

Ontogeny – New Theory

slides prepared by Michal Liput, PAN

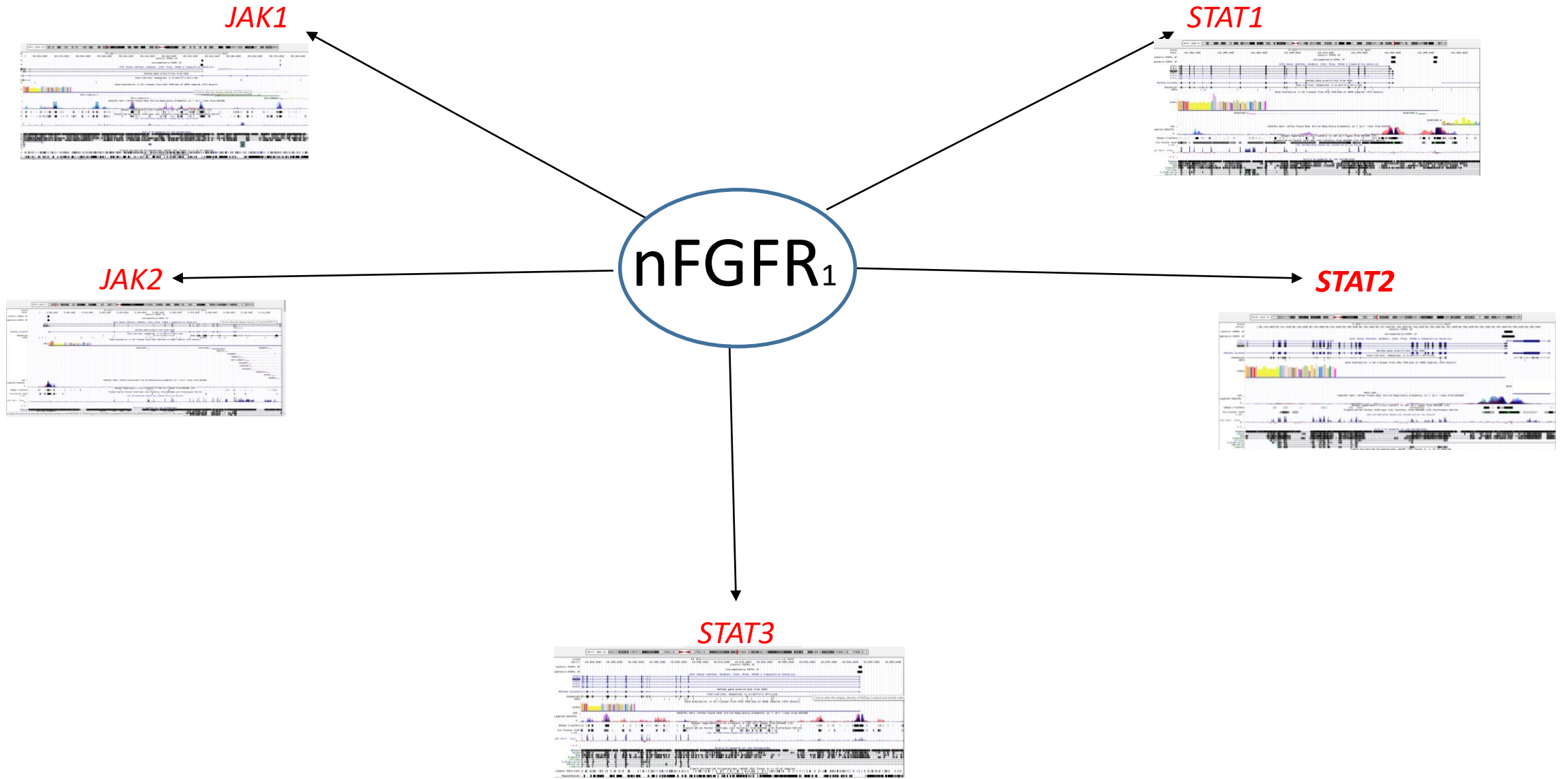
JAK-STAT Signalling

Gene of importance	R1 binding promoter
JAK1	Yes
JAK2	Yes
STAT1	Yes
STAT2	Yes
STAT3	Yes

