CHARACTERIZATION OF PHOTOSWITCHABLE SODIUM CHANNEL INHIBITORS BY PLANAR PATCH CLAMP

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Photopharmacology is an emerging technique for applications in biophysics and medicine without the need of genetic manipulations. The energy of light is used to change the shape and pharmacological properties of molecules, resulting in different biological activities. By introducing a photoswitch, the molecule has two different states between which it can be switched with light. Since both states have a different structure, the activity of the molecule on the target can be changed with a light pulse.

Here we show the high-throughput characterization of different classes of sodium channel inhibitors and their photoregulation. For the characterization a planar patch clamp system (SyncroPatch 384PE) with 96 built in diodes was used to illuminate the 384 patched cells. In this configuration several concentrations of compounds and ion channels could be monitored at the same time. The light was applied to all cells simultaneously. We describe a new class of photoswitchable sodium channel inhibitors. These molecules may serve as useful tools in neurobiology and could have therapeutic value as well.