

Figure 15-10
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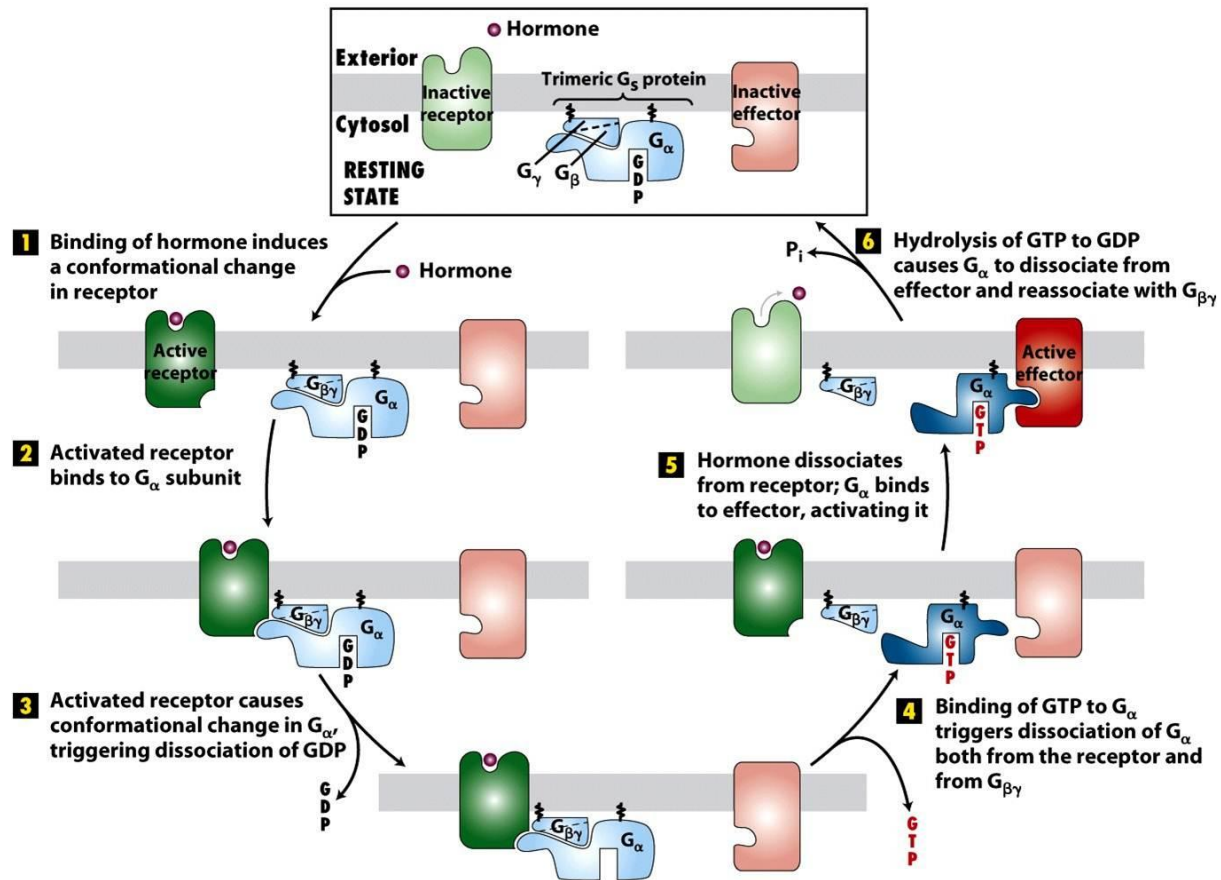


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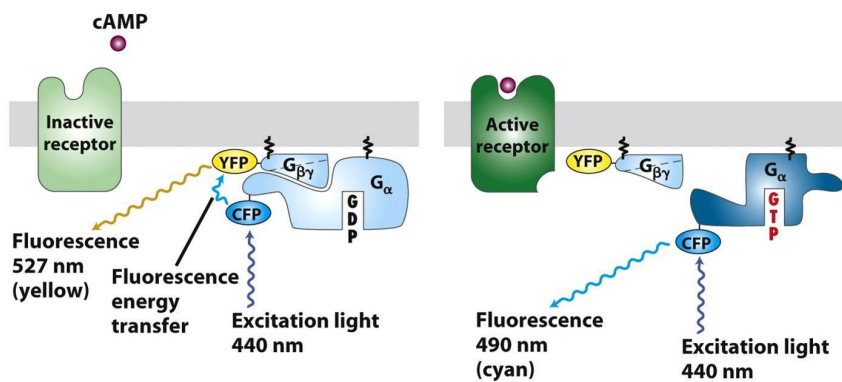


