Interprotein interactions are responsible for the confined diffusion of a G protein coupled receptor at the cell surface.

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The monitoring of the movements of membrane proteins (or lipids) by single particle tracking enables to get reliable insights into the complex dynamic organisation of the plasma membrane constituents. We investigated by this technique the diffusional behavior of a G protein coupled receptor. The trajectories of the receptors revealed a diffusion mode combining a short term confined diffusion with a long term random walk. A detailed statistical analysis shows that the receptors have a diffusion confined to a domain which itself diffuses, the confinement being due to long-range attractive interprotein interactions. The existing models of the dynamic organisation of the cell membrane cannot explain our results. We propose a theoretical Brownian model of interacting proteins that is consistent with the experimental observations and accounts for the variations found with the domain size of the short term and long term diffusion coefficients.