospholipase C-mediated cascade: FGFR16:13SHC-mediated cascade: FGFR26:18SHC-mediated Cascade: FGFR36:22Phospholipase C-mediated FGFR36:32PI-3K cascade: FGFR46:12SHC-mediated cascade: FGFR36:22Phospholipase C-mediated Cascade: FGFR36:22Phospholipase C-mediated Cascade: FGFR36:22Phospholipase C-mediated FGFR36:22Phospholipase C-mediated Cascade: FGFR36:26 <t< td=""><td>Peptide ligand-binding receptors</td><td>5:20</td></t<>	Peptide ligand-binding receptors	5:20
Calcitonin-like ligand receptors5:21Glucagon-type ligand receptors5:22DAG and IP3 signaling3:3Death Receptor Signalling3:1p75 NTR receptor-mediated signalling3:2Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:11Phospholipase C-mediated cascade: FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR16:13Downstream signaling of activated FGFR26:16PI-3K cascade:FGFR36:16PI-3K cascade:FGFR46:13Downstream signaling of activated FGFR26:18SHC-mediated Gascade: FGFR16:12Phospholipase C-mediated cascade: FGFR26:18SHC-mediated Gascade: FGFR36:20Phospholipase C-mediated cascade: FGFR36:21Phospholipase C-mediated cascade: FGFR36:22Phospholipase C-mediated cascade: FGFR36:22Phospholipase C-mediated cascade: FGFR36:22Phospholipase C-mediated cascade: FGFR36:23SHC-mediated Gascade: FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26Phospholipase C-mediated cascade: FGFR46:26Phospholipase C-mediated cascade: FGFR46:26 <td>Class B/2 (Secretin family receptors)</td> <td>4:19</td>	Class B/2 (Secretin family receptors)	4:19
Glucagon-type Igand receptors5:22DAG and IP3 signaling3:3Death Receptor Signalling2:1TNF signaling3:1p75 NTR receptor-mediated signalling3:2Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:11ShC-mediated cascade: FGFR16:12ShC-mediated fGFR2 signaling6:16PI-3K cascade:FGFR25:28FRS-mediated fGFR2 signaling6:16PI-3K cascade:FGFR26:17Phospholipase C-mediated cascade; FGFR26:18ShC-mediated cascade: FGFR36:22Phospholipase C-mediated fGFR35:32FRS-mediated fGFR3 signaling6:21PI-3K cascade: FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade: FGFR36:23SHC-mediated cascade: FGFR36:23SHC-mediated Gascade; FGFR36:23SHC-mediated Gascade; FGFR36:23SHC-mediated Gascade; FGFR36:24Pownstream signaling of activated FGFR46:23SHC-mediated Gascade; FGFR36:24Pownstream signaling of activated FGFR46:24Pownstream signaling of activated FGFR46:25Phospholipase C-mediated cascade; FGFR36:26PI-3K cascade: FGFR36:26PI-3K cascade: FGFR46:26<	Calcitonin-like ligand receptors	5:21
DAG and IP3 signaling3:3Death Receptor Signalling2:1TNF signaling3:1p75 NTR receptor-mediated signalling3:2Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade: FGFR16:11Phospholipase C-mediated cascade: FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated GFR2 signaling6:16PI-3K cascade: FGFR26:17Phospholipase C-mediated cascade; FGFR36:12SHC-mediated cascade: FGFR26:18SHC-mediated cascade: FGFR36:12Ph-syholipase C-mediated cascade; FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated Gascade; FGFR36:23SHC-mediated Gascade; FGFR36:23SHC-mediated Gascade; FGFR36:24Downstream signaling of activated FGFR46:25Phospholipase C-mediated cascade; FGFR36:26Pi-3K cascade: FGFR46:26Pi-3K cascade: FGFR46:27Phospholipase C-mediated cascade; FGFR46:26Pi-3K cascade: FGFR46:27Phospholipase C-mediated casca	Glucagon-type ligand receptors	5:22
Death Receptor Signalling2:1TNF signaling3:1p75 NTR receptor-mediated signalling3:2Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:11Phospholipase C-mediated cascade: FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR16:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade; FGFR26:16PI-3K cascade:FGFR26:17Downstream signaling of activated FGFR26:18SHC-mediated cascade; FGFR26:19Downstream signaling of activated FGFR36:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:24Downstream signaling of activated FGFR46:26PI-3K cascade:FGFR36:26PI-3K cascade:FGFR36:26PI-3K cascade:FGFR46:27Phospholipase C-mediated FGFR46:26PI-3K cascade:FGFR46:27Phospholipase C-mediated FGFR46:26PI-3K cascade:FGFR46:26 <td>DAG and IP3 signaling</td> <td>3:3</td>	DAG and IP3 signaling	3:3
TNF signaling3:1p75 NTR receptor-mediated signalling3:2Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:11Phospholipase C-mediated cascade: FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR16:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade; FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:22Pl-3K cascade:FGFR36:23SHC-mediated cascade; FGFR36:22Phospholipase C-mediated fGFR36:23SHC-mediated cascade; FGFR36:24Pl-3K cascade:FGFR36:24Pl-3K cascade:FGFR36:24Pl-3K cascade:FGFR36:25Phospholipase C-mediated Gascade; FGFR36:26Pl-3K cascade:FGFR36:26Pl-3K cascade:FGFR46:27Phospholipase C-mediated Gascade; FGFR46:27Phospholipase C-mediated Cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:26Pl-3K cascade:FGFR46:27Phospholipase C-mediated C	Death Receptor Signalling	2:1
p75 NTR receptor-mediated signalling3:2Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated cascade: FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR26:17Phospholipase C-mediated cascade; FGFR26:19Downstream signaling of activated FGFR36:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:22Phospholipase C-mediated Cascade; FGFR36:24Downstream signaling of activated FGFR46:35FRS-mediated FGFR36:26Phospholipase C-mediated FGFR45:35FRS-mediated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	TNF signaling	3:1
Degradation of beta-catenin by the destruction complex3:38Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated cascade: FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade: FGFR26:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade; FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade: FGFR36:22Phospholipase C-mediated cascade; FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade: FGFR36:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	p75 NTR receptor-mediated signalling	3:2
Beta-catenin phosphorylation cascade4:77Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated cascade: FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade: FGFR16:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade; FGFR26:19Downstream signaling of activated FGFR36:21PI-3K cascade: FGFR36:21Phospholipase C-mediated cascade; FGFR36:22Phospholipase C-mediated cascade; FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated FGFR3 signaling6:21PI-3K cascade: FGFR36:22Phospholipase C-mediated cascade; FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade: FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	Degradation of beta-catenin by the destruction complex	3:38
