

**BOLD fMRI Evaluation of Normal Female Sexual Arousal Response:**  
Sites of cerebral activation correlated with subjective and objective measures of arousal

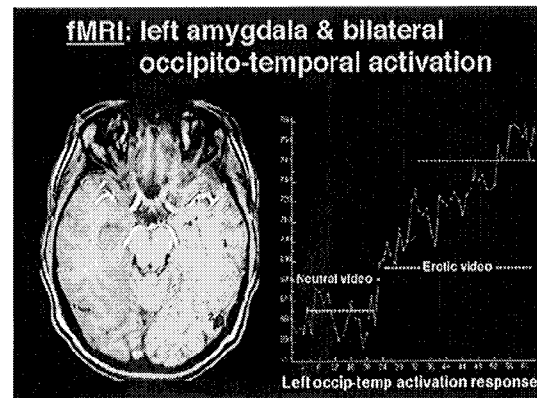
K.R. Maravilla,<sup>1</sup> A.V. Deliganis,<sup>1</sup> J. Heiman,<sup>1</sup> D. Fisher,<sup>1</sup> W. Carter,<sup>2</sup> R. Weisskoff,<sup>3</sup> L. Hackbert,<sup>1</sup> P. Garland,<sup>1</sup>  
D. Echelard,<sup>1</sup> - <sup>1</sup>University of Washington, Seattle, WA, USA; <sup>2</sup>Pfizer, Inc., Groton, CT, USA;  
<sup>3</sup>Epix Medical, Boston, MA, USA

**Purpose:** To better understand female sexual arousal disorder and normal arousal physiology, BOLD fMRI was used to study sexual arousal in response to a video stimulus in normal sexually functional female subjects. Sites of activation were identified and correlated with subjective and objective measures of sexual arousal.

**Methods:** Six normal female volunteers without sexual dysfunction signed an IRB approved informed consent and underwent BOLD fMRI and vaginal photoplethysmography (VPP). Video material was presented to the subject in the magnet using a fiberoptic display system. Paradigm contrasted a neutral documentary control video segment with a sexually explicit stimulus segment. EPI images were obtained on a GE 1.5T system, processed offline with MedX (Sensor Systems) using a two-tailed T-test with a Z-score threshold of 3. Sites of activation in each subject were compared with objective test (VPP) and subjective questionnaire measures of sexual arousal. Activation sites were compared between subjects to identify reproducible sites likely associated with sexual arousal response.

**Results:** All subjects achieved arousal during the fMRI (documented by subjective questionnaire) and VPP studies. In most subjects there was greater activation in the right hemisphere. Reproducible sites of activation associated with arousal identified across subjects included the anterior temporal region, amygdala, fusiform gyrus, posterior temporal-parietal-occipital regions, inferior frontal and the thalamus. Many of these same sites have been described in prior PET/fMRI studies of various types of emotional response. Interestingly, the start of the stimulus video segment correlated with a rapid rise of BOLD activation response that occurred over approximately 1 minute. This rise was independent of the subjectively reported time of onset or the degree of arousal. One subject did show a two-stage rise in BOLD signal with a rapid rise to a first plateau followed by a delayed further rise 4 minutes later that correlated with a subjectively reported increase in sexual arousal at the delayed time point (Fig. 1).

**Conclusion:** Bold fMRI appears to be a viable method for assessing cerebral sites and temporal patterns associated with sexual arousal in normal women and holds promise for future study of female sexual arousal disorder. However, additional studies will be needed to attempt to segregate sites associated with sexual response from sites associated with more general emotional response.



**Figure 1:**

fMRI image on right shows left amygdala and bilateral occipito-temporal sites of activation.

Signal intensity vs. time graph on left shows rapid rise in BOLD signal response at start of erotic video. There is an initial "plateau" followed by a later rise in signal intensity after about four minutes. Total time course for graph is 10 minutes.

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