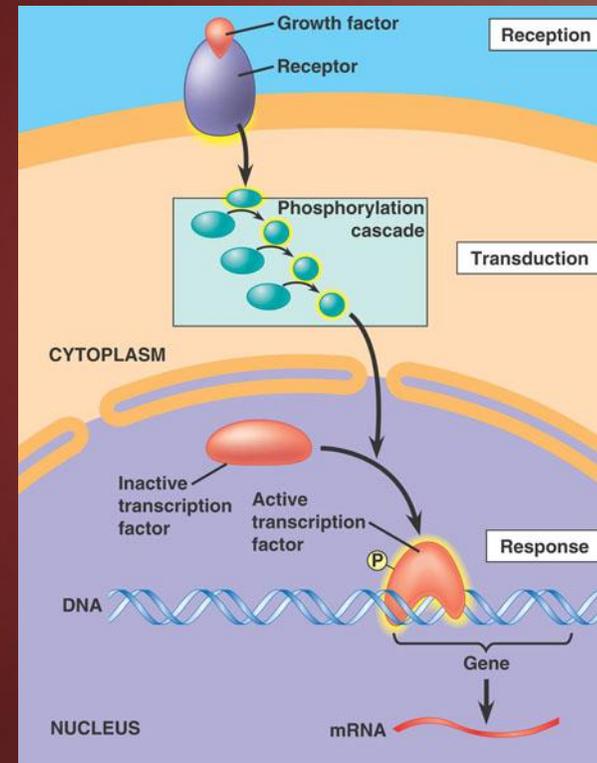


# CELL TO CELL COMMUNICATION VIA ENZYME LINKED RECEPTORS

Packet #26

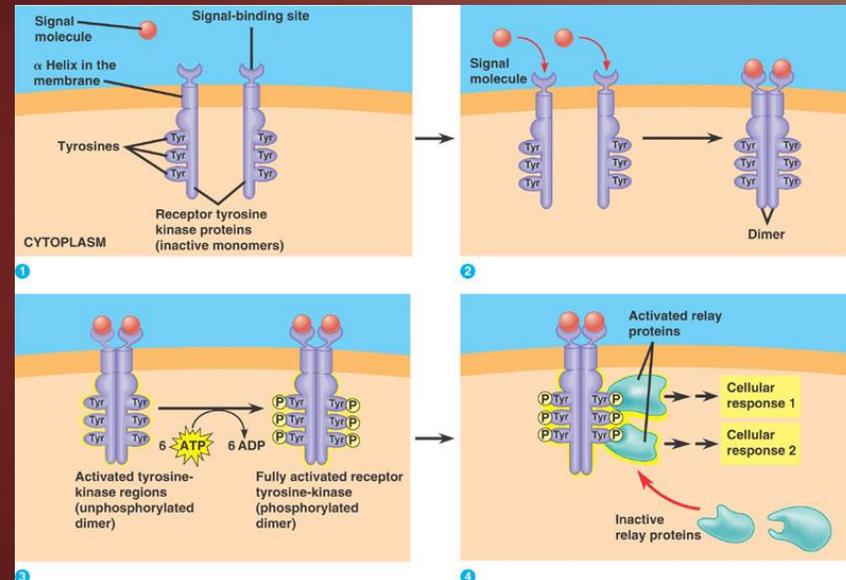
# INTRODUCTION

- Enzyme linked receptors were discovered through the investigation of growth factors.
  - Extracellular signal proteins that regulate cell growth, proliferation, differentiation and survival in animal tissue.
- Once activated, this enzyme acts like an enzyme or forms a complex with another protein that acts as an enzyme.