Repression of WNT target genes4:78Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated cascade: FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade: FGFR26:17Phospholipase C-mediated cascade; FGFR26:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade; FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21Pl-3K cascade: FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26Pl-3K cascade: FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	Beta-catenin phosphorylation cascade	4:77
Downstream signaling of activated FGFR15:24FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated cascade:FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR26:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade: FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21Pl-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade: FGFR36:23SHC-mediated cascade: FGFR36:23SHC-mediated cascade: FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26Pl-3K cascade: FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	Repression of WNT target genes	4:78
FRS-mediated FGFR1 signaling6:10PI-3K cascade:FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated cascade:FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR26:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade:FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:23SHC-mediated rGFR3 signaling6:23SHC-mediated cascade; FGFR36:23SHC-mediated cascade: FGFR36:23SHC-mediated cascade: FGFR36:24Downstream signaling of activated FGFR46:26PI-3K cascade: FGFR46:27Phospholipase C-mediated rGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	Downstream signaling of activated FGFR1	5:24
PI-3K cascade:FGFR16:11Phospholipase C-mediated cascade: FGFR16:12SHC-mediated cascade:FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR26:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade:FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:23SHC-mediated FGFR3 signaling6:24Downstream signaling of activated FGFR36:23SHC-mediated cascade:FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	FRS-mediated FGFR1 signaling	6:10
Phospholipase C-mediated cascade: FGFR16:12SHC-mediated cascade:FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR26:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade:FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:22SHC-mediated cascade:FGFR36:22Pl-3K cascade:FGFR36:23SHC-mediated cascade; FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26Pl-3K cascade:FGFR46:26Pl-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	PI-3K cascade:FGFR1	6:11
SHC-mediated cascade:FGFR16:13Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR26:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade:FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:22SHC-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade:FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	Phospholipase C-mediated cascade: FGFR1	6:12
Downstream signaling of activated FGFR25:28FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR26:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade: FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade: FGFR36:23SHC-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade: FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27	SHC-mediated cascade:FGFR1	6:13
FRS-mediated FGFR2 signaling6:16PI-3K cascade:FGFR26:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade:FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:23SHC-mediated cascade; FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	Downstream signaling of activated FGFR2	5:28
PI-3K cascade:FGFR26:17Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade:FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade:FGFR36:23SHC-mediated cascade:FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:27	FRS-mediated FGFR2 signaling	6:16
Phospholipase C-mediated cascade; FGFR26:18SHC-mediated cascade:FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade:FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27Phospholipase C-mediated cascade; FGFR46:27	PI-3K cascade:FGFR2	6:17
SHC-mediated cascade:FGFR26:19Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade:FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	Phospholipase C-mediated cascade; FGFR2	6:18
Downstream signaling of activated FGFR35:32FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade:FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:27	SHC-mediated cascade:FGFR2	6:19
FRS-mediated FGFR3 signaling6:21PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade:FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	Downstream signaling of activated FGFR3	5:32
PI-3K cascade:FGFR36:22Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade:FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	FRS-mediated FGFR3 signaling	6:21
Phospholipase C-mediated cascade; FGFR36:23SHC-mediated cascade:FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	PI-3K cascade:FGFR3	6:22
SHC-mediated cascade:FGFR36:24Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	Phospholipase C-mediated cascade; FGFR3	6:23
Downstream signaling of activated FGFR45:35FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	SHC-mediated cascade:FGFR3	6:24
FRS-mediated FGFR4 signaling6:26PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	Downstream signaling of activated FGFR4	5:35
PI-3K cascade:FGFR46:27Phospholipase C-mediated cascade; FGFR46:28	FRS-mediated FGFR4 signaling	6:26
Phospholipase C-mediated cascade; FGFR4 6:28	PI-3K cascade: FGFR4	6:27
······································	Phospholipase C-mediated cascade: FGFR4	6:28
SHC-mediated cascade:FGFR4 6:29	SHC-mediated cascade:FGFR4	6:29
ESR-mediated signaling 3:19	ESR-mediated signaling	3:19
Estrogen-dependent gene expression 4:33	Estrogen-dependent gene expression	4:33
Extra-nuclear estrogen signaling 4:34	Extra-nuclear estrogen signaling	4:34
Estrogen-dependent nuclear events downstream of ESR-membrane signaling 5:23	Estrogen-dependent nuclear events downstream of ESR-membrane signaling	5:23

FGFR1 ligand binding and activation	5:25
FGFR1c ligand binding and activation	6:14
FGFR2 ligand binding and activation	5:29
FGFR2c ligand binding and activation	6:20
FGFR3 ligand binding and activation	5:33
FGFR3c ligand binding and activation	6:25
G alpha (i) signalling events	4:11
Opioid Signalling	5:7
