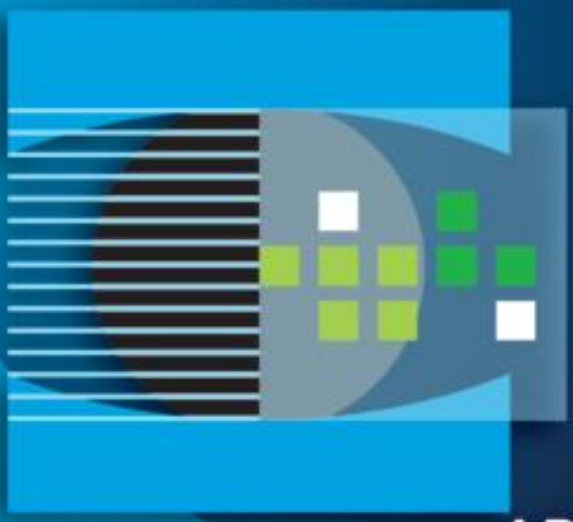
PROGRAM SUMMARY

ARVO 2008 ANNUAL MEETING ■ PROGRAM SUMMARY



# ARVO 2008 ANNUAL MEETING

# Eyes on innovation

■ APRIL 27–MAY 1, 2008

GREATER FORT LAUDERDALE/
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CONVENTION CENTER

FORT LAUDERDALE, FLORIDA

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| **Program#/Poster#:** | 1774/A584 |
| **Abstract Title:** | **Electrically Evoked Cortical Potentials (EECP) in Rabbits Using Implantable Retinal Stimulation System** |
| **Presentation Start/End Time:** | Monday, Apr 28, 2008, 11:15 AM - 1:00 PM |
| **Location:** | Hall B/C |
| **Reviewing Code:** | 338 retinal prostheses - RE |
| **Author Block:** | *J. Zhou[1,2], S.-J. Woo[3,2], K.-S. Min[1,2], H. Chung[3,2], S.-J. Kim[1,2].* [1]School of Electrical Engineering and Computer Science, Seoul National University, Seoul, Republic of Korea; [2]Nano Bioelectronics & Systems Research Center, Nano Artificial Vision Research Center, Seoul, Republic of Korea; [3]Department of Ophthalmology, Seoul National University College of Medicine, Seoul, Republic of Korea. |
| **Keywords:** | 685 retina, 508 electrophysiology: non-clinical, 685 retina |

**Purpose:** To remove external components from animals during long-term electrical stimulation experiments, implantable animal electrical retinal stimulator system was proposed. To evaluate the feasibility of the stimulator, electrically evoked cortical potentials were measured and analyzed in rabbits.

**Methods:** The implantable retinal prosthesis system for a chronic animal experiment consisted of an internal unit for retinal stimulation and an external unit for stimulation control and battery recharge. Rechargeable internal battery and parameter memory component were introduced to the implanted retinal stimulator. Paired RF coils link these two units for data and power transmission. Polyimide-based seven-channel, strip-shaped gold electrode array was used as stimulating electrode. 4 mm x 4 mm sized stimulation part contains seven- segment configuration electrodes and another round electrode 1500 um in diameter was used as the reference one. The stimulation electrode array was implanted in the suprachoroidal space and the reference electrode was placed on the scleral surface of the opposite direction from the stimulation electrode. Evoked cortical potentials were recorded under visual or electrical stimulation of the retina, with titanium screw implanted in the skull over the visual cortex, and repetitive, cathodic-first biphasic stimuli were used as electrical stimulation.

**Results:** The EECP were well recorded upon electrical stimulation with the implanted electrode array. EECP resembled visual evoked potential and showed dosimetric increment in the amplitude according to the increment of the stimulating current. The EECP disappeared after the optic nerves were severed, which showed the waveform recorded with the implanted titanium screw was not a noise generated by the electrical stimulation itself.

**Conclusions:** The feasibility of implantable electrical retinal stimulator has been demonstrated. This stimulation system without attached external components during stimulation cycle might be used for the long-term animal experiments.

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