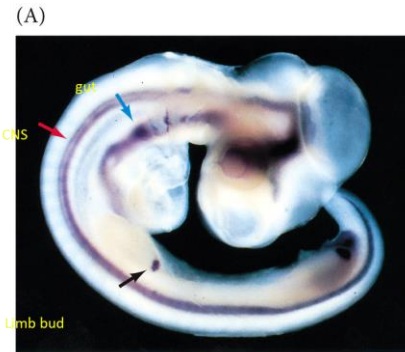
Thanatophoric
dysplasia



JAK-STAT Signalling



Hedgehog Signalling



DEVELOPMENTAL BIOLOGY 11e, Figure 4.31
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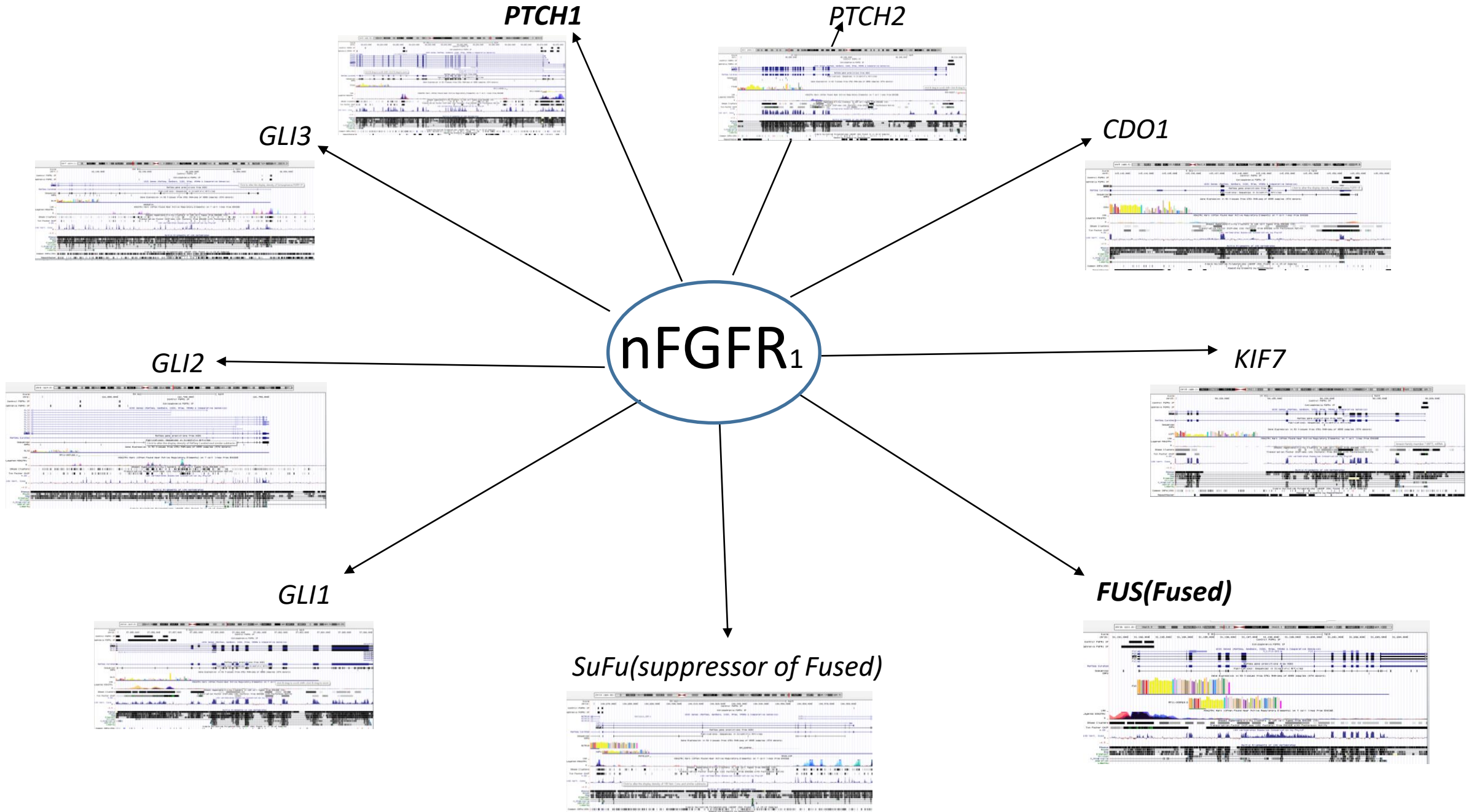
cyclopia



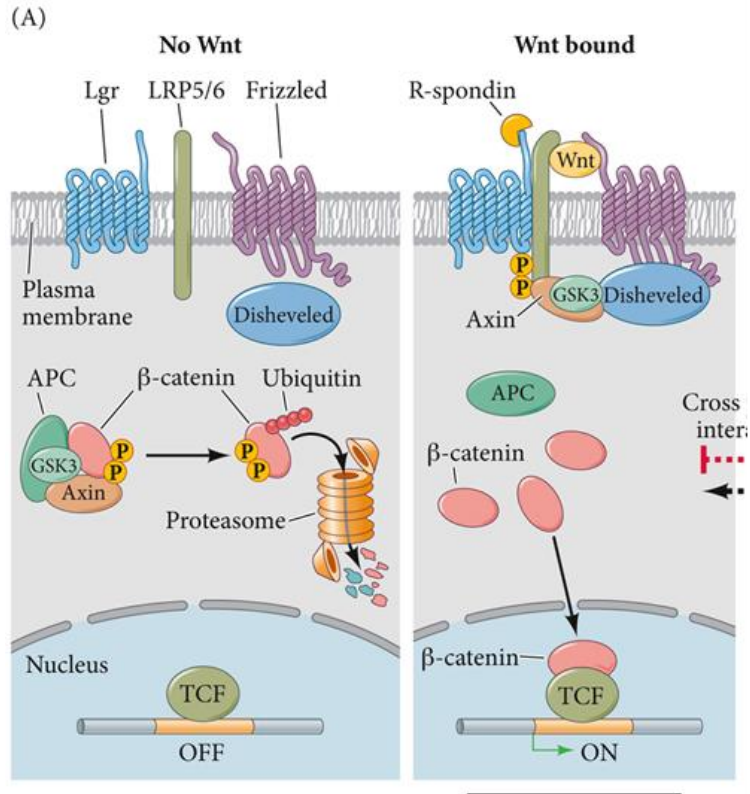
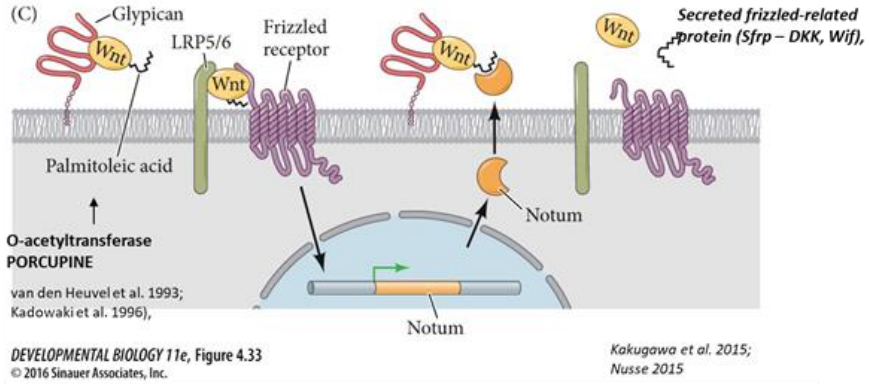
basal cell nevus syndrome

