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Selected Transmembrane Receptors – Structures, Interactions and Binding Site Analysis.

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G-protein couples receptors (GPCRs), sharing consitution of seven transmembrane helices piercing cell membrane, are largely expressed in mammalian organisms. They are involved in a wide variety of physiological processes, such as autonomic nervous system transmission, immunological response, behaviour and mood regulation.
A number of receptors belonging to GPCR family is present in neural tissue and is considered to be involved in learning and memorizing processes. They can be modulated by exogenous compounds, what makes them a common target in drug research. Acquiring information about protein's structure is a basic step to discover interactions involved in ligand binding, which is crucial in design of potential therapeutic compounds. Since structures of proteins with transmembrane domains cannot be easily determined, it is almost impossible to construct their 3D conformation using physical methods. This is why homology modelling is extremely helpful in determining structures of such proteins. Moreover, application of Structural Interaction Fingerprints (SIFts) and averaged SIFt profiles, enables fast and convenient binding site analysis. Such approach allows to determine residues involved in ligand-protein interaction, reveal its type giving insight into binding site proterties.

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