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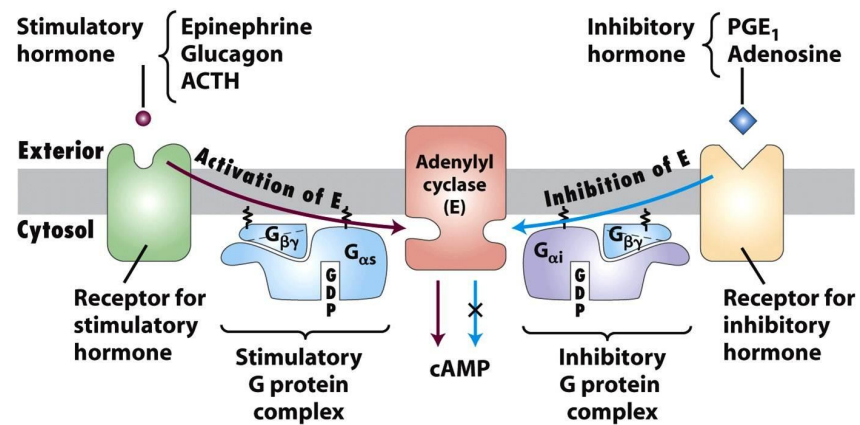


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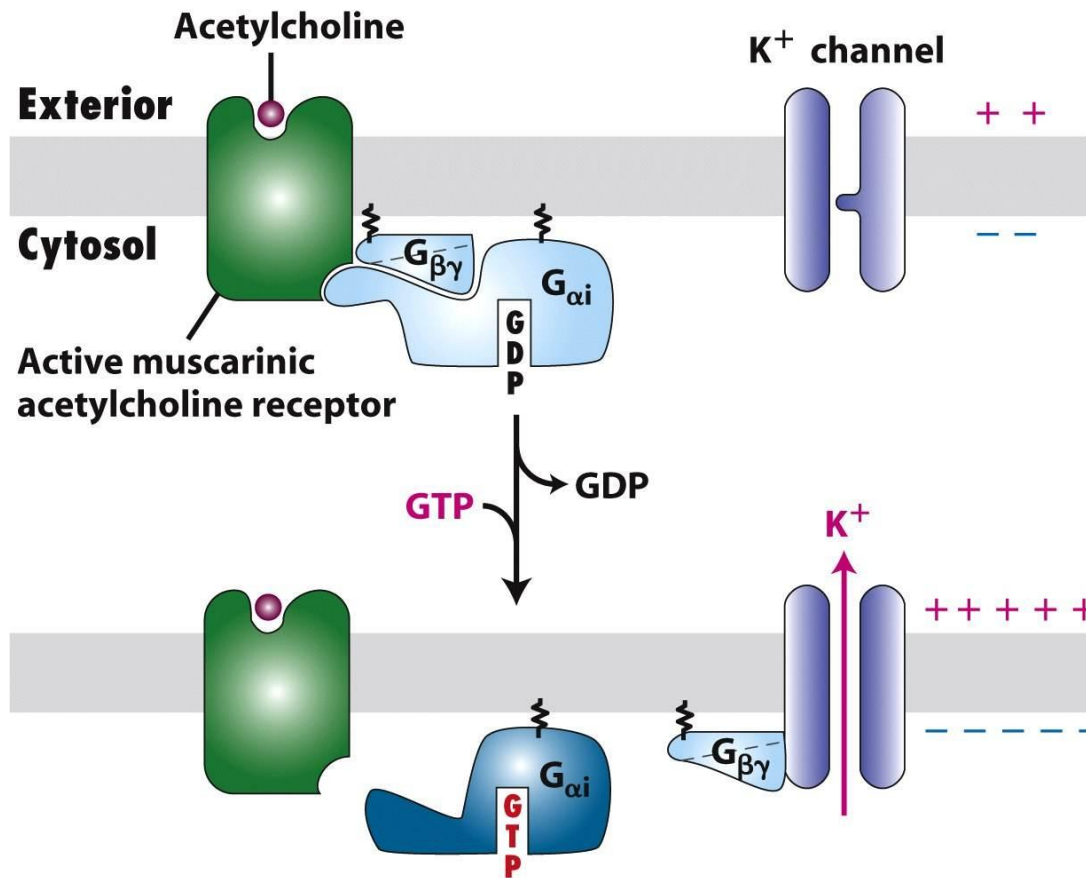


