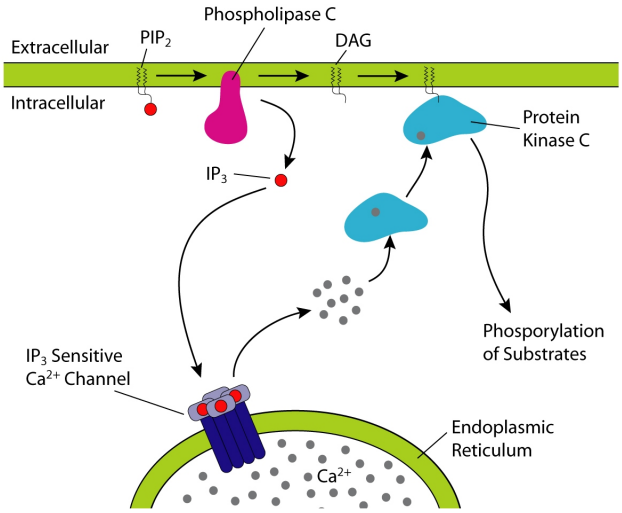
CONCEPT: PHOSPHOINOSITIDE SIGNALING PATHWAY

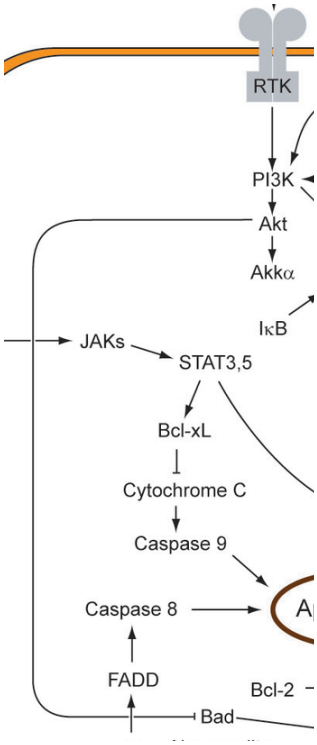
- The phosphoinositide signaling pathway (inositol phospholipid pathway) can be _____ by GPCRs or RTKs
  - □ GPCRs activate G_q which activates the enzyme *phospholipase C*
    - **Phospholipase C** cleaves an inositol phospholipid from the cytosolic side
    - Cleavage generates 1,4,5 triphosphate (IP3) and diacylglycerol (DAG)
      - IP3 binds and opens ER calcium channels causing calcium to rush into cytoplasm
      - DAG recruits and activates **protein kinase C** which activates other proteins when Ca^{2+} is present
  - □ Calcium surges into the cytoplasm trigger a lot of signaling events
    - Ex: Egg development, muscle contraction, nerve cell secretion

EXAMPLE: Signaling pathway of phospholipase C



  - □ RTKs and cytokine receptors can also activate phospholipase C for a _____ purpose
    - **Phospholipase C** recruit's *phosphatidylinositol-3 (PI-3) kinase* to the membrane
    - **Phosphatidylinositol-3 (PI-3) kinase** adds phosphates onto the phosphatidylinositol lipid
      - Can trigger cell division and prevent cell death
      - Also activates **Akt** which can regulate a variety of other proteins
      - **PTEN phosphatase** removes the phosphate groups from PI-3 kinase to inactivate it

EXAMPLE: PI3K signaling pathway



PRACTICE:

1. True or False: The inositol signaling pathway can be activated by both GPCRs and RTKs.
    a. True
    b. False

2. Which of the following molecules removes phosphates from PI-3 kinase?
    a. Phospholipase C
    b. Phosphatidylinositol-3 kinase
    c. PTEN Phosphatase
    d. Protein Kinase C