Contribution from M and P pathways to the contrast sensitivity of pattern transient VEP components

Silveira, LCL[1,2], Souza, GS[1], Gomes, BD[1], Lacerda, EMCB[1], Saito, CA[1], and da Silva Filho, M[1]

[1] Department of Physiology, Biological Sciences Institute, Federal University of Pará, 66075-110 Belém, Pará, Brazil
[2] Tropical Medicine Institute, Federal University of Pará, 66055-240 Belém, Pará, Brazil

Contrast sensitivity of visual evoked potential (VEP) components was estimated using 2 cycles/degree sinewave gratings presented either as 1 Hz pattern reversal or 300 ms onset / 700 ms offset. Twelve young healthy subjects were studied. All subjects had visual acuity normal or corrected to 20/20 and were monocularly tested through the eye with the lowest dioptric error. Eight subjects participated in the two stimulation protocols. All experiments were performed according to the tenets of the Declaration of Helsinki and the Brazilian Norms for Ethics in Research (Resolution 196/96, Health National Council of Brazil). We studied the P100 and N135 components of pattern reversal VEP as well as the C1 and C2 components of the onset / offset VEP. Double slope straight lines were fitted to data representing P100 amplitudes as a function of log stimulus contrast, whilst N135, C1, and C2 amplitudes as functions of log stimulus contrast were fitted by single straight lines. Contrast thresholds were estimated by finding contrast values at zero amplitude for each VEP component. Contrast sensitivity values were estimated by taken the inverses of contrast thresholds. Contrast sensitivity estimated from P100 at low contrasts, N135, and C2 were similar ($P > 0.05$) and higher than those obtained from P100 at high contrasts and C1 ($P < 0.01$) which were also similar to each other ($P > 0.05$) (one-way ANOVA; Bonferroni test for post hoc comparisons). It is suggested that the M pathway contributes to P100 at low contrasts, as well as to N135 and C2 at all contrast levels, whilst the P pathway contributes to P100 at high contrasts and C1 at all contrast levels. A simple model for the M and P contribution to the VEP contrast sensitivity is proposed by adding logarithmic functions with different thresholds for each pathway.

Supported by grants from CNPq-PRONEX / FAPESPA #2268, CNPq #486351/2006-8, CNPq #620248/2006-8, CNPq #550671/2007-2, and FINEP IBN-Net #01.06.0842-00. GSS, BDG, and EMCBL received CAPES-PROF fellowships for graduate students. MSF and LCLS are CNPq research fellows.