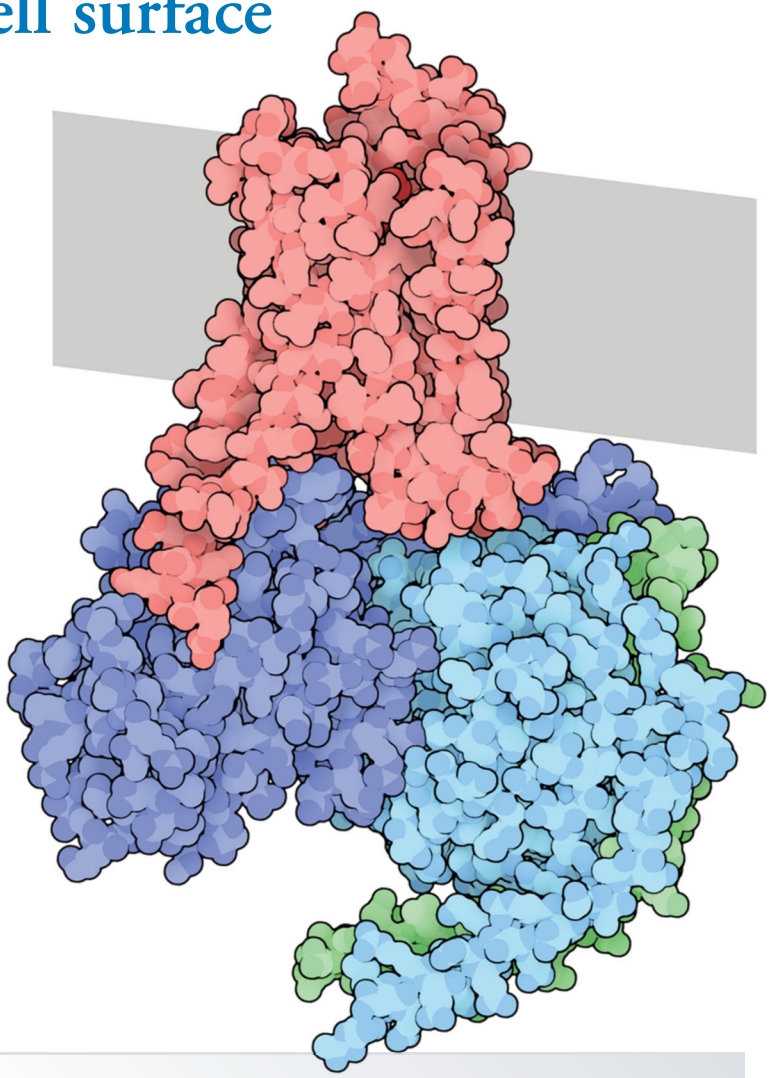
GPCRs
G-Protein-Coupled Receptors
Signaling across the cell surface

There are thousands of G-protein-coupled receptors on our cell surfaces, each waiting for its own particular messenger molecule. When the messenger is sensed, the G-protein associated with the GPCR initiates a chain reaction that amplifies the signal and yields an immediate cellular response. Our sense of sight relies on GPCRs that are sensitive to light, and our sense of smell is controlled by a thousand different forms of GPCR, each recognizing a different odorant molecule. Others are used in the nervous system to transmit nerve signals. Many widely-used drugs, such as Prozac, Claritin, and Zoloft, act by binding to proteins involved in GPCR signaling.



Related Resources:

Molecule of the Month: Adrenergic Receptors
www.rcsb.org/pdb/101/motm.do?momID=100

Molecule of the Month: G Proteins
www.pdb.org/pdb/101/motm.do?momID=58

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The **2012 Nobel Prize in Chemistry** was awarded jointly to **Robert J. Lefkowitz** and **Brian K. Kobilka** *for studies of G-protein-coupled receptors*.

The PDB holds many GPCRs, such as Kobilka's groundbreaking structure of the β2 adrenergic receptor-Gs protein complex shown here.

PDB ID 3SN6: S.G. Rasmussen, B.T. DeVree, Y. Zou, A.C. Kruse, K.Y. Chung, T.S. Kobilka, F.S. Thian, P.S. Chae, E. Pardon, D. Calinski, J.M. Mathiesen, S.T. Shah, J.A. Lyons, M. Caffrey, S.H. Gellman, J. Steyaert, G. Skiniotis, W.I. Weis, R.K. Sunahara, B.K Kobilka (2011) Crystal structure of the β2 adrenergic receptor-Gs protein complex *Nature* 477:549-555.

The GPCR is in red, and the trimeric G-protein in blue, cyan, and green. The PDB structure also includes an antibody and lysozyme (not shown), extra proteins that were added to aid the crystallization of the notoriously difficult GPCR complex.

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