118.11 POSITRON EMISSION TOMOGRAPHY STUDIES OF HUMAN VISUAL CORTEX.
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A series of experiments have been performed which make use of hemi-field stimulation,together with specific spatial stimulus structure,in order to provide a recognizable "signature" for cortical area V1 in PETT studies of human cortex. Based on a quantitative model of the topography of V1(Schwartz,Vision Res. 20:645(1980),a computer animation has been constructed on 8mm film,using a 512x521x1 bit digital display. This stimulus consists of picture elements which are scaled according to human cortical magnification, and is designed to be projected in one visual hemi-field.Visual stimulation is obtained by reversing the black and white pixels of the display, in a spatial pattern which consisted of four logarithmically scaled octants of visual field,which were alternately "on" (i.e. reversing) or "off" (i.e. static and blank). The display was restricted to either the right or left hemi-field, relative to a small (1^0 size) fixation letter. If it were possible to view an idealized and "flattened" V1, the representation of this stimulus would resemble a "check--erboard" of four equal sized patches.
This lateralized cortical "checkerboard" was intended to provide a recognizable "signature" for V1 (and possibly V2). The fixation letter was randomly alternated with a test letter(also about 1^0 in size), which was presented for 200 msec with an average interval between tests of 1 sec. The subject was required to verbally report each test letter. A high score was interpreted as evidence of compliance with the fixation task,since it is very difficult to recognize small rapidly changing letters without disciplined fixation.Subjects viewed a film loop(3 min. loop) of this computer graphic for 15 minutes; then, an i.v. injection of F^{18} labeled 2-deoxy-glucose (FDG) was adminstered,followed by fifteen minutes of stimulation. Subjects were then placed in the Brookhaven National Laboratory PET III scanner and serial scans were performed (10-12 minutes/slice). Successful observation of lateralized FDG counts in the presumed area of V1 was obtained, and local variations of FDG counts which were consistent with the topographic structure of the stimulus were observed. Application of this approach to constructing a cortical "signature" may be of increasing importance as higher resolution PETT scanners soon come on-line,since the confident identificat--ion of cortical areas is a necessary pre-condition for using PETT to study the functional architecture of human visual cortex.

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