Life science

ARTIFICIAL RETINA; Challenge for the Blindness

Title of Inventions

- AGENT FOR INDUCING RECEPTOR POTENTIAL
- METHOD FOR PRODUCING ARTIFICIAL RETINA
- QUALITY CONTROL METHOD FOR ARTIFICIAL RETINAE
- APOPTOSIS INHIBITOR

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Abstract

Eye doctor Dr. Toshihiko Matsuo and polymer science engineer Dr. Tetsuya Uchida have been developing a new type of retinal prosthesis that is based on a photoelectric dye. The photoelectric dye is an organic molecule that absorbs light and converts light energy into electric potentials. The dye molecules are coupled to the surface of a film made of polyethylene. The polyethylene film (or polymer) is a biologically safe and stable material which is used, for example, as a component of artificial joints. The photoelectric dye-coupled polyethylene film, called Okayama University-type retinal prosthesis or OUReP ®, can be implanted beneath the retina as a substitute for photoreceptor cells.

Figure 1. OUReP ®

Invention

OUReP ® does not require a camera or data processing system, or wiring to the retina. A single sheet of OUReP ® would be implanted into the subretinal space by currently-used standard vitreous surgery, just as to treat retinal detachment. A large size of the thin film, up to 10 mm in diameter, could be implanted in the eye, which would provide a wide visual field. Dye molecules in high density on the polyethylene surface work as both an image (light)-receiver and a neuron-stimulator, leading to high resolution of images.

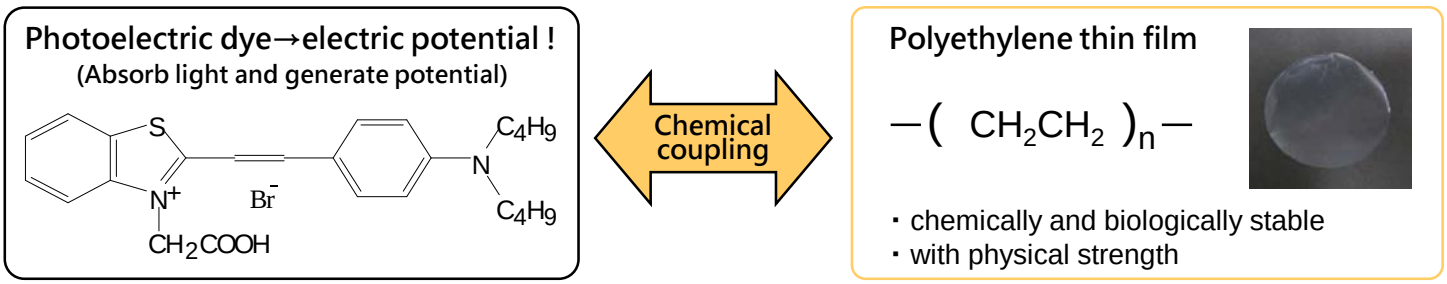


Figure 2. World- First "dye-coupled thin film retinal prosthesis

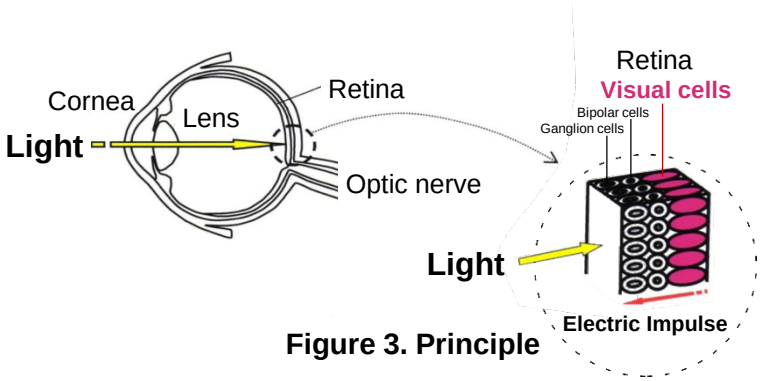
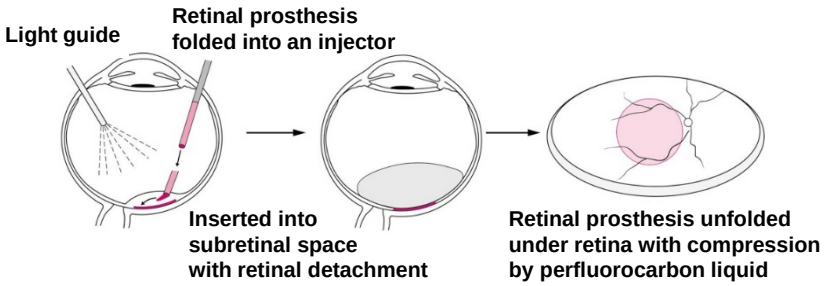
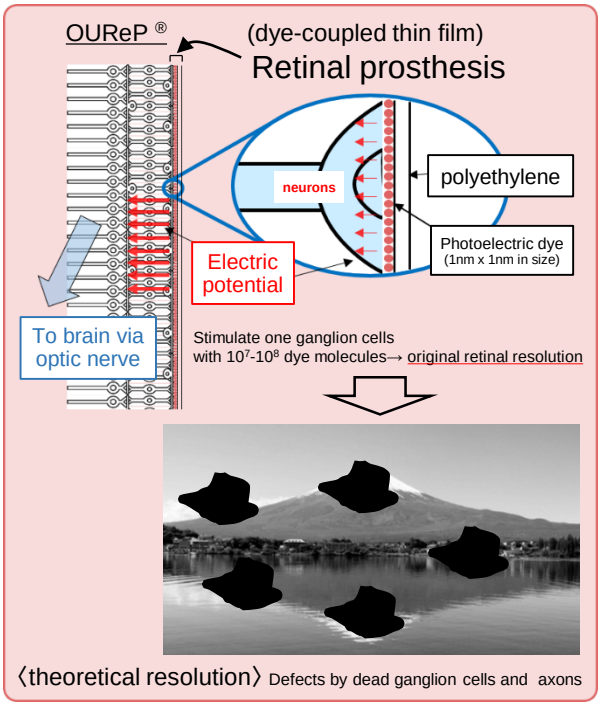


Figure 3. Principle





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