VII SIMPOSI DE NEUROBIOLOGIA EXPERIMENTAL

Secció de Neurobiologia Experimental de la SCB

INSTITUT D´ESTUDIS CATALANS

Carrer del Carme, 47

Barcelona

28 i 29 d'octubre de 2008

PÒSTERS DIA 2

(P-35) AMPLITUDE AND TIMING OF AUDITORY RESPONSES IN THE AWAKE RAT ARE MODULATED BY PREVIOUS HISTORY OF STIMULATION

Abolafia J[1], Perez-Marcos D[1,] and Sanchez-Vives MV[1,2,]

[1]IDIBAPS (Institut d'Investigacions Biomèdiques August Pi i Sunyer), Barcelona. [2]ICREA (Institució Catalana de Recerca i Estudis Avançats), Barcelona.

The influence of the previous history of stimulation on sensory responses is a constant in different sensory systems. Here we explored how the firing frequency and the timing of neuronal responses are determined by preceding stimuli. We recorded from isolated units in the primary auditory cortex of chronically implanted awake rats. The stimulus consisted in two sounds (white noise) separated by a variable inter-stimulus-interval (ISI; 50 ms-5 s). Our results revealed that when the ISI was shortened, and the duration or intensity of the first stimuli was increased, the firing frequency induced by a second stimulus was significantly decreased. Interestingly, sensory responses were influenced by stimuli occurring up to 2 seconds earlier. Similarly, the latency of the response to the 2nd stimulus was often longer than that of the first. Thus, shorter ISIs induced significantly more delayed responses to the 2nd stimulus (17 ms) than longer ISIs did (15 ms). The duration of the first stimulus also determined the lag of the response to the second stimuli (17 ms and 19 ms latencies for 50 and 500 ms duration of the first stimuli, respectively). The intensity of the first stimulus though was found to be less critical to determine the latency of the second response (16 ms for any intensity). Stimulus post-adaptation was also observed, being more common for the second sound (47%) that for the first (39%), although the underlying mechanisms need yet to be elucidated. To conclude, we found that the history of stimulation alters the amplitude and timing of subsequent responses. The increased lag of the second response was correlated to the decrease in the response amplitude. Since navigation in the real world implies a permanent bombarding by different sounds, auditory perception should be determined by a continuous readjustment of amplitude and timing of the neural responses.

Supported by Ministerio de Ciencia e Innovación and EU.