# INTRODUCTION II

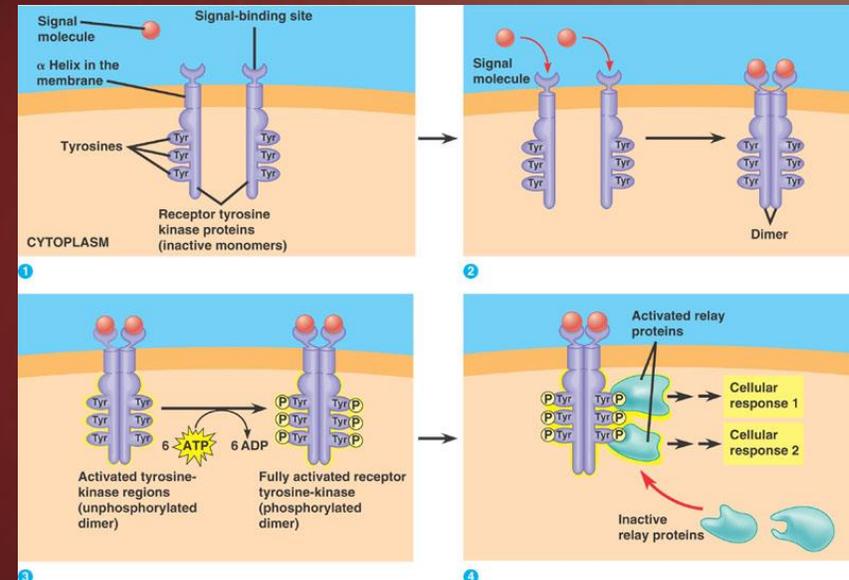
- The largest class of enzyme-linked receptors are receptors called receptor tyrosine kinases.
  - Recall
    - Protein Kinase
      - Enzyme that transfer a phosphate group from ATP to a specific amino acid or target protein.
    - Tyrosine
      - Is the amino acid, on the protein, to which the phosphate will be added.



# INVESTIGATING RECEPTOR TYROSINE KINASES

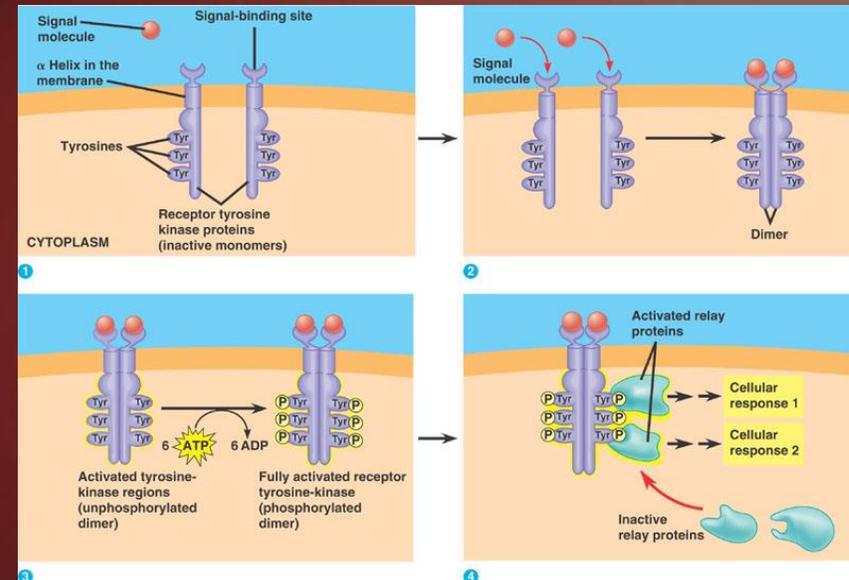
# THE PROCESS I

- Binding of signal molecule causes two receptor molecules to associate into a dimer.
  - Causes the *kinase domains* on each intracellular receptor tail into contact with each other.
  - Kinases become active.