Visual phototransduction	5:10
G alpha (q) signalling events	4:13
Gastrin-CREB signalling pathway via PKC and MAPK	5:11
G alpha (s) signalling events	4:14
Olfactory Signaling Pathway	5:12
G-protein beta:gamma signalling	4:15
G beta:gamma signalling through BTK	5:13
G beta:gamma signalling through CDC42	5:14
G beta:gamma signalling through PI3Kgamma	5:15
G beta:gamma signalling through PLC beta	5:16
G-protein mediated events	6:2
PLC beta mediated events	7:2
GPCR downstream signalling	3:9
G alpha (12/13) signalling events	4:16
G alpha (z) signalling events	4:17
GPCR ligand binding	3:10
Class C/3 (Metabotropic glutamate/pheromone receptors)	4:20
Hedgehog 'off' state	3:11
Degradation of GLI1 by the proteasome	4:21
GLI3 is processed to GLI3R by the proteasome	4:22
Hedgehog 'on' state	3:12
Activation of SMO	4:23
IGF1R signaling cascade	4:62
IRS-related events triggered by IGF1R	5:45
IRS-mediated signalling	5:38
Insulin receptor signalling cascade	4:51
Intracellular signaling by second messengers	2:2
PIP3 activates AKT signaling	3:4
MAPK family signaling cascades	2:3
MAPK1/MAPK3 signaling	3:5
MAPK6/MAPK4 signaling	3:6
RAF-independent MAPK1/3 activation	4:12
MET promotes cell motility	4:53
MET activates PTK2 signaling	5:39
MET activates RAP1 and RAC1	5:40
Negative regulation of FGFR1 signaling	5:26
Spry regulation of FGF signaling	6:15
Negative regulation of FGFR2 signaling	5:30
Negative regulation of FGFR3 signaling	5:34
Negative regulation of FGFR4 signaling	5:36
Negative regulation of the PI3K/AKT network	4:8
PI5P, PP2A and IER3 Regulate PI3K/AKT Signaling	5:6
P2Y receptors	6:8

G-protein activation6.4Asymmetric localization of PCD proteins5.51WNTSA-dependent internalization of FZD45.52WNTSA-dependent internalization of FZD45.52XCT phosphorylates targets in the cytosol4.90PFLN Regulation7.11PKA activation7.11Regulation of PTEN gene transcription5.93Regulation of PTEN stability and activity5.93Chemokine receptors bind chemokines6.93Pre-NTCTE Hypersesion and Processing3.32Pre-NTCTE Hypersesion and Processing3.32RHO GTPases Activate Formins4.24RHO GTPases Activate NDPH Oxidases4.65RHO GTPases Activate NDPH Oxidases4.65RHO GTPases Activate NDPH Oxidases4.66RHO GTPases activate IQGAPS4.67RHO GTPases Activate NDPH Oxidases4.72RHO GTPases Activate NDPH Oxidases4.72RHO GTPases activate IQGAPS4.72RHO GTPases activate IQGAPS4.72RHO GTPases activate IQGAPS4.72RHO GTPases activate PAKS4.72RHO GTPases activate PAKS4.72Signaling by Heghong2.72Signaling by Leghton2.14Signaling by Leghton2.14Signaling by NOTCH2.210Signaling by NOTCH2.210Signaling by NOTCH2.210Signaling by VEGR2.212Signaling by VEGR2.213Signaling by KEGR2.214Signaling by KEGR2.212Signaling by KEGR2.212 <th>DARPP-32 events</th> <th>6:3</th>	DARPP-32 events	6:3
Aymmetric localization of FCD proteins550WNTSA-dependent internalization of FZD4, FZD5 and ROR2551WNTSA-dependent internalization of FZD4552AKT phosphorylates targets in the cytosol490PKA activation711Regulation of PTEN gene transcription713Regulation of PTEN stability and activity539Chemokine receptors bind chemokines69Pre-NOTCH Processing in Golgi314Pre-NOTCH Processing in Golgi314Pre-NOTCH Processing in Golgi314Pre-NOTCH Processing in Golgi313Pre-NOTCH Transcription and Translation425RHO GTPases Activate Formins446RHO GTPases Activate NADPH Oxidases465RHO GTPases activate ROCKs466RHO GTPases activate ROCKs470RHO GTPases activate ROCAs471RHO GTPases activate ROCAs472RHO GTPases activate ROCAs472RHO GTPases activate ROCAs472RHO GTPases activate ROTA473RHO GTPases activate ROTA473Signaling by Hotpo225Signaling by Hotpo238Signaling by Hotpo238Signaling by Hotpo238Signaling by Hotpo238Signaling by Nort-Hotses231Signaling by Nort-Hotses231Signaling by Nort-Hotses231Signaling by Nort-Hotses232Signaling by Nort-Hotses232Signaling by Nort-Hotses232Signaling by Nort-Hotses232	G-protein activation	6:4
WNTSA-dependent internalization of FZD2, FZD5 and ROR2551WNTSA-dependent internalization of FZD4552AtT phosphoylates targets in the cytosol439PTEN Regulation7.11Regulation of PTEN gene transcription518Regulation of PTEN gene transcription519Chemokine receptors bind chemokines639Pre-NOTCH Expression and Processing314Pre-NOTCH Expression and Processing312Pre-NOTCH Transcription and Translation425RHO GTPases Activate NADPH Oxidases456RHO GTPases Activate NADPH Oxidases456RHO GTPases Activate NADPH Oxidases456RHO GTPases Activate QCKs466RHO GTPases Activate QCAP458RHO GTPases activate QCAP459RHO GTPases activate QCAPS450RHO GTPases activate PAKS471Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK3548Signaling by GPCR25Signaling by Hedgehog27Signaling by Hedgehog27Signaling by Hedgehog27Signaling by NOTCH25Signaling by NOTCH212Signaling by Hedgehog212Signaling by NOTCH212Signaling by NOTCH212Signaling by NOTCH215Signaling by NOTCH215Signaling	Asymmetric localization of PCP proteins	5:50
WNTSA-dependent internalization of FZD45.52AKT phosphorylates targets in the cytosol4.91PKA activation7.11Regulation of PTEN gene transcription5.81Regulation of PTEN stability and activity5.92Chemokine receptors bind chemokines6.99Pre-NOTCH Expression and Processing3.14Pre-NOTCH Processing in Golgi4.22Pre-NOTCH Processing in Golgi4.23Pre-NOTCH Transcription and Translation4.25RHO GTPases Activate Formins4.64RHO GTPases Activate NADPH Oxidases4.65RHO GTPases Activate NADPH Oxidases4.66RHO GTPases Activate NADPH Oxidases4.67RHO GTPases Activate QCAPs4.68RHO GTPases activate UACAPs4.70RHO GTPases activate CT4.68RHO GTPases activate NTN14.70RHO GTPases activate NTN14.70RHO GTPases activate PKNs4.71RHO GTPases activate PKNs4.72Signal Transcription of AR (androgen receptor) regulated genes KLK2 and KLK35.48Signaling by CPCR2.26Signaling by NoTCH2.26Signaling by NoTCH2.29Signaling by NoTCH2.21Signaling by NoTCH2.24Signaling by NoTCH2.24Signaling by NoTCH2.21Signaling by NoTCH2.21Signaling by NoTCH2.21Signaling by NoTCH2.21Signaling by NoTCH2.21Signaling by NoTCH2.21Signaling by NoTCH2.21<	WNT5A-dependent internalization of FZD2, FZD5 and ROR2	5:51