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TABLE 15-1 Major Classes of Mammalian Trimeric G Proteins and Their Effectors*

| G_α CLASS | ASSOCIATED EFFECTOR | 2ND MESSENGER | RECEPTOR EXAMPLES |
|----------------------------|---|--|--|
| G_{αs} | Adenylyl cyclase | cAMP (increased) | β-Adrenergic (epinephrine) receptor; receptors for glucagon, serotonin, vasopressin |
| G_{αi} | Adenylyl cyclase K⁺ channel (G_{βγ} activates effector) | cAMP (decreased) Change in membrane potential | α₂-Adrenergic receptor Muscarinic acetylcholine receptor |
| G_{αolf} | Adenylyl cyclase | cAMP (increased) | Odorant receptors in nose |
| G_{αq} | Phospholipase C | IP₃, DAG (increased) | α₁-Adrenergic receptor |
| G_{αo} | Phospholipase C | IP₃, DAG (increased) | Acetylcholine receptor in endothelial cells |
| G_{αt} | cGMP phosphodiesterase | cGMP (decreased) | Rhodopsin (light receptor) in rod cells |

*A given G_α subclass may be associated with more than one effector protein. To date, only one major G_{αs} has been identified, but multiple G_{αq} and G_{αi} proteins have been described. Effector proteins commonly are regulated by G_α but in some cases by G_{βγ} or the combined action of G_α and G_{βγ}.

IP₃ = inositol 1,4,5-trisphosphate; DAG = 1,2-diacylglycerol.

SOURCES: See L. Birnbaumer, 1992, *Cell* **71**:1069; Z. Farfel et al., 1999, *New Eng. J. Med.* **340**:1012; and K. Pierce et al., 2002, *Nature Rev. Mol. Cell Biol.* **3**:639.

Table 15-1

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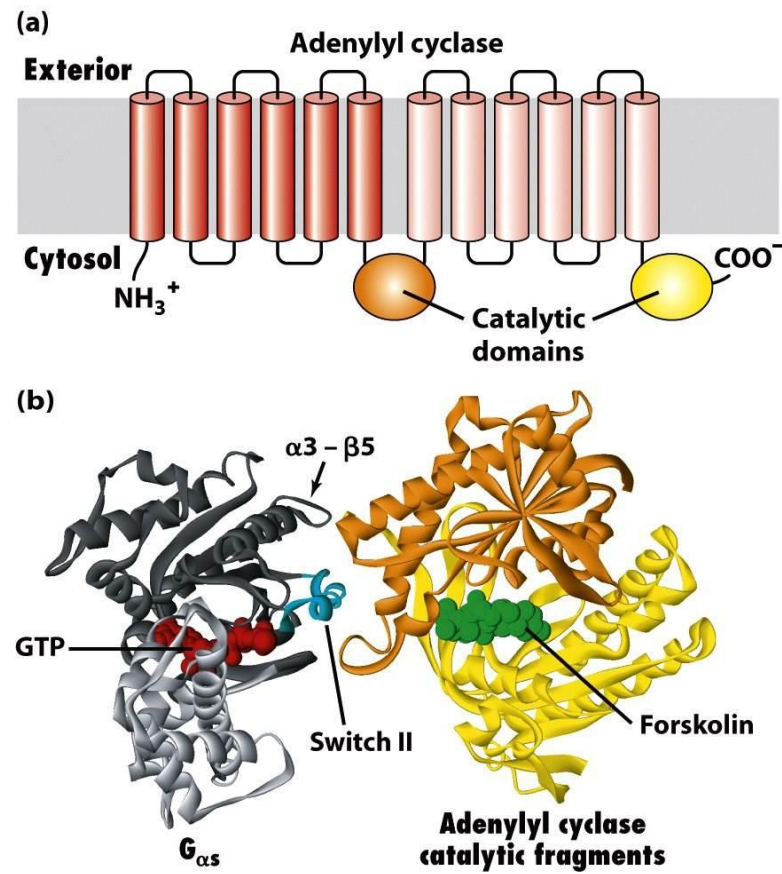