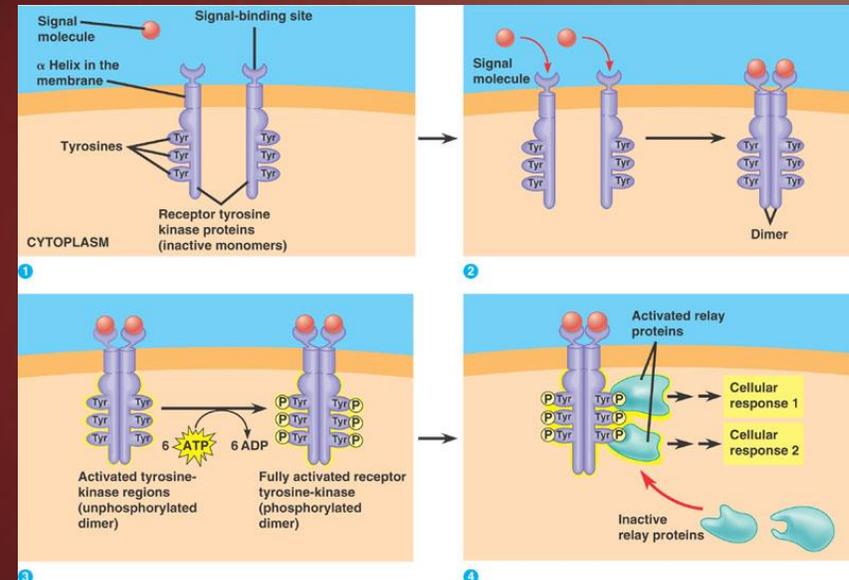
# THE PROCESS II

- *Kinases*, on the two separate tails, phosphorylate each other on several tyrosine side chains.



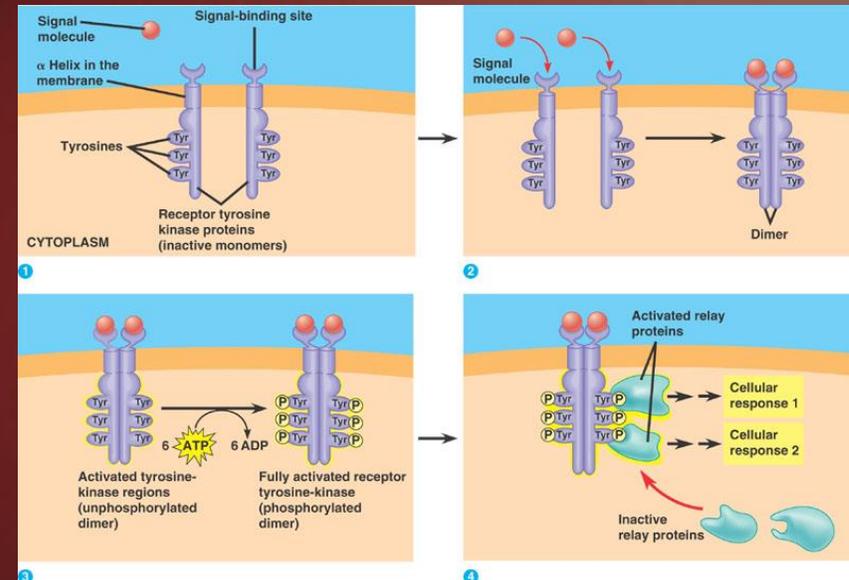
# THE PROCESS III

- Each phosphorylated tyrosine serves as a specific binding site for a different intracellular signaling protein.



# THE PROCESS IV

- Signaling protein, bound and now active, relays a signal into the cell's interior.
  - Including a message for cell proliferation.
    - Gene mutations, that cause this pathway to be consistently turned on, are a causative factor in many types of cancer.
- Activated receptor tyrosine kinases are only turned off when they are brought into the cell and digested by lysosomes.



# HOMEWORK

- What is the relationship between receptor tyrosine kinases, the Ras protein, gene expression, cell proliferation and cell differentiation? Is there a link to cancer?

# INSULIN

- Insulin is a hormone that binds and activates the intrinsic tyrosine kinase activity...allowing for the storage of glucose.