Art phosphorylates targets in the cytosol49PTEN Regulation410PFLA activation711Regulation of PTEN gene transcription58Regulation of PTEN stability and activity59Chemokine receptors bind chemokines69Pre-NOTCH Expression and Processing314Pre-NOTCH Forcessing in Golgi424Pre-NOTCH Processing in Golgi424Pre-NOTCH Forcessing in Golgi424Pre-NOTCH Forcessing in Golgi424Pre-NOTCH Transcription and Translation425RHO GTPases Activate NADPH Oxidases466RHO GTPases Activate ROCKS466RHO GTPases activate UGAPs467RHO GTPases activate UGAPs467RHO GTPases activate CT478RHO GTPases activate CT470RHO GTPases activate CT470RHO GTPases activate CT470RHO GTPases activate PAKS471Activated PKN s472Activated PKN s472Activated PKN s472Activated PKN s273Signaling by CPA28Signaling by CPA29Signaling by CPA210Signaling by NOTCH210Signaling by Rowclear Neceptor S211Signaling by NOTCH214Signaling by NOTCH216Signaling by NOTCH216Signaling by Rowclear Neceptor S215Signaling by NOTCH216Signaling by NOTCH216Signaling by Rowclear Neceptor S215Signaling	WNT5A-dependent internalization of FZD4	5:52
PTEN Regulation410PKA activation7:1Regulation of PTEN gene transcription538Regulation of PTEN spene transcription59Chemokine receptors bind chemokines69Pre-NOTCH Expression and Processing314Pre-NOTCH Expression and Processing312Pre-NOTCH Frocessing in Golgi422RHO GTPases Activate Formins446RHO GTPases Activate Formins446RHO GTPases Activate NOCKS466RHO GTPases Activate NOCKS467RHO GTPases Activate NOCKS469RHO GTPases Activate NOS471RHO GTPases Activate NOS472Activate Activate NOS472Activate PNNS472Activate PNNS472Activate PNNS472Signaling by GPCR25Signaling by GPCR26Signaling by OFCH210Signaling by NOTCH210Signaling by NOTCH211Signaling by NOTCH212Signaling by NOTCH212Signaling by NOTCH214Signaling by NOTCH216Signaling by NOTCH216Signaling by NOTCH216Signaling by NOTCH216Signaling by NOTCH<	AKT phosphorylates targets in the cytosol	4:9
PKA activation7.1Regulation of PTEN gene transcription5.8Regulation of PTEN stability and activity5.9Chemokine receptors bind chemokines6.9Pre-NOTCH Expression and Processing3.14Pre-NOTCH Transcription and Translation4.25RHO GTPases Activate Formins3.25RHO GTPases Activate Formins4.56RHO GTPases Activate NADPH Oxidases4.56RHO GTPases Activate ROCKs4.56RHO GTPases Activate CT4.58RHO GTPases Activate CT4.58RHO GTPases activate CT4.58RHO GTPases activate CIT4.58RHO GTPases activate CIT4.58RHO GTPases activate CIGAPs4.57RHO GTPases activate CIGAPs4.57RHO GTPases activate CIGAPs4.72Activate WASPs and WAVES4.71RHO GTPases activate PAKs4.71RHO GTPases activate PAKs4.72Activate WASI stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35.48Signaling by Exptrincoletin2.5Signaling by Exptrincoletin2.5Signaling by Heppo2.8Signaling by Non-Receptor Tyrosine Kinases2.11Signaling by Non-Receptor Tyrosine Kinases2.12Signaling by Non-GrPases2.12Signaling by	PTEN Regulation	4:10
Regulation of PTEN gene transcription5.8Regulation of PTEN stability and activity5.9Chemokine ceptors bind chemokines6.9Pre-NOTCH Expression and Processing3.14Pre-NOTCH Processing in Golgi4.25RHO GTPases Effectors3.32RHO GTPases Activate Formins4.66RHO GTPases Activate Formins4.66RHO GTPases Activate MADP Advises4.65RHO GTPases Activate MADP Advises4.65RHO GTPases Activate MADP Advises4.66RHO GTPases Activate MADPs and WAVES4.66RHO GTPases activate UQAPs4.69RHO GTPases activate UQAPs4.69RHO GTPases activate KTN14.70Activate MADPs and WAVES4.72Activate PKNS4.72Activate PKNS4.72Activate PKNS4.72Signaling by Exptropoletin2.25Signaling by Exptropoletin2.56Signaling by Exptropoletin2.25Signaling by Hedgehog2.7Signaling by Hedgehog2.7Signaling by NORCH2.10Signaling by NORCH2.10Signaling by NORCH2.10Signaling by NORCH2.12Signaling by Receptor Tyrosine Kinases2.11Signaling by Receptor Tyrosine Kinases2.12Signaling by Receptor Tyrosine Kinases2.12Signaling by Receptor Tyrosine Kinases2.13Signaling by Receptor Tyrosine Kinases2.13Signaling by Receptor Tyrosine Kinases2.14Signaling by Receptor Tyrosine Kin	PKA activation	7:1
Regulation of PTEN stability and activity5.9Chemokine receptors bind chemokines6.9Pre-NOTCH Processing in Golgi4.24Pre-NOTCH Transcription and Translation4.25RHO GTPase Effectors3.32RHO GTPase Effectors3.32RHO GTPase Activate Formins4.64RHO GTPase Activate NADPH Oxidases4.65RHO GTPase Activate NADPH Oxidases4.66RHO GTPases Activate CKS4.66RHO GTPases Activate CCS4.66RHO GTPases Activate CGN4.69RHO GTPases activate CIT4.68RHO GTPases activate CIGAPs4.69RHO GTPases activate CIAPS4.71RHO GTPases activate CIAPS4.72RHO GTPases activate PAKS4.71RHO GTPases activate PAKS4.71RHO GTPases activate PAKS4.72Activated PKN 1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35.48Signaling by Erythropoietin2.25Signaling by Hedgehog2.7Signaling by Hedgehog2.7Signaling by KDCFA2.10Signaling by NOTCH2.10Signaling by Non-Receptor Tyrosine Kinases2.13Signaling by Non-Receptor Tyrosine Kinases2.13Signaling by WNT2.16GTR downgulation4.32GAR downgulation3.12EGR downgulation3.12EGR downgulation4.33GAB1 signaling by VNT2.16Signaling by WNT3.12CFR downgulation t EGRS signaling4.33 <td>Regulation of PTEN gene transcription</td> <td>5:8</td>	Regulation of PTEN gene transcription	5:8
Chemokine receptors bind chemokines6.9Pre-NOTCH Expression and Processing3.14Pre-NOTCH Transcription and Translation4.25RHO GTPase Effectors3.32RHO GTPase Activate Formins4.64RHO GTPases Activate ROCKs4.65RHO GTPases Activate ROCKs4.66RHO GTPases Activate ROCKs4.66RHO GTPases Activate ROCKs4.66RHO GTPases Activate ROCKs4.66RHO GTPases Activate ROCKs4.67RHO GTPases Activate ROCKs4.67RHO GTPases activate IQGAPs4.69RHO GTPases activate IQGAPs4.70RHO GTPases activate PKNs4.71RHO GTPases activate PKNs4.72Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35.48Signal Transduction1.11Integrin signaling2.4Signaling by CPCR2.75Signaling by GPCR2.76Signaling by OPCH2.91Signaling by NOTCH2.91Signaling by NOTCH2.10Signaling by NOTCH2.12Signaling by NOTCH2.13Signaling by Rotecptor Tyrosine Kinases2.13Signaling by ROTPAses2.14Signaling by ROTPAses2.12Signaling by ROTPAses2.12 <td>Regulation of PTEN stability and activity</td> <td>5:9</td>	Regulation of PTEN stability and activity	5:9
Pre-NOTCH Expression and Processing3:14Pre-NOTCH Processing in Golgi4:24Pre-NOTCH Transcription and Translation4:25RHO GTPase Effectors3:32RHO GTPases Activate Formins4:64RHO GTPases Activate NADPH Oxidases4:65RHO GTPases Activate NADPH Oxidases4:66RHO GTPases Activate WASPs and WAVES4:67RHO GTPases Activate WASPs and WAVES4:69RHO GTPases activate CIT4:68RHO GTPases activate CIGAPs4:69RHO GTPases activate CIGAPs4:69RHO GTPases activate PAKS4:71RHO GTPases activate PAKS4:72Activate PKNS4:72Activate PKNS4:72Activated PKNI stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signaling by Erythropoietin2:5Signaling by Erythropoietin2:6Signaling by Uppin2:10Signaling by NOTCH2:10Signaling by NOTCH2:10Signaling by NOTCH2:12Signaling by NOTCH2:13Signaling by NOTCH2:14Signaling by NOTCH2:12Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by NOTCH2:14Signaling by Rof GTPases2:12Signaling by Rof GTPases2:13Signaling by Rof GTPases2:13Signaling by Rof GTPases3:12Effer downregulation4:33GAL signaling4:33SH	Chemokine receptors bind chemokines	6:9