Gene of importance	R1 binding promoter
SHH	No
DHH	No
IHH	No
PTCH1	Yes
PTCH2	Yes
CDO1	Yes
BOC	No
GAS1	No
SMO (smoothened)	Yes
esKIF7	Yes
FUS (Fused)	Yes
SuFu (suppressor of Fused)	Yes
GLI1	Yes
GLI2	Yes
GLI3	Yes

Hedgehog Signalling

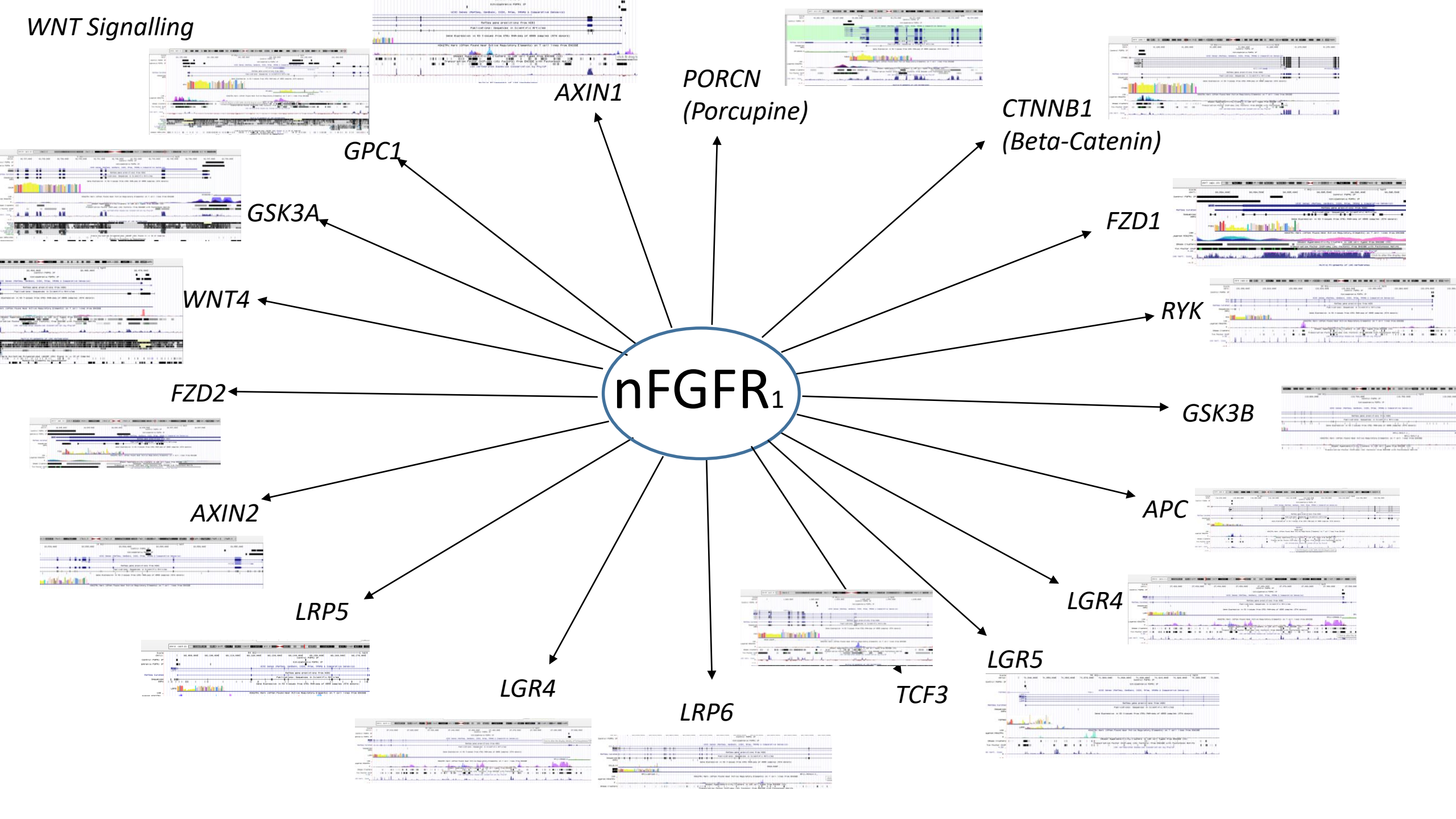


WNT Signalling

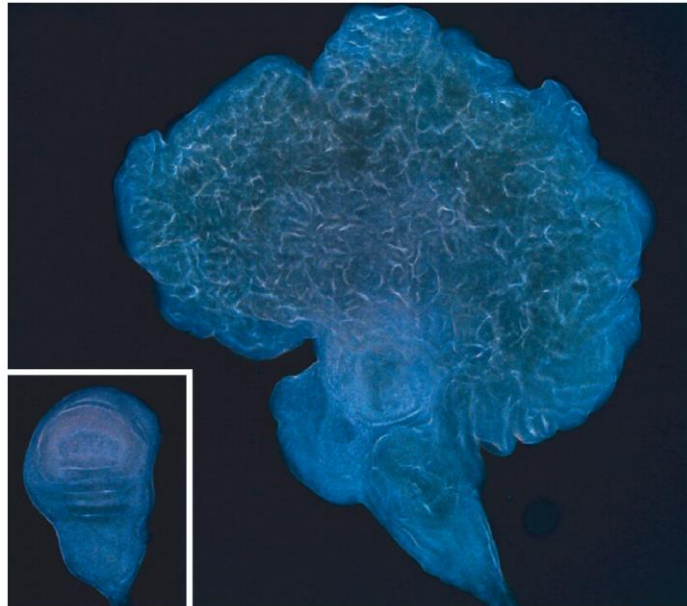
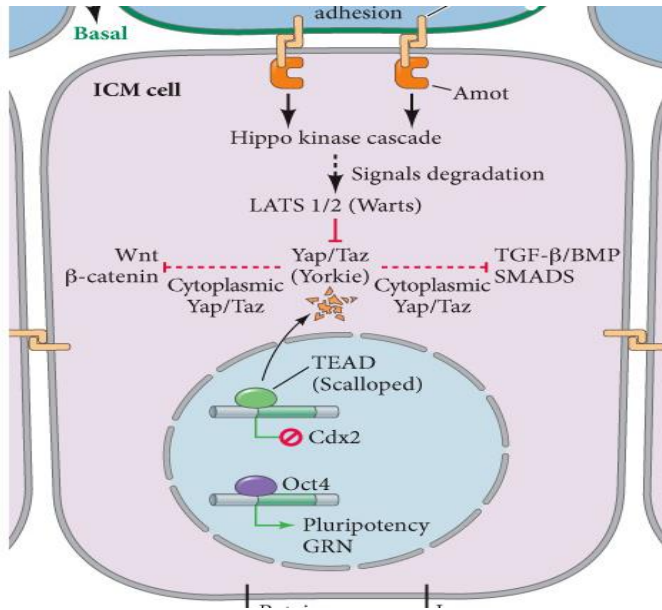


