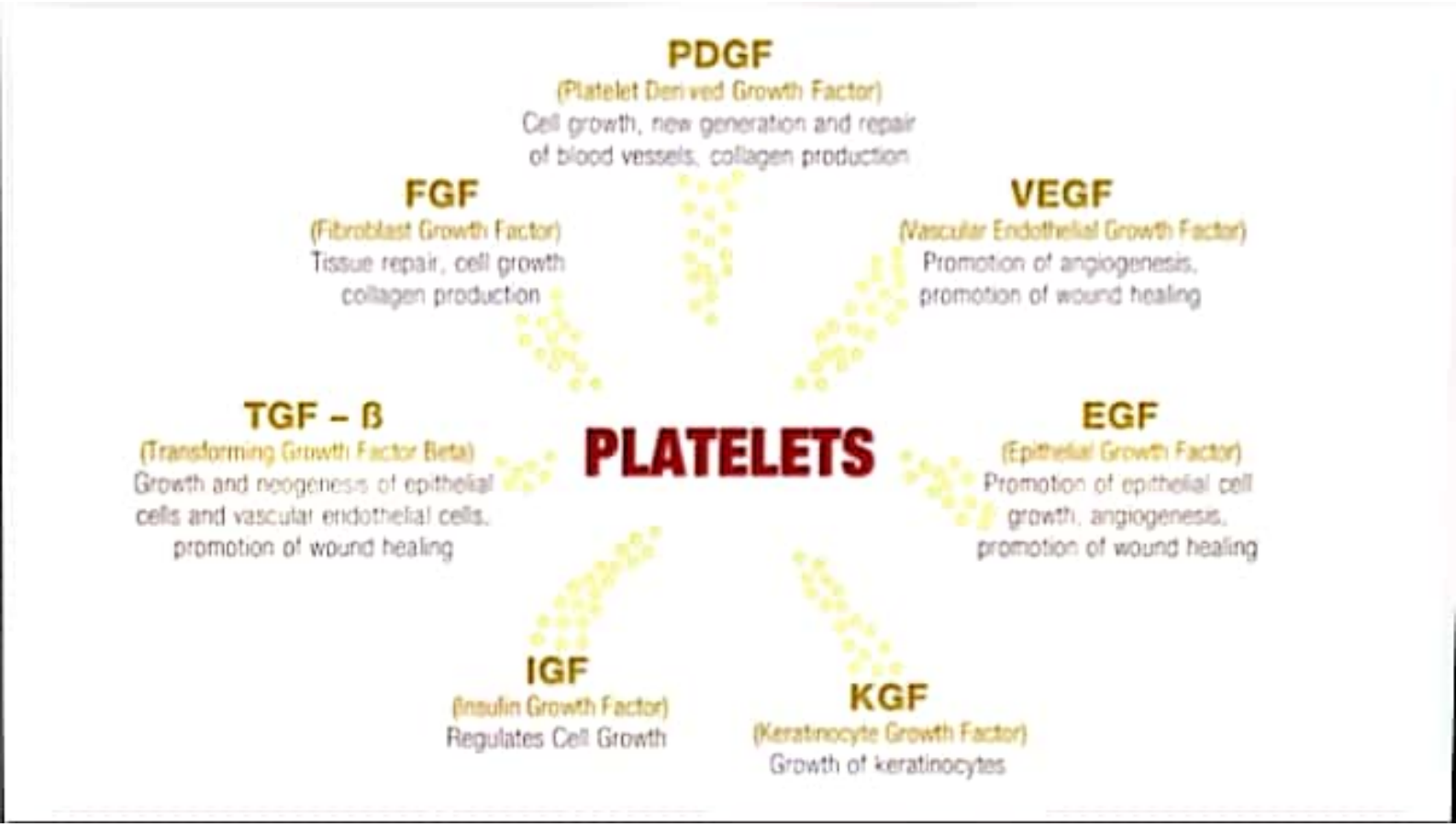
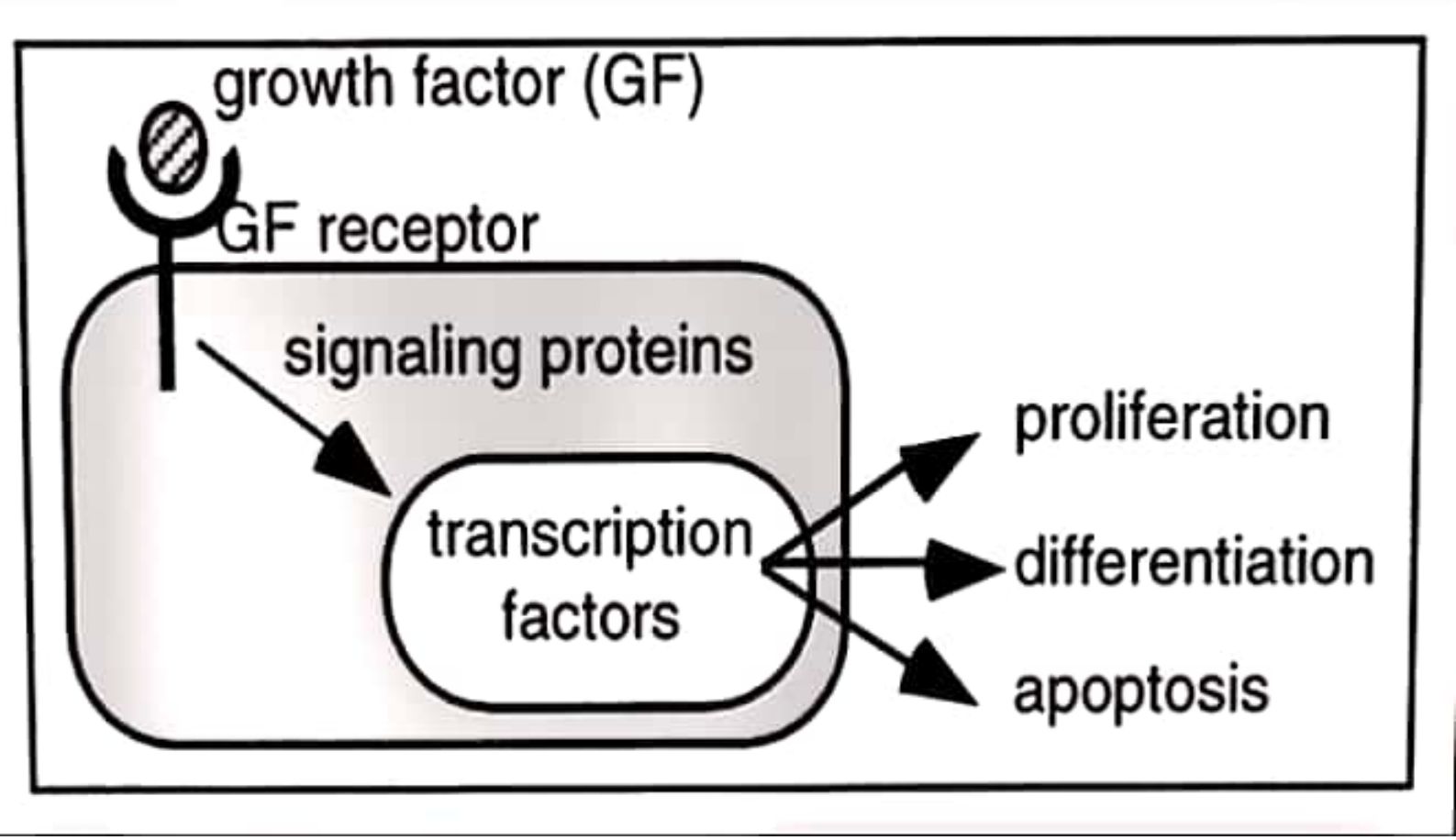