Pre-NOTCH Processing in Golgi4:24Pre-NOTCH Transcription and Translation4:25PHO GTPase Effectors3:32RHO GTPases Activate Formins4:64RHO GTPases Activate NADPH Oxidases4:65RHO GTPases Activate NOPK4:66RHO GTPases Activate ROCKs4:66RHO GTPases Activate UXAPs and WAVEs4:67RHO GTPases activate CIT4:68RHO GTPases activate CIAPS4:69RHO GTPases activate IQGAPs4:69RHO GTPases activate IQGAPs4:72Activate WASPs and WAVEs4:72RHO GTPases activate PAKs4:71RHO GTPases activate PAKs4:72Activate DKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signaling bry thropoletin2:56Signaling bry brythropoletin2:56Signaling by Ucpton2:36Signaling by Ucpton2:30Signaling by Ucpton2:30Signaling by Ucpton2:30Signaling by NOTCH2:10Signaling by Noclear Receptors2:11Signaling by Noclear Receptors2:12Signaling by Noclear Receptors2:12Signaling by Rog GFR3:12EGFR downregulation4:36GAS1 signaling by GFR3:32CAR signaling by CFR3:32Signaling by KGFR3:32Signaling by KGFR3:32Signaling by KGFR3:32Signaling by KGFR3:32CAR signaling3:33Signaling by KGFR3:32 </td <td>Pre-NOTCH Expression and Processing</td> <td>3:14</td>	Pre-NOTCH Expression and Processing	3:14
Pre-NOTCH Transcription and Translation4:25RHO GTPase Effectors3:32RHO GTPases Activate Formins4:64RHO GTPases Activate ROXFs4:66RHO GTPases Activate ROXFs4:66RHO GTPases Activate ROXFs4:66RHO GTPases Activate ROXFs4:69RHO GTPases activate CT4:58RHO GTPases activate KTN14:70RHO GTPases activate KTN14:70RHO GTPases activate KTN14:71RHO GTPases activate PKNs4:71Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signaling by Erythropoietin2:5Signaling by GPCR2:6Signaling by Hedgehog2:7Signaling by Hedgehog2:7Signaling by NOTCH2:9Signaling by NotCH2:9Signaling by NotCH2:11Signaling by NotCH2:12Signaling by NotCH2:12Signaling by NotCH2:12Signaling by NotCH2:14Signaling by NotCH2:14Signaling by NotCH2:15Signaling by NotCH2:16mTOR signaling by GFR2:13Signaling by SGF3:12Signaling by KGF3:12Signaling by KGFR3:12Signaling by KGFR3:12Signaling by KGFR3:21Signaling by KGFR3:21Signaling by KGFR3:22Signaling by KGFR3:22Signaling by KGFR3:22Signaling by KGFR3:22 <t< td=""><td>Pre-NOTCH Processing in Golgi</td><td>4:24</td></t<>	Pre-NOTCH Processing in Golgi	4:24
RHO GTPase Effectors3.32RHO GTPases Activate Formins4.64RHO GTPases Activate NADPH Oxidases4.65RHO GTPases Activate NADPH Oxidases4.66RHO GTPases Activate WASPs and WAVES4.67RHO GTPases Activate WASPs and WAVES4.67RHO GTPases activate CIT4.68RHO GTPases activate CIGAPs4.69RHO GTPases activate IQGAPs4.70RHO GTPases activate PAKs4.71RHO GTPases activate PAKs4.71RHO GTPases activate PKNs4.72Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35.48Signal Transduction1.11Integrin signaling2.4Signaling by Forthropoietin2.56Signaling by Forthropoietin2.56Signaling by Hippo2.38Signaling by NorCH2.10Signaling by NorCH2.10Signaling by NorCH2.10Signaling by NorCH2.11Signaling by NorCH2.13Signaling by NorCH2.13Signaling by NorCH2.14Signaling by NorCH2.14Signaling by Ro GTPases2.13Signaling by Ro GTPase2.13Signaling by Ro GTPase3.21Signaling by GFR3.21Signaling by GFR3.21Signaling by GF	Pre-NOTCH Transcription and Translation	4:25
RHO GTPases Activate Formins4:64RHO GTPases Activate NADPH Oxidases4:65RHO GTPases Activate ROCKs4:66RHO GTPases Activate ROCKs4:67RHO GTPases Activate QAPs and WAVEs4:67RHO GTPases activate CIT4:68RHO GTPases activate IQGAPs4:70RHO GTPases activate PAKs4:71RHO GTPases activate PAKs4:71RHO GTPases activate PAKs4:72Activate PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signal Transduction1:11Integrin signaling2:4Signaling by Erythropoletin2:5Signaling by Frythropoletin2:6Signaling by Helgehog2:7Signaling by HopO2:8Signaling by NorCH2:10Signaling by NorCH2:10Signaling by NorCH2:11Signaling by NorCH2:12Signaling by NorCH2:12Signaling by NorCH Tyrosine Kinases2:12Signaling by NorCH Tyrosine Kinases2:13Signaling by NorCH2:14Signaling by Ko GTPase2:15Signaling by Ko GTPase2:14Signaling by Kort2:14Signaling by Koff CFR2:12Signaling by Koff CFR2:14Signaling by Koff CFR2:15Signaling by Koff CFR2:14Signaling by	RHO GTPase Effectors	3:32
RHO GTPases Activate NADPH Oxidases4:65RHO GTPases Activate ROCKs4:67RHO GTPases Activate WASPs and WAVEs4:67RHO GTPases activate UGGAPs4:69RHO GTPases activate IQGAPs4:71RHO GTPases activate KTN14:70RHO GTPases activate KTN14:72Activated PKNs4:71RHO GTPases activate PKNs4:72Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signali Transduction1:1Integrin signaling2:4Signaling by Erythropoietin2:5Signaling by Frythropoietin2:5Signaling by Hedgehog2:7Signaling by Hedgehog2:7Signaling by Leptin2:9Signaling by NOTCH2:10Signaling by Noc-Receptor Tyrosine Kinases2:11Signaling by Noc-Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Rob GTPases2:14Signaling by GFCR2:17Signaling by GFCR2:12Signaling by Rob GTPases2:13Signaling by Rob GTPases2:13Signaling by Kho GTPases2:14Signaling by GFCR3:13Signaling by GFCR3:13Signaling by GFCR3:13Signaling by GFCR3:13Signaling by GFCR3:13Signaling by Rob GTPases3:13Signaling by Rob GTPase3:13Signaling by GFCR3:13Signaling by GFCR3:13<	RHO GTPases Activate Formins	4:64
RHO GTPases Activate ROCKs4:66RHO GTPases Activate VMXPs and WAVEs4:67RHO GTPases Activate CIT4:88RHO GTPases activate CIGAPs4:59RHO GTPases activate CIGAPs4:70RHO GTPases activate PKNs4:71Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signal Transduction1:1Integrin signaling2:4Signaling by Erythropoletin2:5Signaling by Frythropoletin2:6Signaling by Hedgehog2:7Signaling by Hedgehog2:8Signaling by Ucter2:10Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:13Signaling by Non-Receptor Tyrosine Kinases2:13Signaling by Ron-Receptor Tyrosine Kinases2:14Signaling by Ron-Receptor Tyrosine Kinases2:14Signaling by Ron-Receptor Tyrosine Kinases2:13Signaling by Ron-Receptor Tyrosine Kinases2:13Signaling by Ron-Receptor Tyrosine Kinases2:14Signaling by Ron-Receptor2:16 <td>RHO GTPases Activate NADPH Oxidases</td> <td>4:65</td>	RHO GTPases Activate NADPH Oxidases	4:65