Gene of importance	R1 binding promoter
WNT4	Yes
FZD1	Yes
FZD2	Yes
LRP5	Yes
LRP6	Yes
LGR4	Yes
LGR5	Yes
LGR6	No
RYK	Yes
ROR1	No
ROR2	No
PORCN (Porcupine)	Yes
GPC1	Yes
NOTUM	No
CTNNB1 (Beta-Catenin)	Yes
GSK3A	Yes
GSK3B	Yes
AXIN1	Yes
AXIN2	Yes
APC	Yes
TCF3	Yes

WNT Signalling



hippo pathway for E Cadherin

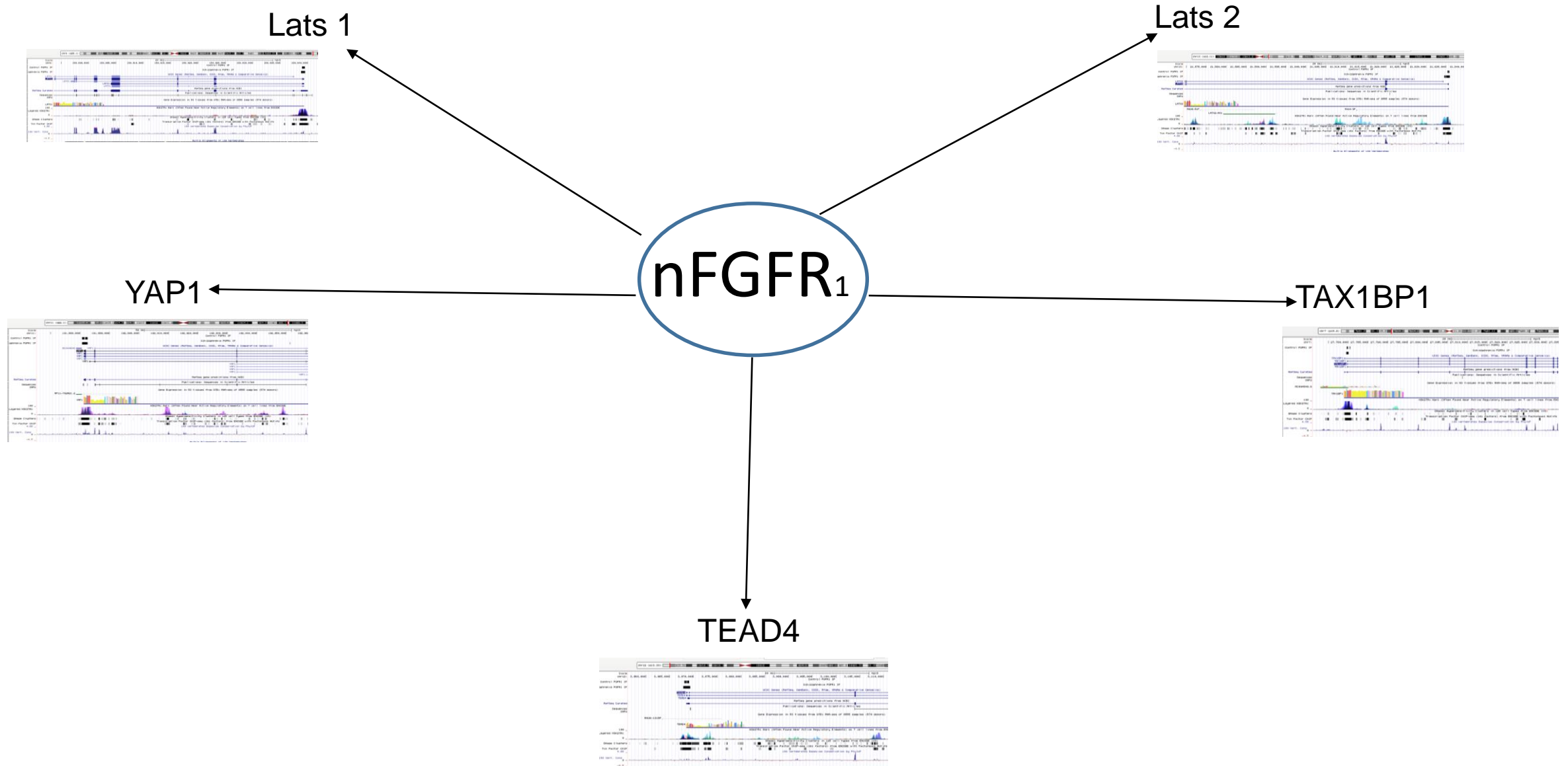


Wild-type

Overexpression of *yorkie*

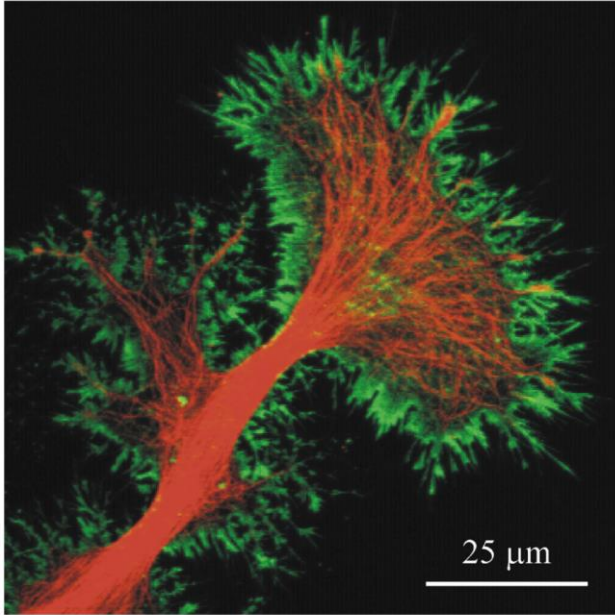