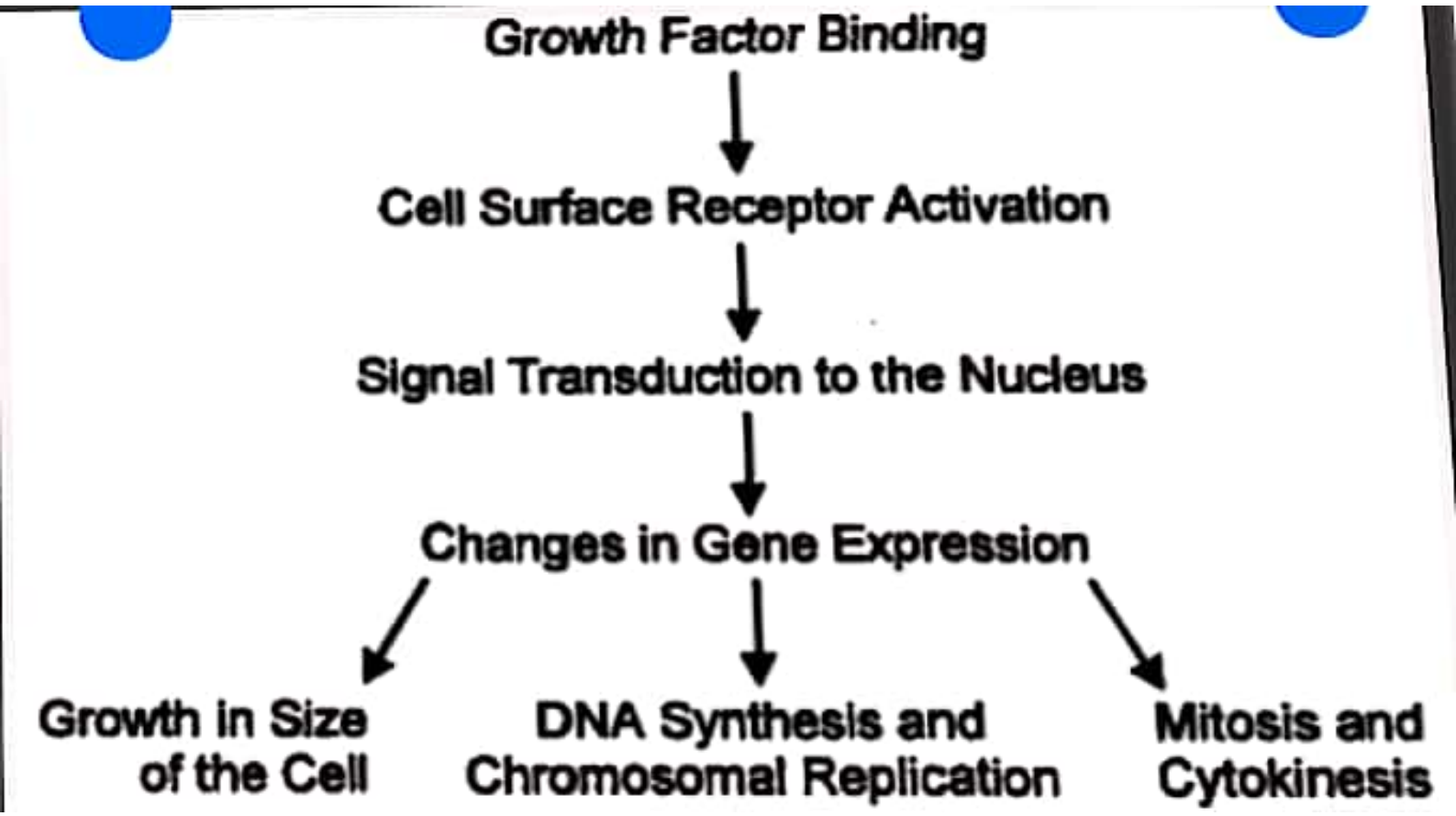
Growth factor families and their receptors