RHO GTPases Activate WASPs and WAVEs4:67RHO GTPases Activate IQGAPs4:68RHO GTPases activate IQGAPs4:69RHO GTPases activate INIA4:70RHO GTPases activate PAKs4:71RHO GTPases activate PAKs4:72Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signal Transduction1:11Integrin signaling2:4Signaling by Erythropoletin2:5Signaling by PCR2:6Signaling by HopO2:8Signaling by HopO2:8Signaling by HopO2:8Signaling by NOTCH2:10Signaling by Nuclear Receptor Tyrosine Kinases2:11Signaling by Nuclear Receptor Tyrosine Kinases2:13Signaling by NotFA2:16Signaling by Kho GTPases2:13Signaling by KotFA2:16Signaling by Kho GTPases2:17Signaling by KotFA2:16Signaling by KotFA2:17Signaling by KotFA2:17Signaling by KotFA2:17Signaling by KotFA2:16Signaling by KotFA2:17Signaling by KotFA2:17Signaling by KotFA2:17Signaling by KotFA2:16Signaling by KotFA2:17Signaling by KotFA2:16Signaling by KotFA2:17Signaling by KotFA2:17Signaling by KotFA2:12Signaling by KotFA2:20Downregulation of ERBB2 signaling4:33S	RHO GTPases Activate ROCKs	4:66
RHO GTPases activate IQGAPs4:68RHO GTPases activate IQGAPs4:70RHO GTPases activate FXN14:70RHO GTPases activate PKNs4:72Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signal Transduction1:11Integrin signaling2:4Signaling by Erythropoletin2:5Signaling by Frythropoletin2:6Signaling by Hedgehog2:7Signaling by Hedgehog2:8Signaling by NOTCH2:9Signaling by NotCH2:10Signaling by NotCH2:11Signaling by NotCH2:12Signaling by NotCH2:12Signaling by NotCH2:13Signaling by NotCH2:13Signaling by NotCH2:13Signaling by NotCH2:13Signaling by NotCH2:13Signaling by NotCH2:13Signaling by NotCF-beta family members2:14Signaling by RGF,2:15Signaling by RGF3:21Signaling by CFF,3:21Signaling by CFF,3:21Signaling by RGF3:21Signaling by RGF3:21Signaling by RGF3:21Signaling by RGF3:21Signaling by CFF, Signaling4:33SHC1 events in EGFF signaling4:32Signaling by ERB23:22Downregulation of ERB2 Signaling4:31ERB2 Activates PTK6 Signaling4:31ERB2 Activates PTK6 Signaling4:32Signaling by ERB2 Signaling	RHO GTPases Activate WASPs and WAVEs	4:67
RHO GTPases activate IQGAPs4:69RHO GTPases activate KTN14:70RHO GTPases activate PAKs4:72Activate PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signal Transduction1:1Integrin signaling2:4Signaling by Erythropoietin2:6Signaling by GPCR2:6Signaling by Hedgehog2:7Signaling by Hedgehog2:8Signaling by NOTCH2:10Signaling by NotCeA2:10Signaling by NotCeA2:11Signaling by NotCeA2:12Signaling by NotCeA2:12Signaling by NotCeA2:12Signaling by NotCeA2:13Signaling by NotCeA2:10Signaling by NotCeA2:10Signaling by NotCeA2:12Signaling by NotCeA2:13Signaling by NotCeA2:13Signaling by NotCeA2:14Signaling by NotCeA2:12Signaling by NotCeA2:13Signaling by NotCeA2:14Signaling by NotCeA2:15Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:14Signaling by Receptor Tyrosine Kinases2:15Signaling by Receptor Tyrosine Kinases2:15Signaling by TeF-beta family members2:15Signaling by EfFR3:24Signaling by EfFR3:24Signal	RHO GTPases activate CIT	4:68
RHO GTPases activate KTN14.70RHO GTPases activate PAKs4.71RHO GTPases activate PKNs4.72Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35.48Signal Transduction1.11Integrin signaling2.4Signaling by Erythropoietin2.5Signaling by Hedgehog2.6Signaling by Hedgehog2.7Signaling by Hedgehog2.8Signaling by VOTCH2.10Signaling by Non-Receptor Tyrosine Kinases2.11Signaling by Non-Receptor Tyrosine Kinases2.13Signaling by Receptor Tyrosine Kinases2.13Signaling by Rof GTPases2.14Signaling by KIG-F-beta family members2.15Signaling by ErfR2.16Signaling by ErfR2.17Signaling by KIGF-R2.13Signaling by KIGF-Beta family members2.15Signaling by KIGF2.16TOR signaling by ErfR3.21EGFR downregulation4.36GAB1 signalosome4.37GR2 events in EGFR signaling4.38SHC1 events in EGFR signaling4.30ERB2 Activates PTKo Signaling4.31ERB2 Activates In EGRB2 signaling4.34PJS Kevents in ERBB2 signaling4.43	RHO GTPases activate IQGAPs	4:69
RHO GTPases activate PAKs4.71RHO GTPases activate PKNs4.72Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35.48Signal Transduction1.1Integrin signaling2.4Signaling by Erythropoietin2.5Signaling by GPCR2.6Signaling by Hedgehog2.7Signaling by Hedgehog2.8Signaling by Ueptin2.9Signaling by NOTCH2.10Signaling by NotCeat Receptor Tyrosine Kinases2.11Signaling by NotCeat Receptor Tyrosine Kinases2.12Signaling by Receptor Tyrosine Kinases2.13Signaling by NotCeat Receptors2.12Signaling by VMT2.14Signaling by Kho GTPases2.13Signaling by Kho GTPases2.13Signaling by EGFR2.12Signaling by EGFR2.13Signaling by EGFR3.21EGFR downregulation4.36GAB1 signalosome4.37Signaling by EGFR signaling4.33Signaling by EGFR signaling4.33Signaling by ERB23.22Downregulation of ERBB2 signaling4.31ERB2 Activates PTKo Signaling4.31ERB2 Activates Cell Motility4.41GRB2 events in ERBB2 signaling4.43GRB2 events in ERBB2 signaling4.43 <trt< td=""><td>RHO GTPases activate KTN1</td><td>4:70</td></trt<>	RHO GTPases activate KTN1	4:70
RHO GTPases activate PKNs4:72Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signal Transduction1:1Integrin signaling2:4Signaling by Erythropoietin2:5Signaling by GPCR2:6Signaling by Hedgehog2:7Signaling by Leptin2:9Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Non-Receptor Tyrosine Kinases2:12Signaling by Roteptor Tyrosine Kinases2:13Signaling by Roteptor Tyrosine Kinases2:14Signaling by Roteptor Tyrosine Kinases2:13Signaling by Roteptor Tyrosine Kinases2:14Signaling by Roteptor Tyrosine Kinases2:15Signaling by Roteptor Tyrosine Kinases2:16MTOR Signalling2:17Signaling by EGFR2:17Signaling by EGFR3:21EGFR downregulation4:36GA1 signalosome4:37Signaling by ERB23:22Downregulation of ERBB2 signaling4:31ERB2 Activates PTKS Signaling4:31ERB2 Activates Cell Motility4:41GRB2 events in ERBB2 signaling4:42Pi3K events in ERBB2 signaling4:43 </td <td>RHO GTPases activate PAKs</td> <td>4:71</td>	RHO GTPases activate PAKs	4:71
Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK35:48Signal Transduction1:1Integrin signaling2:4Signaling by Erythropoletin2:5Signaling by GPCR2:6Signaling by Hedgehog2:7Signaling by Hedgehog2:8Signaling by Leptin2:9Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Nuclear Receptors2:12Signaling by Receptor Tyrosine Kinases2:13Signaling by Rof GPases2:14Signaling by Kof GF Pases2:15Signaling by Kof F- beta family members2:15Signaling by Koff R2:16mTOR signalling2:17Signaling by EGFR2:12Signaling by EGFR2:12Signaling by EGFR2:12Signaling by Stoff Stage2:14Signaling by Stage2:15Signaling by Stage2:16mTOR signalling2:17Signaling by EGFR2:12Signaling by EGFR2:12Signaling by EGFR2:13Signaling by EGFR2:14Signaling by EBB22:13Signaling by ERBB23:22Downregulation of ERBB2 signaling4:31ERB2 Activates PTK6 Signaling4:31ERB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:42Signaling by ERBB24:42 <tr <td="">Signaling by ERBB2 signal</tr>	RHO GTPases activate PKNs	4:72