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TABLE 15-2 Cellular Responses to Hormone-Induced Rise in cAMP in Various Tissues*

| TISSUE | HORMONE INDUCING RISE IN cAMP | CELLULAR RESPONSE |
|-------------------------|--|--|
| Adipose | Epinephrine; ACTH; glucagon | Increase in hydrolysis of triglyceride; decrease in amino acid uptake |
| Liver | Epinephrine; norepinephrine; glucagon | Increase in conversion of glycogen to glucose; inhibition of glycogen synthesis; increase in amino acid uptake; increase in gluconeogenesis (synthesis of glucose from amino acids) |
| Ovarian follicle | FSH; LH | Increase in synthesis of estrogen, progesterone |
| Adrenal cortex | ACTH | Increase in synthesis of aldosterone, cortisol |
| Cardiac muscle | Epinephrine | Increase in contraction rate |
| Thyroid gland | TSH | Secretion of thyroxine |
| Bone | Parathyroid hormone | Increase in resorption of calcium from bone |
| Skeletal muscle | Epinephrine | Conversion of glycogen to glucose |
| Intestine | Epinephrine | Fluid secretion |
| Kidney | Vasopressin | Resorption of water |
| Blood platelets | Prostaglandin I | Inhibition of aggregation and secretion |

*Nearly all the effects of cAMP are mediated through protein kinase A (PKA), which is activated by binding of cAMP.

SOURCE: E. W. Sutherland, 1972, *Science* 177:401.