Gene of importance	R1 binding promoter
Lats 1	Yes
Lats 2	Yes
YAP1 (Yorkie)	Yes
TAX1BP1	Yes
TEAD4	Yes
CDX2	No

hippo pathway for E Cadherin



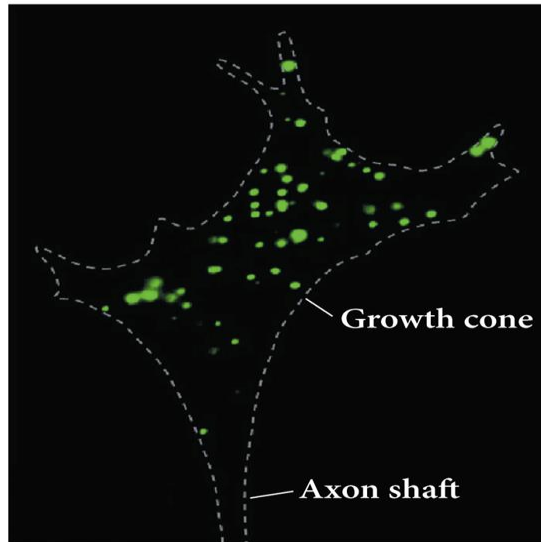
translation (especially at the growth cones)

(A)



DEVELOPMENTAL BIOLOGY 11e, Figure 15.24 (Part 1)
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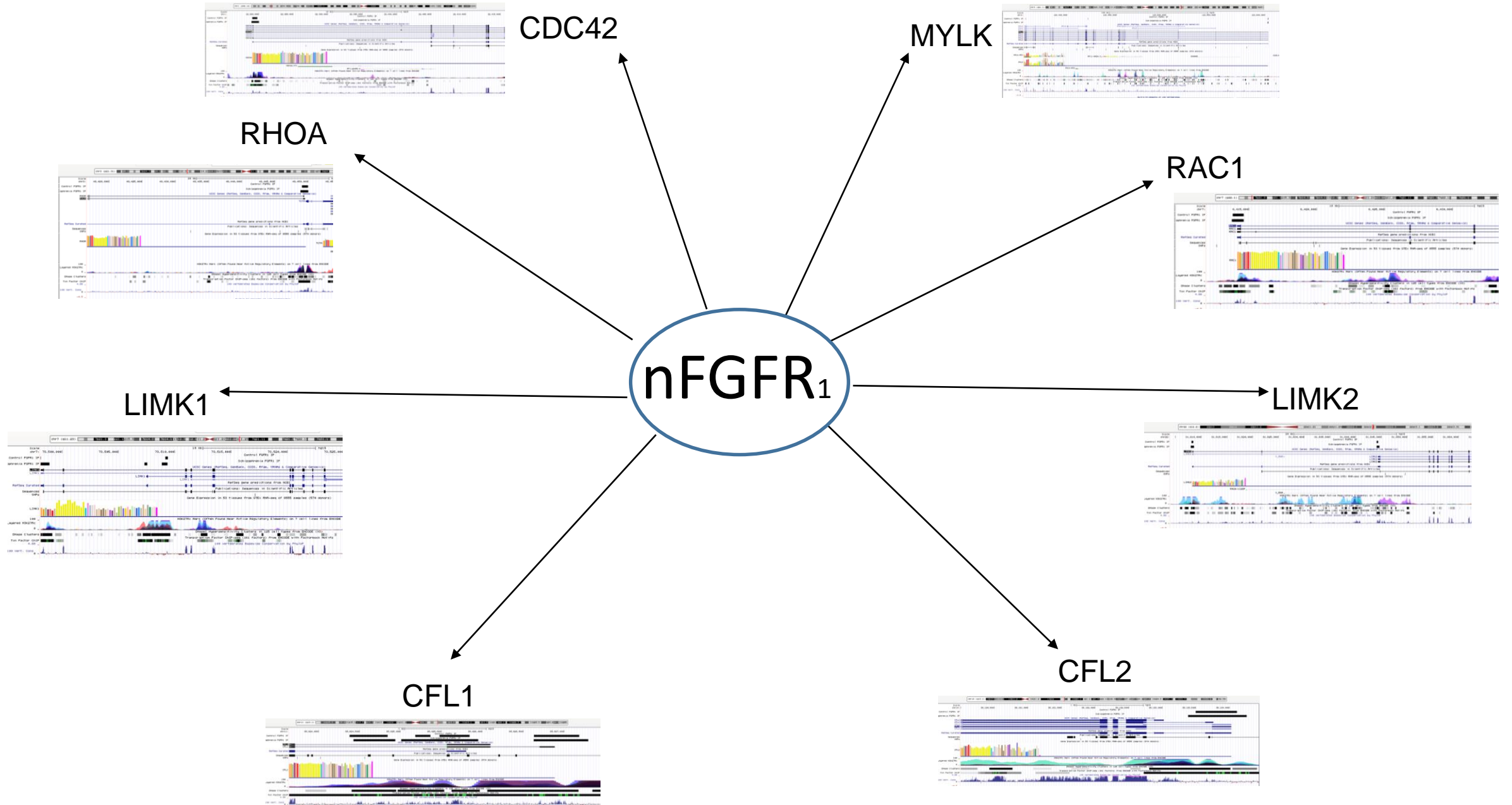
(B) *Tubb2b* mRNA



