

Okay, for each of the following signaling pathways, see whether you can fill in the relevant information.

1. Nodal

Ligand(s) nodal (TGF β family)
Receptor nodal receptor (type I plus type II heterodimer, S/T kinase)
Intracellular signaling factors Smad 2,4
Extracellular modulators follistatin, cerberus

2. BMP

Ligand(s) BMP (TGF β superfamily)
Receptor BMP (type I plus type II heterodimer, serine/threonine kinase)
Intracellular signaling factors Smad 1, 4
Extracellular modulators chordin, noggin, follistatin, Frzb

3. Fgf/ Egf

Ligand(s) Fgf, Egf, others
Receptor Fgf/Egf (receptor tyrosine kinase, dimer)
Intracellular signaling factors gap/sos, ras, raf, MEK, ERK (MAP kinase pathway)
Extracellular modulators sprouty (Fgf)

4. Wnt (canonical)

Ligand(s) Wnt
Receptor Frizzled
Intracellular signaling factors disheveled, GSK3, β -catenin (TCF)
Extracellular modulators Frzb

5. Wnt (non-canonical)

Ligand(s) Wnt
Receptor Frizzled, strabismus
Intracellular signaling factors disheveled, Daam1, rho, rock or rac, jnk
Extracellular modulators Frzb

6. Notch

Ligand(s) Delta, serrate, jagged

Receptor Notch

Intracellular signaling factors

Extracellular modulators

7. Hedgehog

Ligand(s) Hedgehog

Receptor Patched, Smoothened

Intracellular signaling factors PKA, cos2, Ci

Extracellular modulators Frzb (maybe)

8. Retinoic Acid

Ligand(s) retinoic acid

Receptor RAR, RXR (homo- or heterodimer)

Intracellular signaling factors receptors are transcription factors, cyp26 (inhibitor)

Extracellular modulators CRABP