# fMRIは記憶抑制の理解に役立つ

## 機能的MRI画像によりストレス関連障害が前頭前野の記憶過程に影響することが示される

Functional MRI images show that stress-related disorders affect processing of memory in prefrontal lobe

機能的MRI（fMRI）を用いている研究者らは、ストレス関連記憶障害の患者における認知機能低下による記憶抑制のメカニズムは主に前頭前野の変化が原因である、とRadiological Society of North America （RSNA）学会で述べた。研究者らは脳のfMRIを用いて前頭前野と海馬を連結する神経回路の変化を調べ、スタディの対象者は記憶力テストを受けた。対象者は大うつ病11人、全般性不安障害13人、パニック発作9人、境界性パーソナリティ障害5人、および健常者21人であった。全ての参加者は人生のいずれかの時期に様々な程度のストレス性の心的外傷イベントを経験していた。fMRI画像により、海馬で形成される記憶の抑制及び回復をコントロールする前頭前野がストレス関連障害患者においては健常者と比較し異常活性を示すことが明らかになった。検査では、記憶抑制段階でストレス関連障害患者において海馬の活性の増加が認められ、前頭前野の不十分な活性化が、海馬に記憶された忘れたい心的外傷の不十分な抑制の原因でありうることが示唆された。

## Full Text

Researchers using functional MRI (fMRI) have a described a dysfunctional cognitive memory suppression mechanism primarily due to alteration in the prefrontal cortex in patients with stress related disorders. Results of the study were presented at the annual meeting of the Radiological Society of North America (RSNA).

"For patients with major depression and other stress-related disorders, traumatic memories are a source of anxiety," said Nivedita Agarwal, M.D., radiology resident at the University of Udine in Italy, where the study is being conducted, and research fellow at the Brain Imaging Center of McLean Hospital, Department of Psychiatry at Harvard Medical School in Boston. "Because traumatic memories are not adequately suppressed by the brain, they continue to interfere with the patient's life."

Dr. Agarwal and colleagues used brain fMRI to explore alterations in the neural circuitry that links the prefrontal cortex to the hippocampus, while study participants performed a memory task. Participants included 11 patients with major depression, 13 with generalized anxiety disorder, nine with panic attack disorders, five with borderline personality disorder and 21 healthy individuals. All patients reported suffering varying degrees of stressful traumatic events, such as sexual or physical abuse, difficult relationships or "mobbing" - a type of bullying or harassment - at some point in their lives.

After reviewing a list of neutral word pairs, each participant underwent fMRI. During imaging, they were presented with one of the words and asked to either recall or to suppress the memory of its associated word.

The fMRI images revealed that the prefrontal cortex, which controls the suppression and retrieval of memories processed by the hippocampus, showed abnormal activation in the patients with stress-related disorders compared to the healthy controls. During the memory suppression phase of the test, patients with stress-related disorders showed greater activation in the hippocampus, suggesting that insufficient activation of the prefrontal cortex could be the basis for inadequate suppression of unwanted traumatic memories stored in the hippocampus.

"These data suggest that the mechanism for memory suppression is dysfunctional in patients with stress-related disorders primarily because of an alteration of the prefrontal cortex," Dr. Agarwal said. "These patients often complain of poor memory, which might in part be attributed to this altered circuitry," she added.

According to Dr. Agarwal, fMRI is an important tool in understanding the neurobiological basis of psychiatric disorders and in identifying imaging markers to psychiatric disease, helping clinicians target specific parts of the brain for treatment.

The study's principal investigator is Paolo Brambilla, M.D., Ph.D. Co-authors are Monica Baiano, M.D., Ph.D., Massimo Bazzocchi, M.D., Giuseppe Como, M.D., and Marta Maieron, Ph.D.