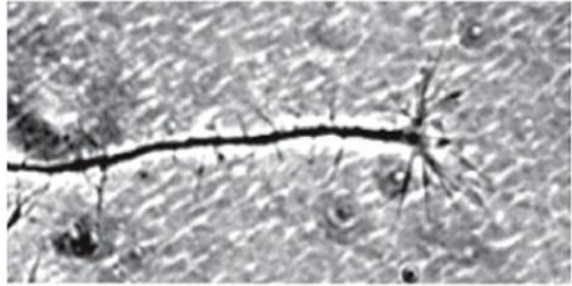
DEVELOPMENTAL BIOLOGY 11e, Figure 15.25 (Part 2)
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Gene of importance	R1 binding promoter
RHOA	Yes
RAC1	Yes
CDC42	Yes
MYLK	Yes
LIMK1	Yes
LIMK2	Yes
CFL1	Yes
CFL2	Yes
Fermin	
ARPC2	Yes
ARPC3	Yes

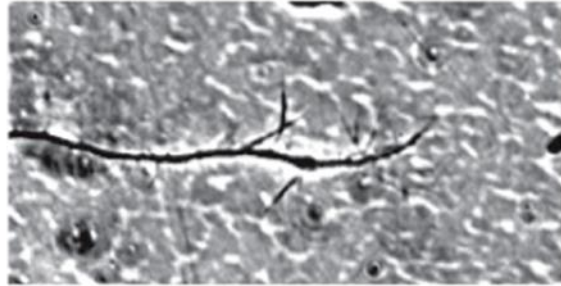
translation (especially at the growth cones)