Signal Transduction1:1Integrin signaling2:4Signaling by Erythropoietin2:5Signaling by GPCR2:6Signaling by Hedgehog2:7Signaling by Hedgehog2:7Signaling by Leptin2:9Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Nuclear Receptors2:12Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:14Signaling by Rof GPases2:15Signaling by Stoff-beta family members2:15Signaling by KOFR2:16mTOR signalling2:17Signaling by EGFR2:12Signaling by EGFR2:12Signaling by EGFR2:12Signaling by EGFR2:12Signaling by EGFR2:13Signaling by EGFR2:12Signaling by EGFR2:12Signaling by EGFR2:12Signaling by EGFR2:12Signaling by EBB22:32Downregulation of ERB82 signaling4:33Signaling by ERB823:32Downregulation of ERB82 signaling4:31ERB82 Regulates Cell Motility4:31GR82 events in ERB82 signaling4:32PI3K events in ERB82 signaling4:42PI3K events in ERB82 signaling4:42PI3K events in ERB82 signaling4:42Signaling by ERB824:42	Activated PKN1 stimulates transcription of AR (androgen receptor) regulated genes KLK2 and KLK3	5:48
Integrin signaling2:4Signaling by Erythropoietin2:5Signaling by GPCR2:6Signaling by Hedgehog2:7Signaling by Hedgehog2:8Signaling by Leptin2:9Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Nectear Receptors2:12Signaling by Neceptor Tyrosine Kinases2:13Signaling by Neceptor Tyrosine Kinases2:13Signaling by Neceptor Tyrosine Kinases2:13Signaling by Neceptor Tyrosine Kinases2:14Signaling by Receptor Tyrosine Kinases2:15Signaling by Receptor Tyrosine Kinases2:15Signaling by Receptor Tyrosine Kinases2:15Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:14Signaling by Receptor Tyrosine Kinases2:15Signaling by Receptor Tyrosine Kinases2:15Signaling by GFR2:16mTOR signalling2:17Signaling by EGFR3:21Signaling by EGFR3:22GRB2 events in EGFR signaling4:33SHC1 events in EGFR signaling4:32Signaling by ERB23:22Downregulation of ERB2 signaling4:31ERB2 Regulates Cell Motility4:31ERB2 Regulates Cell Motility4:41PI3K events in ERB2 signaling4:43	Signal Transduction	1:1
Signaling by Erythropoietin2:5Signaling by GPCR2:6Signaling by Hedgehog2:7Signaling by Hedgehog2:8Signaling by Leptin2:9Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Nuclear Receptors2:12Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:14Signaling by Receptor Tyrosine Kinases2:15Signaling by Receptor Tyrosine Kinases2:15Signaling by Receptor Tyrosine Kinases2:15Signaling by Receptor Tyrosine Kinases2:16mTOR signaling2:17Signaling by GFR2:16GRB2 events in EGFR signaling4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling3:22Downregulation of ERBB2 signaling4:31ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:31ERBB2 revents in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Integrin signaling	2:4
Signaling by GPCR2:6Signaling by Hedgehog2:7Signaling by Hedgehog2:8Signaling by Leptin2:9Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Nuclear Receptors2:12Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:14Signaling by Receptor Tyrosine Kinases2:15Signaling by Rof GP-Bases2:15Signaling by VDT2:16mTOR signalling2:17Signaling by GFR2:17Signaling by GFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling4:32Downregulation of ERB2 signaling4:32RBB2 Activates PTK6 Signaling4:31ERBB2 Activates PTK6 Signaling4:32POwnregulation of ERB2 signaling4:31ERBB2 Activates PTK6 Signaling4:32POW PTK OFF EXPTK6 Signaling4:32PABK events in ERBB2 signaling4:43PI3K events in ERBB2 signaling4:43PI3K events in ERBB2 signaling4:43	Signaling by Erythropoietin	2:5
Signaling by Hedgehog2:7Signaling by Hippo2:8Signaling by Leptin2:9Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Nuclear Receptors2:12Signaling by Neceptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:14Signaling by Rof GTPases2:15Signaling by VMT2:16mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:39Signaling by ERB23:22Downregulation of ERBB2 signaling4:31ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:42PI3K events in ERBB2 signaling4:43	Signaling by GPCR	2:6
Signaling by Hippo2:8Signaling by Leptin2:9Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Nuclear Receptors2:12Signaling by Neceptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Ro GTPases2:14Signaling by TGF-beta family members2:15Signaling by WNT2:16mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:39Signaling by ERB23:22Downregulation of ERBB2 signaling4:31ERB82 Activates PTK6 Signaling4:31ERB82 Regulates Cell Motility4:41GRB2 events in ERB82 signaling4:42PI3K events in ERB82 signaling4:43	Signaling by Hedgehog	2:7
Signaling by Leptin2:9Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Nuclear Receptors2:12Signaling by Neceptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Ro GTPases2:14Signaling by TGF-beta family members2:15Signaling by WNT2:16mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling3:22Downregulation of ERBB2 signaling4:30Signaling by ERBB23:22Downregulation of ERBB2 signaling4:41GRB2 events in EGFR signaling4:31ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Signaling by Hippo	2:8
Signaling by NOTCH2:10Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Nuclear Receptors2:12Signaling by Receptor Tyrosine Kinases2:13Signaling by Receptor Tyrosine Kinases2:13Signaling by Ro GTPases2:14Signaling by TGF-beta family members2:15Signaling by WNT2:16mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling3:22Downregulation of ERBB2 signaling4:30Signaling by ERBB23:22Downregulation of ERBB2 signaling4:31ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Signaling by Leptin	2:9
Signaling by Non-Receptor Tyrosine Kinases2:11Signaling by Nuclear Receptors2:12Signaling by Receptor Tyrosine Kinases2:13Signaling by Rho GTPases2:14Signaling by TGF-beta family members2:15Signaling by WNT2:16mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:39Signaling by EBB23:22Downregulation of ERBB2 signaling4:30SHC1 events in EGFR signaling4:31ERBB2 Activates PTK6 Signaling4:31ERBB2 Activates PTK6 Signaling4:31ERBB2 revents in ERBB2 signaling4:41GRB2 events in ERBB2 signaling4:41SHS1 events in ERBB2 signaling4:41GRB2 events in ERBB2 signaling4:41GRB2 events in ERBB2 signaling4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Signaling by NOTCH	2:10
Signaling by Nuclear Receptors2:12Signaling by Receptor Tyrosine Kinases2:13Signaling by Rho GTPases2:14Signaling by TGF-beta family members2:15Signaling by WNT2:16mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling3:22Downregulation of ERBB2 signaling4:30Signaling by ERB23:22Downregulation of ERBB2 signaling4:31ERB2 Activates PTK6 Signaling4:31ERB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Signaling by Non-Receptor Tyrosine Kinases	2:11