Table 15-2

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Протеинкиназа А

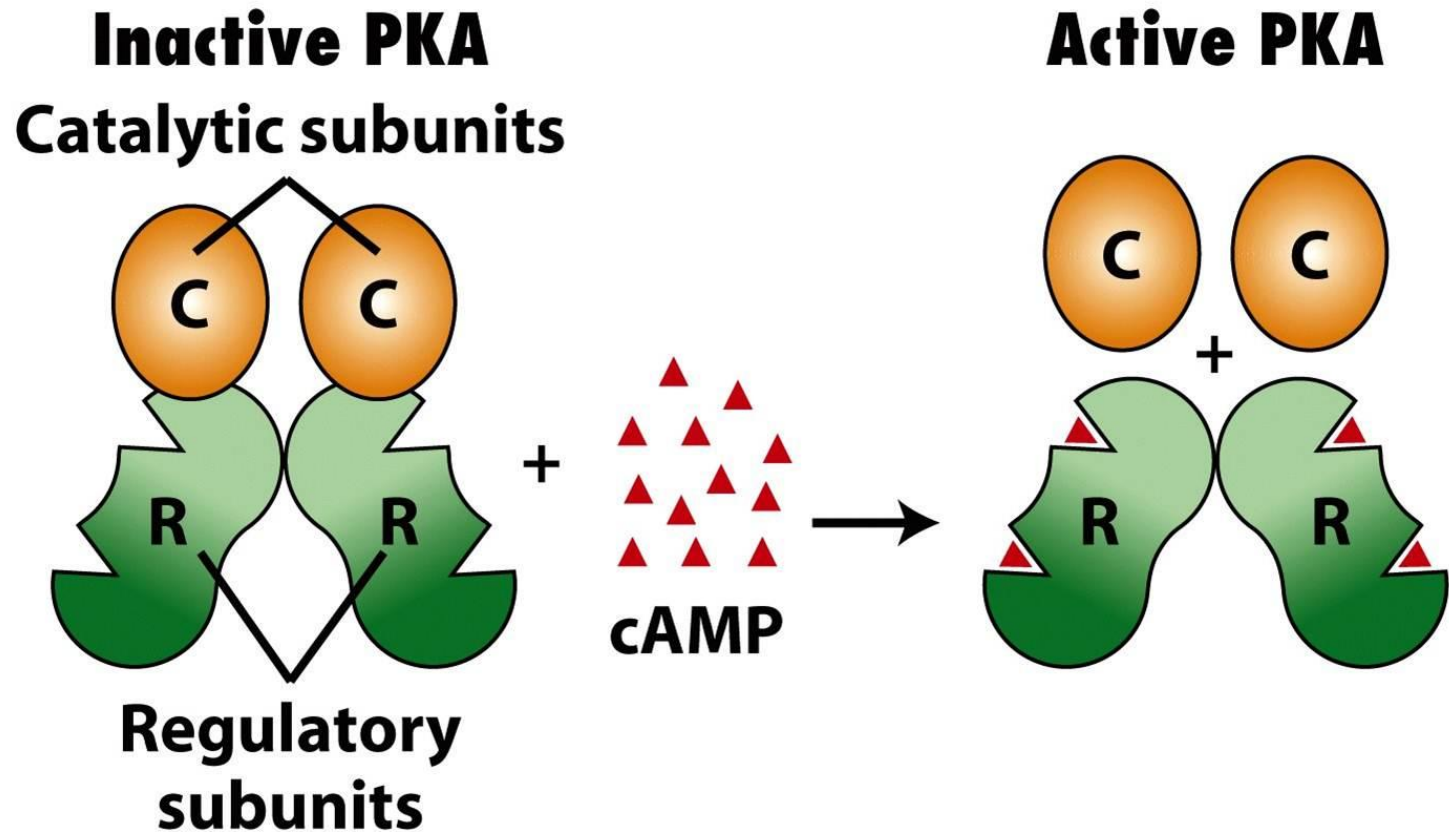
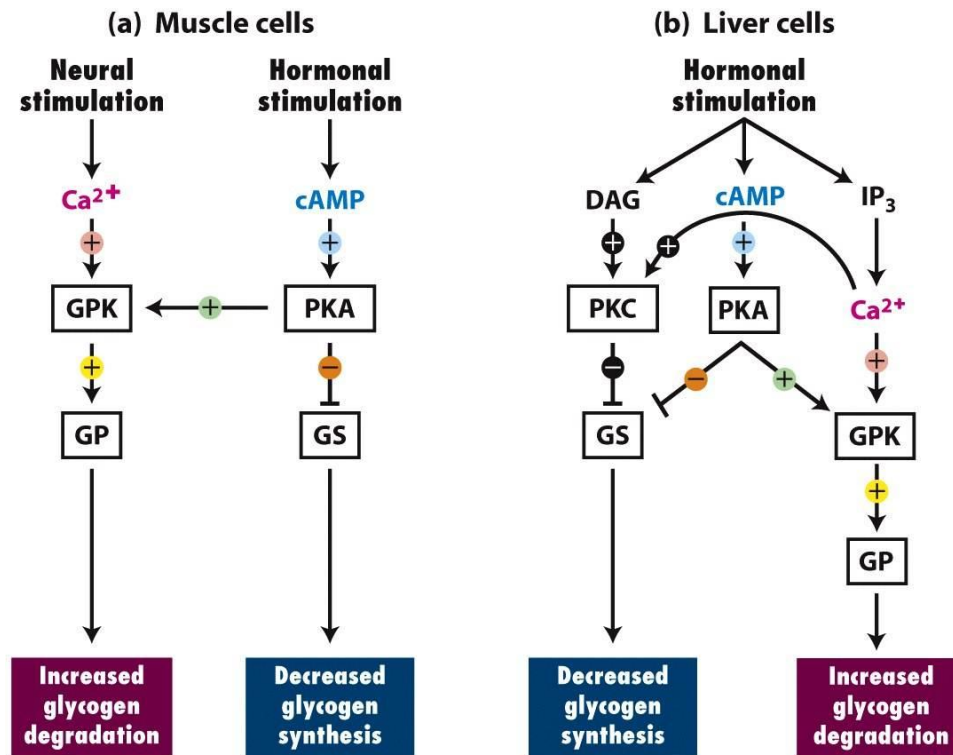


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Abbreviations:

