What is sensed by a cell and what creates the specificity of response to a particular signal?

- It requires a whole network - phosphorylation states activities of several proteins esp. receptors, spatial distribution of Ca^{2+}, kinases, phosphatases and interactions between cross-linking proteins.

* It must be remembered that at one given time, plants receive a mass of external signals that originate from mechanical, temp., minerals, light, gaseous, wound, H_2O, physical & electrical. Internally they are subjected to signals from a stream of growth regulators, peptides, sugars & other metabolites

✡ Plants are capable of responding to all these signals due to the complex signal transduction apparatus.
- Several receptors present in plasma membrane, nucleus, cytoplasm or even cell wall. - TRY TO FIND EXAMPLES
- protein cascades become active - DRAW ONE AT LEAST
- In the process secondary messengers are released
- give examples of sec. messenger

Let us concentrate on Receptors

Receptors for the following have been identified. Pls give names of rece

ethylene, cytokinins
red light, blue light
ABA, auxins, inositol

Pseudoreceptors

Chemicals like azide & cyanide → inhibit oxidative phosphorylation

① SNF-1 kinase is a pseudo receptor

this disturbance in ETC is detected by SNF-1 kinase (expand)

(Cellular AMP/ATP ratio controls SNF-1 kinase)

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(2) In another example of pseudoreceptor.

Organic solvents → Effect (increase) plasmamemb. permeability

↘ increase permeability

(is a pseudoreceptor) affects membrane potential

↓

induces opening of voltage gated Ca^{2+} channels.

↓

signal transduction

Protein Kinases

Discrete signals move from one cell to another thro' the wall activating receptor protein kinases in plasma memb of adjacent cells.

Even protein kinases have been reported to move thro' plasmodesmata.

Protein kinases interact with G-proteins.

For this a ligand binds to a receptor to form a ligand/receptor complex. (protein kinase)

✡ ligand/receptor complex + GTPase (G protein) → activates GTPase

- G proteins are called so because they bind GDP & GTP (guanine nucleotides)
- They possess GTPase activity.
- Play a central role in signal transduction
- Heteromeric with Gα, Gβ & Gγ subunits.
- Gα - binds to GDP or GTP → allows Gα to release GDP & pick up GTP & get detached from the complex.
- G proteins bound to GTP are active, those bound to GDP are not.

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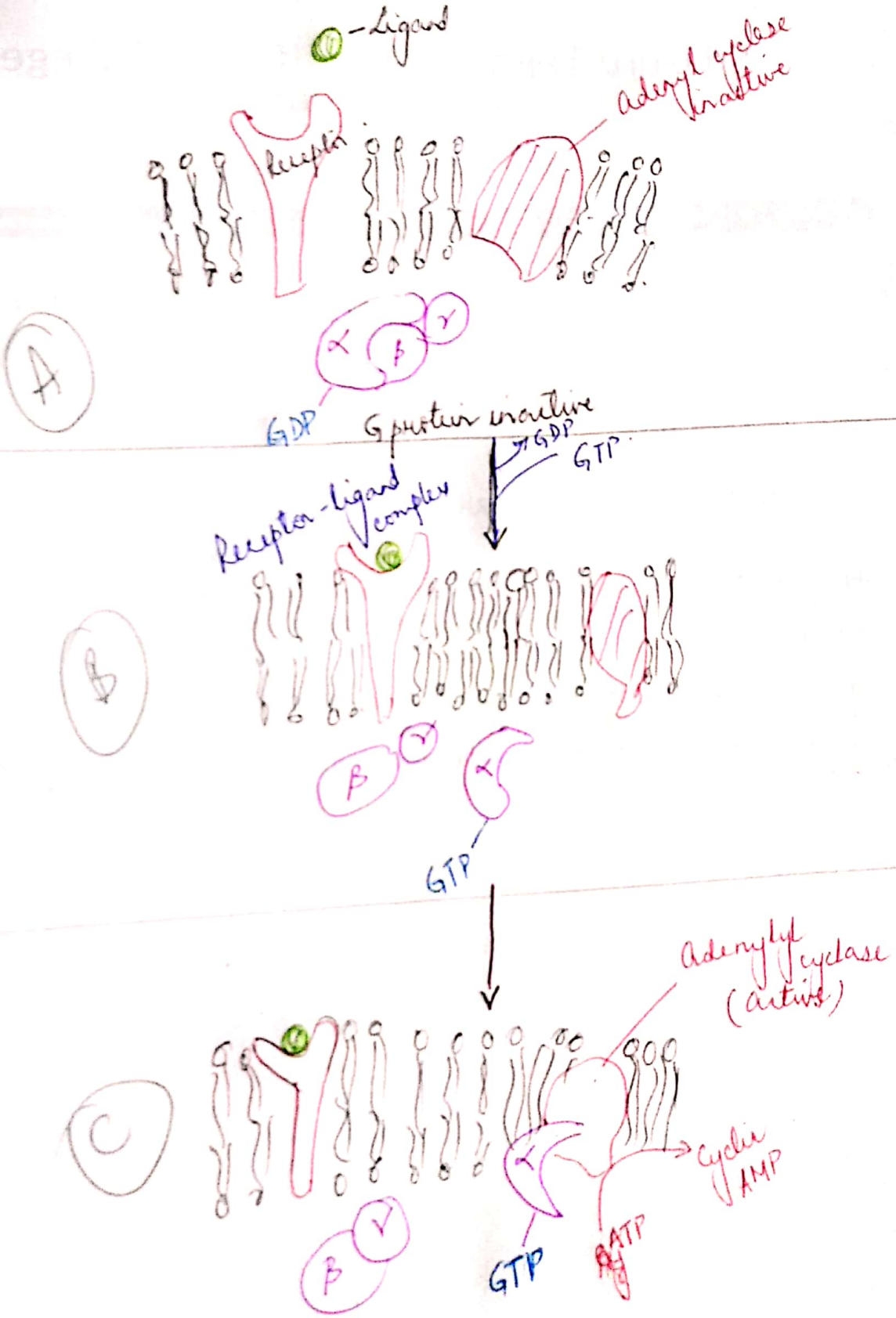

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