Navigational programming



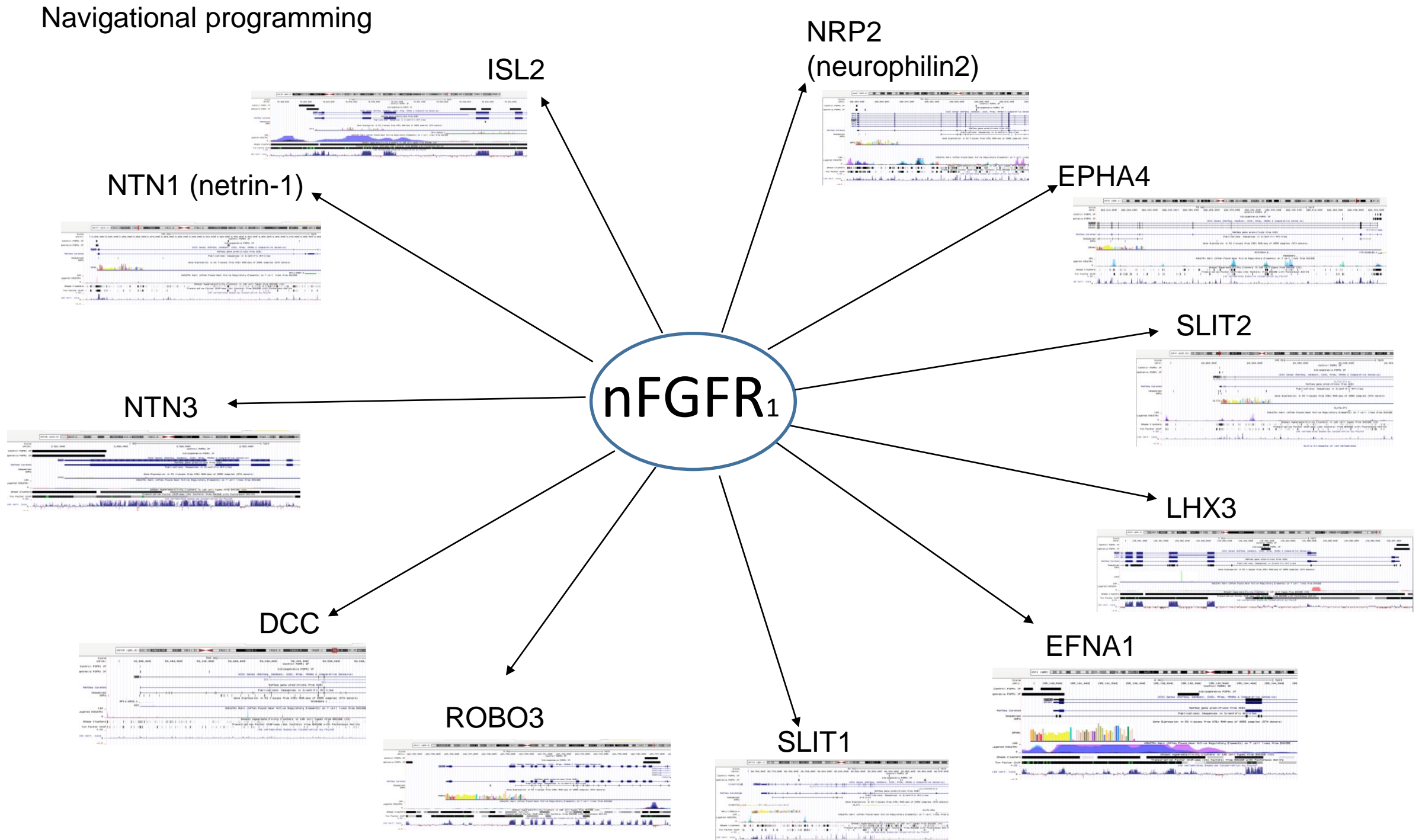
Control



Ephrin

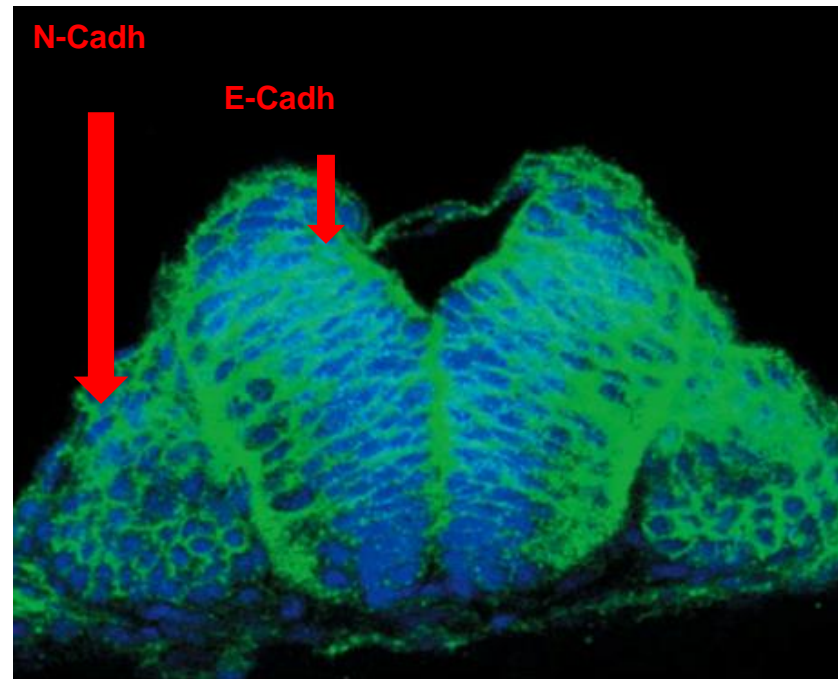
Gene of importance	R1 binding pr
ISL1	No
ISL2	Yes
LHX1	No
NRP2 (neurophilin2)	Yes
SEMA3F (semaphorin3F)	No
EFNA5 (ephrinA5)	Yes
EPHA4	Yes
LHX3	Yes
EFNA1	Yes
SEMA3A (semaphorin-1)	No
SEMA3G (semaphorin-2)	No
SEMA3E (semaphorin-3)	No
NTN1 (netrin-1)	Yes
NTN3	Yes
DCC	Yes
DSCAM	No
NTF3	No
NGF	No
SLIT1	Yes
SLIT2	Yes
SLIT3	No
ROBO1	No
ROBO2	No
ROBO3	Yes

Navigational programming



Neural Tube and Synapse formation

Gene of importance	R1 binding promoter
CDH1 (E-cadherin)	No
CDH2 (N-cadherin)	yes



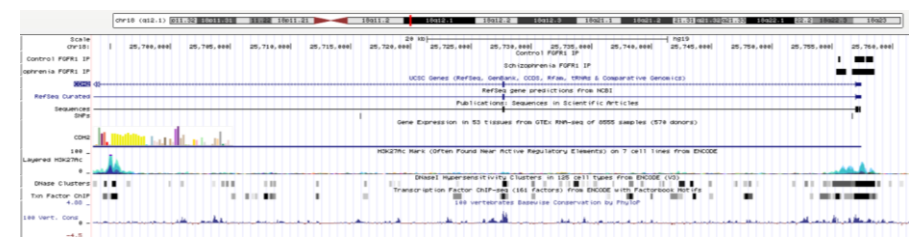
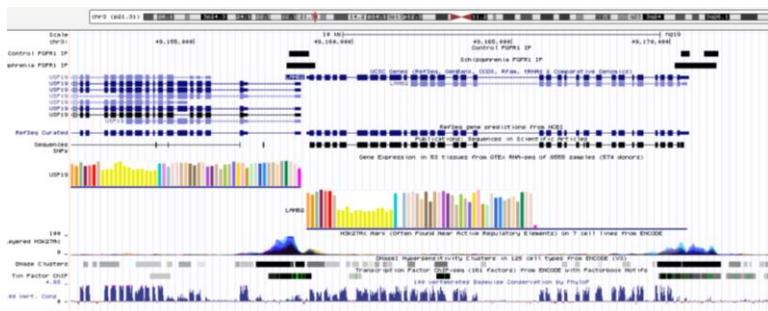
DEVELOPMENTAL BIOLOGY 11e, Figure 4.9
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Neural tube and synapse formation

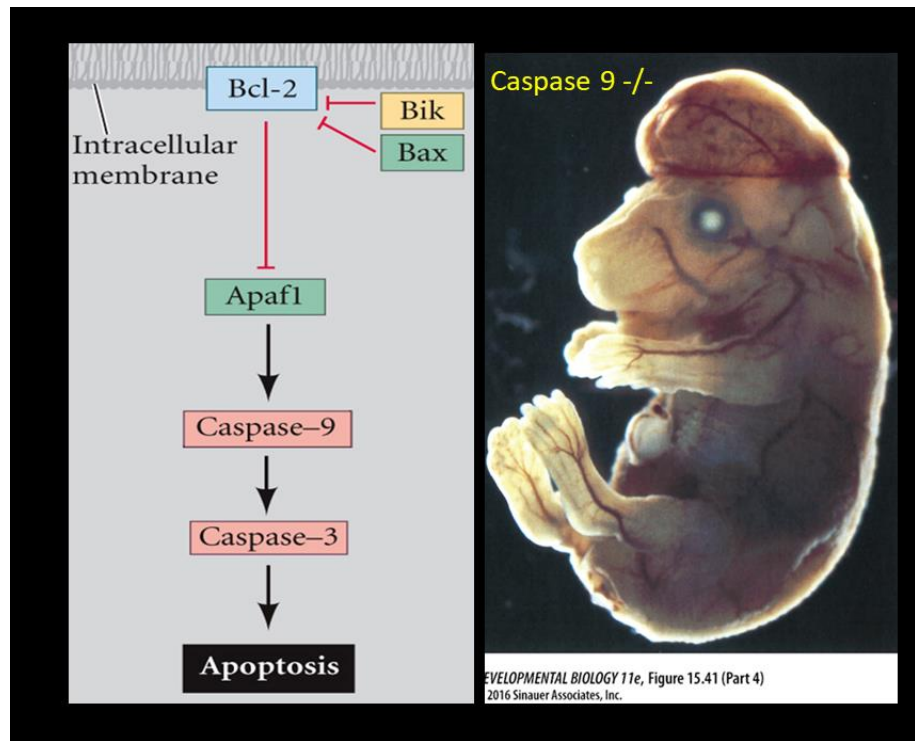
LAMB2 (Beta2 laminin)

nFGFR₁

CDH2 (N-cadherin)