PKA Protein kinase A

GPK Glycogen phosphorylase kinase

GP Glycogen phosphorylase

GS Glycogen synthase

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Протеинкиназа С

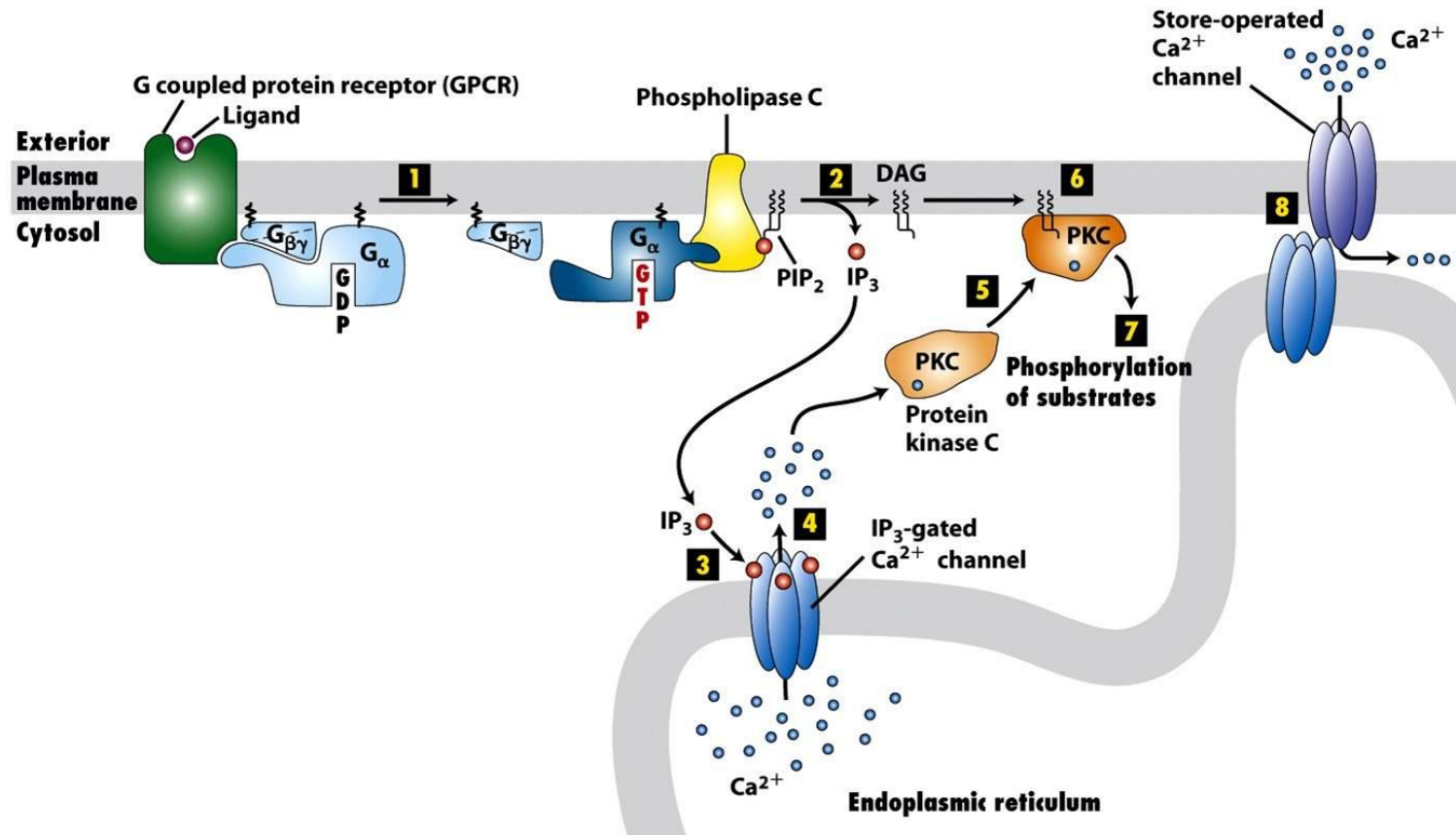


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2 ответа: эндотелий сосудов и гладкие мышцы

