Modelling the role of the brain in orgasm

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Orgasm is negatively impacted by many illnesses and drug therapies. We have few clinical tools with which to address these problems. A conceptual framework is needed for investigating those brain mechanisms which, when activated, produce the suite of responses identified as orgasm.

Sexual climax usually involves responses of the reproductive tract (e.g. ejaculation), multiple viscerosomatic systems (e.g. elevated blood pressure), and brain/mind/emotions (e.g. elevated mood). The term orgasm is applied to the last of these, but has never been satisfactorily defined or described. Investigations into brain function during orgasm are allowing development of a model that can be used to test hypotheses concerning the role of the brain in orgasm. The model encompasses three major brain systems encoding (i) emotion, (ii) pleasure and (iii) euphoria: the limbic association cortex, basal forebrain, and asymmetric left hemisphere activation.

Deep electroencephalograms (EEGs[1]), and regional cerebral blood flow (rCBF) monitored by positron emission tomography (PET[2, 3]) implicate structures of the limbic association cortex, basal forebrain, and thalamus, as well as lateralization of cortical activation in brain function during orgasm. (i) Observed activity in the limbic association cortex, especially the prefrontal cortex and cingulate gyrus, are consistent with emotional responses occurring during orgasm. (ii) Pleasure and satiety reported by subjects can be ascribed to changes observed in the ventral tegmental area with its dopaminergic projection to the "rewards centres" of the septal nuclei and nucleus accumbens. (iii) Generalized activation of the left hemisphere can occur with euphoria in bipolar disorder. A shift from symmetrical to asymmetrical brain activity does occur in association with orgasm but it is usually a shift to right dominance. The model will allow this apparent contradiction to be tested.

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(3) Heath RG. Journal of Nervous and Mental Disease. 1972;154:3-18.