- Each growth factor superfamily has a corresponding family of related receptors.
- There is high specificity with respect to receptor binding between super-families.
- But there are cases in which more than one family member binds to a single receptor and in which a given family member binds to multiple receptors.
- For instance, there are 4 FGF receptors for the 22 members of the FGF superfamily.

- The most important groups of signals that bind to receptor tyrosine kinases are:
- *peptide growth factors* like *nerve growth factor* (NGF) and *epidermal growth factor* (EGF)
- *peptide hormones*, like insulin.

- Binding of signal molecules to the extracellular domains of receptor tyrosine kinase molecules causes two receptor molecules to *dimerize*.
- This brings the cytoplasmic tails of the receptors close to each other and causes the *tyrosine kinase* activity of these tails to be turned on.





Fibroblast Growth Factor (FGF)

FGF

polypeptide growth factors,
a large family with 22 members which share 120 amino acids.

FGF receptor (FGFR)

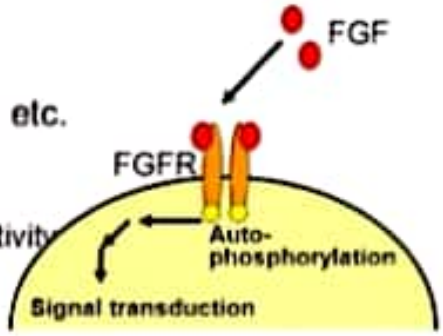
FGF binds one of five subtypes of FGFR,
inducing the tyrosine kinase activity, and transmit the signal by sequential phosphorylation of down-stream kinases.

Function

cell growth, angiogenesis, differentiation, etc.

Association with tumor

FGF3, 4, 5: originally reported by transforming activity
FGF8: prostate and breast cancer



Growth Factors	Source	Target Cells / Effect
Epidermal growth factor (EGF)	Macrophages, platelets, epithelium	Mitogenic for epithelial tissues, fibroblasts, endothelial cells
Fibroblast growth factor (FGF)	Fibroblasts, endothelial cells, bone cells, macrophages	Endothelial cells, fibroblasts
Transforming growth factor (TGF-alpha)	Macrophages, eosinophils, keratinocytes, epithelial cells, platelets	Similar to EGF, but more potent angiogenesis factor
Transforming growth factor (TGF-beta)	Macrophages, lymphocytes, fibroblasts, keratinocytes, platelets, bone	Inhibits replication of most cells in vitro.
Platelet derived growth factor (PDGF)	Endothelial cells, platelets, macrophages, fibroblasts	Mitogenic for vascular smooth muscles, fibroblasts, macrophages
Insulin-like growth factor (IGF-I)	plasma, liver, fibroblasts	Mitogenic for fibroblasts, endothelial cells, fibroblasts, fetal tissues