Apoptosis



Gene of importance	R1 binding promoter
BCL2	Yes
BCL2L1 (Bcl-X)	Yes
BIK	Yes
BAX	Yes
APAF1	Yes
CASP9 (Caspase-9)	Yes
CASP3 (caspase-3)	Yes

Apoptosis

BCL2

BAX

APAF1

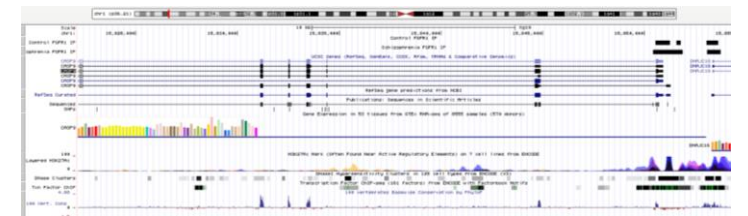
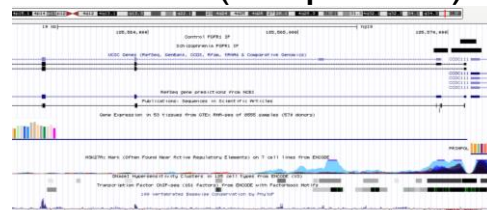
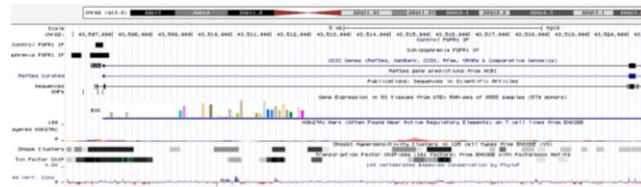
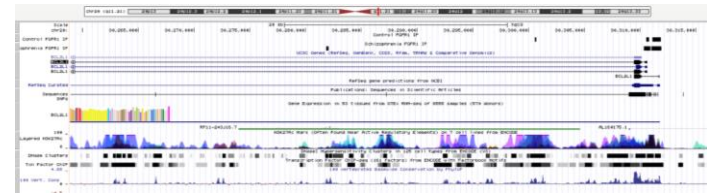
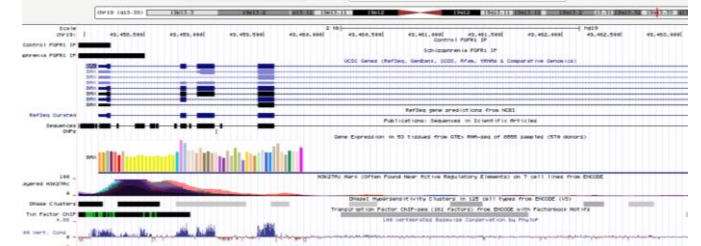
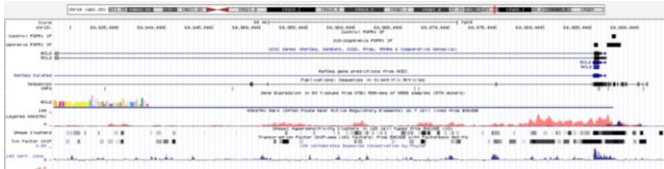
BCL2L1
(Bcl-X)

nFGFR₁

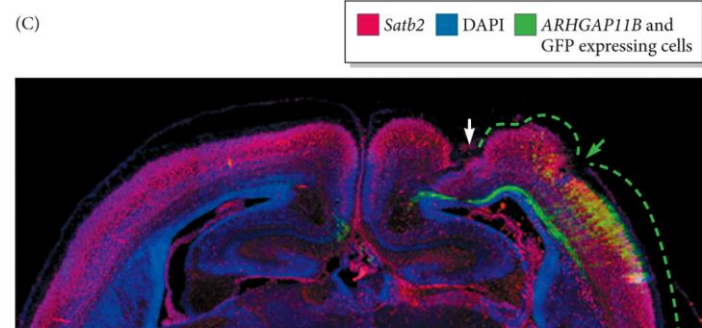
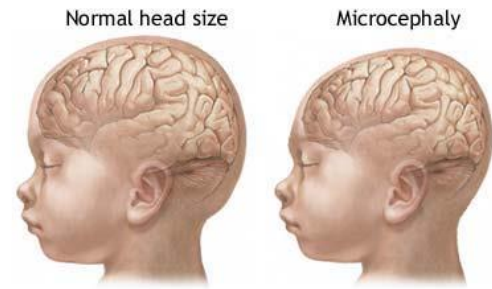
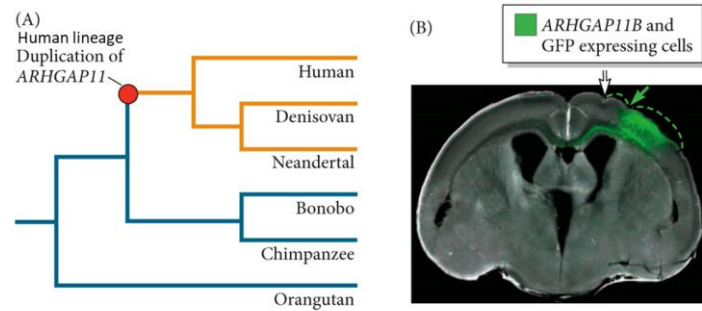
CASP9 (Caspase-9)

BIK

CASP3 (caspase-3)



Genes important for cortical development



ADAM.

DEVELOPMENTAL BIOLOGY 11e, Figure 14.18
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Lhx2, *ASPM*, *TBR1*, *Microcephalin*, *FOXP2*, *Satb2*, *Satb2*
as, *ARHGAP11B*, ...