

ER α activators

one receptor - multiple inputs

ligands

Estrogens

Androgens

27-OH-cholesterol

Xeno-estrogens

Phyto-estrogens

Farnesyl PP

Metallo-estrogens

(Cd²⁺, Co²⁺, Cu²⁺, Ni²⁺,
Pb²⁺, Hg²⁺, Sn²⁺, Cr²⁺)

Vanadate

Arsenite, Selenite

Ca²⁺

ATP

CXCL12 /SDF-1

Dopamine

GnRH

IL-6, Leptin

Peptide growth factors

(EGF, Heregulin, TGF α , IGF, bFGF)

Prolactin

TNF α

Amino acids

AhR/Arnt

Cyclins

Ets-1, Hif-1 α

G α 0

PI3K, Akt, Pak1, v-Src, TBK1, IKK ϵ

Progesterone receptor (PR)

Protein kinases A and C δ

Vav3

XBP1s

(PR and AR in non-genomic signaling)

other signals

other factors