平成２３年度　入学試験（１月）問題

人間健康科学研究科

フロンティアヘルスサイエンス学域

筆記試験

試験時間　　１０：００～１１：３０　　９０分間

注意事項

1．試験開始の合図があるまで、この問題冊子を開いてはいけない。

2．この問題冊子は５ページである（表紙、余白を除く）。

3．試験中に、問題冊子の印刷不鮮明、ページの落丁・乱丁及び解答用紙の汚れ

　　等に気付いた場合は、手を挙げて監督員に知らせること。

4．解答用紙の所定の記入欄には、監督員の指示に従って、それぞれ正しく記入

　　すること。

5．解答は、解答用紙の解答欄に記入すること。

6．筆記試験に際しては、英和辞典１冊の持ち込み参照を認める。（専門用語辞典

　　及び電子辞典の持ち込みは不可とする。）

7．問題冊子の余白等は適宜使用してよいが、どのページも切り離してはいけない。

8．試験終了まで退室してはいけない。

9．解答用紙は必ず提出すること。問題冊子は持ち帰ること。

首都大学東京　大学院　人間健康科学研究科　博士後期課程

次ページ以降に問題が記載されています。

問題Ⅰ～問題Ⅱのうち、自分が第一志望とする分野の問題を選択して解答しなさい。

上記の問題を解答しなさい。

[脳機能解析科学分野]

問題Ⅰ．次の英文を読み、問に答えなさい。

Mother's Responses Related to Maternal Love

Maternal love is essential for maternal behavior in which the mother makes sacrifices that are necessary to care for her infant day and night. Loving the infant is the dynamo that empowers her to maintain never-ending vigilance and sustain exhausting toil for the protection and nurture of her infant. In our study, we assumed that the brain areas showing significant activation under either of the following two conditions would be particularly related to maternal love: 1) the brain areas that were significantly activated for the mother's own infant compared with other infants and for the mother's own infant compared with other infants in both the situations and showed no significance in the simple effect of situation (Separation Situation (SS) vs. Play Situation (PS), PS vs. SS) in the mother's own infant; and 2) the brain areas that were significantly activated for the mother's own infant compared with other infants, were not significantly activated for the mother's own infant compared with other infants in either of the situations, and showed no significance in the simple effect of situation in the mother's own infant. This consideration was based on the idea that invariant maternal love would exist in the mother herself, regardless of how she responded to her own infant in any situation. Based on these assumptions, we found that a limited number of the mother's brain areas might be specifically involved in recognition of the mother's own infant irrespective of the situation, namely the right (1) OFC, (2) PAG, anterior insula, and dorsal and ventrolateral putamen, when the mother viewed her own infant's attachment behaviors compared with other infants' attachment behaviors. The lateral (1) OFC is activated with pleasant visual, tactile, and olfactory stimuli, with its response depending on pleasantness rather than the intensity of stimulation. That is, the (1) OFC is known to play an important role in the reward system; it receives ascending (3) [   ] projections from the (4) VTA and is critical in representing the stimulus reward value. Additionally, it is suggested that maternal love and attachment are involved in the (1) OFC activation while the mother views the photo of her own child. In the present study, the infant's attachment behaviors in the video stimuli were thought to touch its mother's heart, in which she felt her own infant's dynamic facial expressions and actions realistically. The intensities of motherly feeling and love

during both the PS and SS were significantly higher when the mothers viewed video clips of their own infant compared with those of other infants, and there were no significant differences in the intensities of motherly feeling and love between the two situations for their own infant. It seems that these feelings representing maternal love were elicited by viewing their own infant, regardless of the situation, and the activity in the right (1) OFC was associated with this. Moreover, the magnitude of activation of the right (1) OFC was positively correlated with the intensity of anxious, and the magnitude of activation of the left (1) OFC was positively correlated with the intensities of joyful and happy feelings. These feelings are important for facilitating maternal behavior. The (2) PAG has direct connections with the (1) OFC, which may explain the equally specific activation of the (1) OFC with maternal love. The (2) PAG also receives direct connections from the limbic areas and contains a high density of vasopressin and oxytocin receptors. In fact, maternal behaviors may be inhibited when (2) PAG is pharmacologically or physically targeted. Our finding supported that the (2) PAG is also involved in human maternal love for her own infant. The anterior insula is involved in processing caress-like touch between individuals and is thought to be important for affiliative behavior between the mother and infant. Furthermore, the dorsal and ventrolateral putamen were activated only by the mother's own infant. The striatum receives strong projections from the (1) OFC and plays an important role in stimulus reward learning, which is mediated by afferent dopamine input so that responses associated with greater predicted reward in a given context become reinforced and are thus more likely to be selected afterwards. Furthermore, action selection and preparation for reward could be mediated by the dorsal striatum. Therefore, the putamen, which belongs to the motor loop, may be related to motor aspects of action selection for reward. In addition, the striatum contains cells that respond to food and drink reward, and it was shown to be activated by monetary reward stimuli, cocaine, and sexual arousal in humans. According to a meta-analysis of the results of 55 (5) PET and (6) fMRI activation studies, basal ganglia activation was reported in approximately 70% of happiness-induction studies, and increased activity in the ventral striatum was associated with reward processing. The particular subregions in the reward-related structure, that is, the dorsal and ventrolateral putamen activated only by the mother's own infant, also may be specialized to mediate maternal love. In fact, the level of left dorsal putamen activity tended to be positively correlated with the intensity of motherly feeling for the mother's own infant compared with other infants in PS.

(From Noriuchi, M., Kikuchi, Y., et al.: The functional neuroanatomy of maternal love: mother's response to infant's attachment behaviors. Biological Psychiatry 63; 415-23, 2008.)

問１．下線部(1)は、ある脳部位の略である。本来の英語と日本語を書きなさい。
問２．下線部(2)は、ある脳部位の略である。本来の英語と日本語を書きなさい。

問３． (3)   は、ある神経伝達物質である。これを英語と日本語で書きなさい。

問４． 下線部(4)は、ある脳部位の略である。本来の英語と日本語を書きなさい。

問５． 下線部(5)は、ある脳機能計測法の略である。本来の英語と日本語を書きなさい。
また、これについて簡単に日本語で説明しなさい。

問６． 下線部(6)は、ある脳機能計測法の略である。本来の英語と日本語を書きなさい。
また、これについて簡単に日本語で説明しなさい。

問７． 本文から、maternal love に関連する 4 つの脳部位について簡単にまとめなさい。

[臨床神経科学分野]

問題Ⅱ．　下記の英文を読んで全訳しなさい。

【ここに、英文（*Yamagata K, Onizawa K, Yamagawa T, et al: A prospective study to evaluate a new dental management protocol before hematopoietic stem cell transplantation. Bone Marrow Transplant 38: 237-242, 2006*）が示されている。】