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(54) Title: CHIMERIC OPSIN GPCR PROTEINS

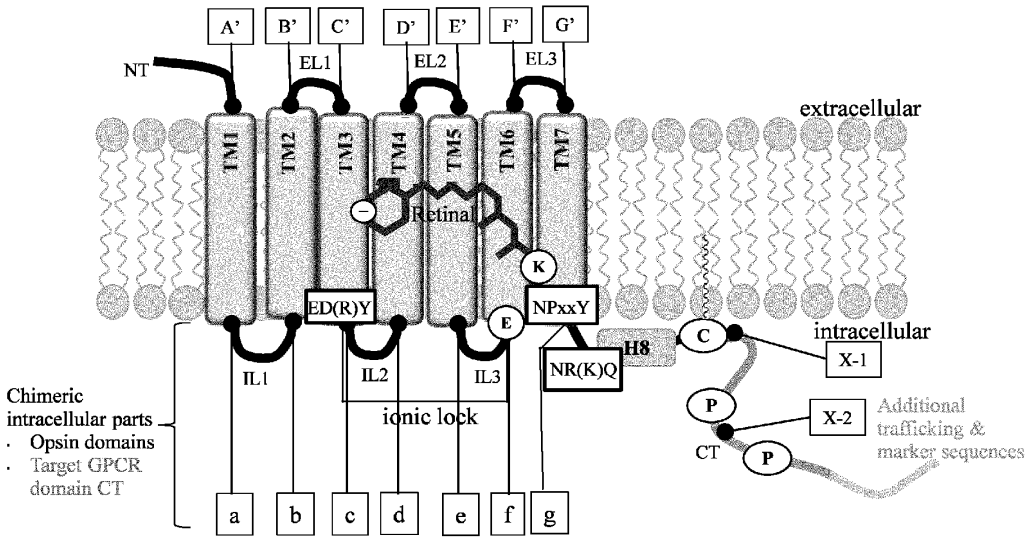


Figure 2

(57) **Abstract:** A chimeric opsin GPCR protein comprising a light- sensitive upstream opsin portion and a target GPCR portion comprising a chimeric CT is provided that expresses strongly and is targeted into the correct subcellular compartment of target cells. The chimeric opsin GPCR protein activates efficiently the native G- protein specific to the target GPCR pathway eliciting a physiological response comparable to the native target GPCR. Nucleic acid molecules encoding the chimeric opsin GPCR protein as well as a capsids, vectors, cells and carriers comprising or expressing the chimeric opsin GPCR protein are also provided. Furthermore, a method of genetically engineering a chimeric opsin GPCR protein and medical applications of the chimeric opsin GPCR protein are provided.

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