Signaling by Receptor Tyrosine Kinases2:13Signaling by Rho GTPases2:14Signaling by TGF-beta family members2:15Signaling by WNT2:16mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling4:39Signaling by ERBB23:22Downregulation of ERBB2 signaling4:31ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in EGFRs ignaling4:42PI3K events in ERBB2 signaling4:43	Signaling by Nuclear Receptors	2:12
Signaling by Rho GTPases2:14Signaling by TGF-beta family members2:15Signaling by WNT2:16mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling4:39Signaling by ERB23:22Downregulation of ERBB2 signaling4:40ERB82 Activates PTK6 Signaling4:31ERB82 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Signaling by Receptor Tyrosine Kinases	2:13
Signaling by TGF-beta family members2:15Signaling by WNT2:16mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling4:39Signaling by ERB23:22Downregulation of ERBB2 signaling4:40ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Signaling by Rho GTPases	2:14
Signaling by WNT2:16mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling4:39Signaling by ERB23:22Downregulation of ERBB2 signaling4:40ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Signaling by TGF-beta family members	2:15
mTOR signalling2:17Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling4:39Signaling by ERBB23:22Downregulation of ERBB2 signaling4:40ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Signaling by WNT	2:16
Signaling by EGFR3:21EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling4:39Signaling by ERBB23:22Downregulation of ERBB2 signaling4:40ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	mTOR signalling	2:17
EGFR downregulation4:36GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling4:39Signaling by ERBB23:22Downregulation of ERBB2 signaling4:40ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Signaling by EGFR	3:21
GAB1 signalosome4:37GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling4:39Signaling by ERBB23:22Downregulation of ERBB2 signaling4:40ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	EGFR downregulation	4:36
GRB2 events in EGFR signaling4:38SHC1 events in EGFR signaling4:39Signaling by ERBB23:22Downregulation of ERBB2 signaling4:40ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	GAB1 signalosome	4:37
SHC1 events in EGFR signaling4:39Signaling by ERBB23:22Downregulation of ERBB2 signaling4:40ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	GRB2 events in EGFR signaling	4:38
Signaling by ERBB23:22Downregulation of ERBB2 signaling4:40ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	SHC1 events in EGFR signaling	4:39
Downregulation of ERBB2 signaling4:40ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Signaling by ERBB2	3:22
ERBB2 Activates PTK6 Signaling4:31ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	Downregulation of ERBB2 signaling	4:40
ERBB2 Regulates Cell Motility4:41GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	ERBB2 Activates PTK6 Signaling	4:31
GRB2 events in ERBB2 signaling4:42PI3K events in ERBB2 signaling4:43	ERBB2 Regulates Cell Motility	4:41
PI3K events in ERBB2 signaling 4:43	GRB2 events in ERBB2 signaling	4:42
	PI3K events in ERBB2 signaling	4:43

SHC1 events in ERBB2 signaling	4:44
Signaling by ERBB4	3:23
Nuclear signaling by ERBB4	4:45
SHC1 events in ERBB4 signaling	4:46
Erythropoietin activates Phosphoinositide-3-kinase (PI3K)	3:7
Erythropoietin activates RAS	3:8
Signaling by FGFR	3:24
Signaling by FGFR1	4:47
Signaling by FGFR2	4:48
Signaling by FGFR3	4:49
Signaling by FGFR4	4:50
FGFRL1 modulation of FGFR1 signaling	5:27
FGFR2 alternative splicing	5:31
FGFR4 ligand binding and activation	5:37
Hedgehog ligand biogenesis	3:13
Signaling by Insulin receptor	3:25
Insulin receptor recycling	4:52
Signaling by MET	3:26
MET activates RAS signaling	4:54
MET receptor recycling	4:55
Negative regulation of MET activity	4:56
Signaling by NOTCH1	3:15
Signaling by NOTCH3	3:16
Signaling by NOTCH4	3:17
Activated NOTCH1 Transmits Signal to the Nucleus	4:26
NOTCH1 Intracellular Domain Regulates Transcription	4:27
NOTCH3 Activation and Transmission of Signal to the Nucleus	4:28
NOTCH4 Activation and Transmission of Signal to the Nucleus	4:29
Negative regulation of NOTCH4 signaling	4:30
Signaling by NTRK1 (TRKA)	4:57
Nuclear Events (kinase and transcription factor activation)	5:41
Retrograde neurotrophin signalling	5:42
Signalling to ERKs	5:43
Signaling by NTRK2 (TRKB)	4:58
Activated NTRK2 signals through FRS2 and FRS3	5:44
Signaling by NTRKs	3:27
Signaling by NTRK3 (TRKC)	4:59
Signaling by PTK6	3:18
Signaling by Retinoic Acid	3:20
Signaling by PDGF	3:28
Downstream signal transduction	4:60
PTK6 Regulates RHO GTPases, RAS GTPase and MAP kinases	4:32
Signaling by SCF-KIT	3:29
Signaling by Type 1 Insulin-like Growth Factor 1 Receptor (IGF1R)	3:30
Signaling by VEGF	3:31
RA biosynthesis pathway	4:35
Rho GTPase cycle	3:33
Regulation of KIT signaling	4:61
Signaling by TGF-beta Receptor Complex	3:34
TGF-beta receptor signaling activates SMADs	4:73
TGF-beta receptor signaling in EMT (epithelial to mesenchymal transition)	4:74
, ,	

Signaling by Activin	3:35
Signaling by BMP	3:36
VEGFA-VEGFR2 Pathway	4:63
TCF dependent signaling in response to WNT	3:39
WNT ligand biogenesis and trafficking	3:40
Prolonged ERK activation events	6:30
Signalling to RAS	6:31
p38MAPK events	7:5
Deactivation of the beta-catenin transactivating complex	4:79
Degradation of AXIN	4:80
Degradation of DVL	4:81
Disassembly of the destruction complex and recruitment of AXIN to the membrane	4:82
Formation of the beta-catenin:TCF transactivating complex	4:83
Negative regulation of TCF-dependent signaling by WNT ligand antagonists	4:84
Regulation of FZD by ubiquitination	4:85
Downregulation of TGF-beta receptor signaling	5:49
Regulation of TNFR1 signaling	4:1
TNFR1-induced NFkappaB signaling pathway	4:2
TNFR1-induced proapoptotic signaling	4:3
The phototransduction cascade	6:5
Activation of the phototransduction cascade	7:3
Inactivation, recovery and regulation of the phototransduction cascade	7:4
VEGFR2 mediated cell proliferation	5:46
VEGFR2 mediated vascular permeability	5:47
The canonical retinoid cycle in rods (twilight vision)	6:6
Energy dependent regulation of mTOR by LKB1-AMPK	3:41
mTORC1-mediated signalling	3:42
Regulated proteolysis of p75NTR	4:5
p75NTR signals via NF-kB	4:6
NF-kB is activated and signals survival	5:3
p75NTR recruits signalling complexes	5:4