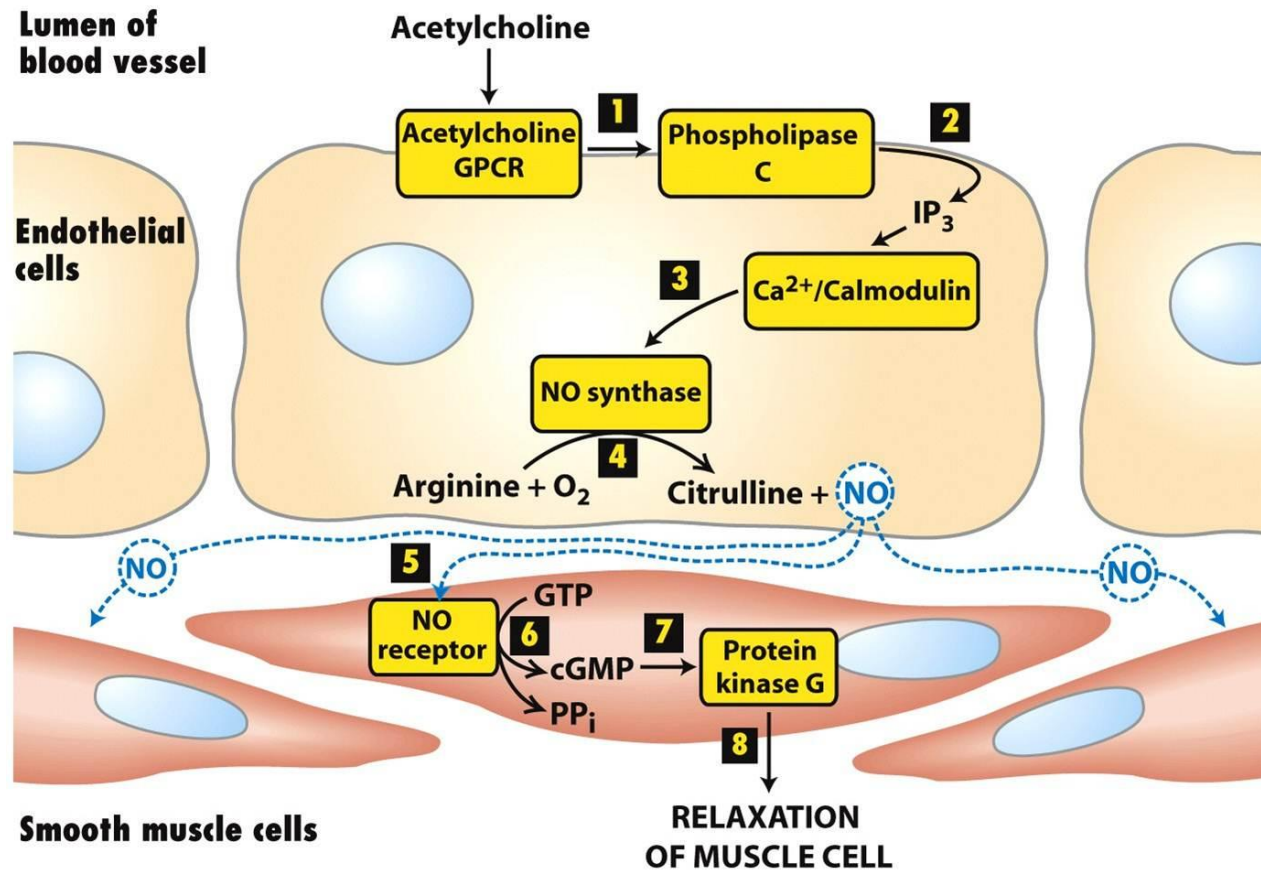


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TABLE 15-3 Cellular Responses to Hormone-Induced Rise in Cytosolic Ca^{2+} in Various Tissues*

| TISSUE | HORMONE INDUCING RISE IN Ca^{2+} | CELLULAR RESPONSE |
|-----------------------------------|--|---|
| Pancreas (acinar cells) | Acetylcholine | Secretion of digestive enzymes, such as amylase and trypsinogen |
| Parotid (salivary) gland | Acetylcholine | Secretion of amylase |
| Vascular or stomach smooth muscle | Acetylcholine | Contraction |
| Liver | Vasopressin | Conversion of glycogen to glucose |
| Blood platelets | Thrombin | Aggregation, shape change, secretion of hormones |
| Mast cells | Antigen | Histamine secretion |
| Fibroblasts | Peptide growth factors (e.g., bombesin and PDGF) | DNA synthesis, cell division |

*Hormone stimulation leads to production of inositol 1,4,5-trisphosphate (IP_3), a second messenger that promotes release of Ca^{2+} stored in the endoplasmic reticulum.

SOURCE: M. J. Berridge, 1987, *Ann. Rev. Biochem.* **56**:159; M. J. Berridge and R. F. Irvine, 1984, *Nature* **312**:315.

Table 15-3

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