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[Close Window](#)**Program#/Poster#:** 659/B283**Abstract Title:** **Psychometric Analysis of Visual Sensations Mediated by Subretinal Microelectrode Arrays Implanted Into Blind Retinitis Pigmentosa Patients****Presentation Start/End Time:** Sunday, May 06, 2007, 2:30 PM - 4:15 PM**Location:** Hall B/C**Reviewing Code:** 312 retinalprotheses - RE**Author Block:** *E.Zrenner¹, R.Wilke¹, T.Zabel¹, H.Sachs², K.Bartz-Schmidt¹, F.Gekeler¹, B.Wilhelm³, U.Greppmaier⁴, A.Stett⁵, SUBRET Study Group.* ¹University Eye Hospital, Tuebingen, Germany; ²University Eye Hospital, Regensburg, Germany; ³STC Autonomous Nervous System and Safety Studies, Ofterdingen, Germany; ⁴Retina Implant GmbH, Reutlingen, Germany; ⁵NMI, Reutlingen, Germany.**Keywords:** 678 retina,632 perception,436 brightness and lightness**Purpose:** Assessment of perceptions mediated by subretinal implants, consisting of a chip (3x3x0.1mm, 1500 microphotodiodes, amplifiers and electrodes of 50x50µm, spaced 70µm) and a 4x4 array of identical electrodes, spaced 280µm, for direct stimulation (DS), chronically implanted next to the foveal rim in 6 patients.**Methods:** Chip and DS array are positioned on a small subretinal polyimide foil powered via a subretinal transchoroidal, retroauricular transdermal line. Visual perception of brightness elicited by applying biphasic voltage impulses from 1 to 2,5V (t = 3 ms) was assessed using a scale from 5 (very strong) to 0 (none); additionally double impulses with differences up to 0.8V between two stimuli (10 s interval) were applied.**Results:** Electrical stimulation of rows, columns and blocks of 4 electrodes allowed some patients to clearly distinguish horizontal from vertical lines and positions, respectively. Under optimal conditions, dot alignment and direction of dot movement was properly recognized, if three neighbouring electrodes were switched on simultaneously or sequentially at 1 s intervals. Brightness perception of spots varied from scale 0 to 5 in a linear manner if voltages between 1.5 and 2.5 were applied (randomly 6 times) to a square of 4 electrodes. This corresponds to a charge increase of approximately 0.23 mC/cm² for each of the 5 steps. A difference in brightness between two consecutive pulses was discerned, if a difference in charge of at least 16 µC/cm² was applied. If equal charges were applied to both conditions, the second flash always was perceived slightly dimmer irrespective of the stimulation level. Subjective brightness amplification phenomena were observed at medium stimulation levels and at certain frequencies. The subjective size of spot perception upon stimulation of a square of 4 electrodes increased from 1 to 5 mm at arm's length, if the voltage was increased from 1,5 to 2,5 V. In SLO microperimetry of the chip, single light spots down to 100 to 400 µm in diameter were detected, allowing the patient to localize a white plate on a black table cloth correctly.**Conclusions:** Subretinal electrical multielectrode stimulation can provide a useful range of localized brightness perceptions in blind patients within a limited range of temporal, spatial and electrical parameters.**Commercial Relationship:** **E. Zrenner**, C,P,I, F; **R. Wilke**, R, C; **T. Zabel**, E, E; **H. Sachs**, C, F; **K. Bartz-Schmidt**, F, C; **F. Gekeler**, F, C; **B. Wilhelm**, C, R; **U. Greppmaier**, E, E; **A. Stett**, F,P, C.**Support:** BMBF01KP0401 of the Federal Ministry of Education and Research and Retina Implant AG**Clinical Trial:** RP TUE

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