

## 흡연갈망의 신경해부학적 특이성 : 기능자기공명영상연구

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### fMRI Investigation on Cue-induced Smoking Craving : A Case Report

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#### ABSTRACT

**O**bject : Nicotine dependence is the most common substance abuse disorder. One of the characteristics of nicotine dependence is craving. Regional activation of the brain induced by craving for nicotine was evaluated by using functional magnetic resonance imaging to investigate neuroanatomical site of smoking craving.

**Method** : A smoker who satisfied DSM - IV criteria for nicotine dependence and a non smoker was studied. MRI data were acquired on a 1.5T Magnetom Vision Plus with a head volume coil. Two sets of visual stimuli were presented to subjects in a random manner. One was the film scenes of inducing smoking craving and the other was neutral stimuli not related to smoking. There were two fMRI sessions before and after smoking or sham smoking. Data were analyzed using SPM99.

**Results** : fMRI showed significant activated area in anterior cingulate and medial frontal lobes in the smoker during smoking craving. Right dorsolateral prefrontal cortex and parietal lobes were activated in the control during visual stimulation before smoking. After smoking, there was no brain activation during visual stimulation in both of smoker and non smoker.

**Conclusion** : Metabolic activity of the anterior cingulate and medial frontal lobes increased during craving for smoking. This result suggests that fMRI may be a valuable tool in the identification of neurobiological process of craving.

**KEY WORDS** : Smoking · Craving · fMRI.

## 서 론

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1988 Surgeon General's Report on the Health Consequence of Smoking : Nicotine Addiction

fMRI

1) (craving) (nucleus accumbance) (ventral tagmental area) (mesolimbic dopamine pathway)가 (functional magnetic resonance imaging, fMRI), (positron emission tomography, PET)

증례

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(anterior cingulate gyrus) (left dorsolateral prefrontal cortex), (medial temporal lobe), (amygdala), (cerebellum) Brody 7) PET

Presentation software (Version 0.46, Neurobehavioral Systems, CA) MRI

(perigenual anterior cingulate gyrus) (orbitofrontal cortex), (bilateral anterior insula)

(viewing angle) 5 (peripheral visual field) 1 가 1

fMRI 1990 fMRI가 (cerebral blood flow, CBF), (cerebral blood volume, CBV) 가 가 fMRI PET (single photon emission tomography, SPECT)

A B 2 (sham smoking) 1.5T Magnetom Vision Plus (Siemens, Erlangan, Germany) EPI (TR)/

(TE)=3.0/60msec, (flip angle)=90°, field-of-view 240×240mm, matrix 64×64 6mm) BOLD(Blood Oxygen Level Dependent)

6mm

24

T1 (Spin Echo sequence, TR/TE=100 msec/minimum, 256×128 in plane matrix, 6mm slice thickness) (co-registration) (normalization)

, BOLD 가 p<0.001 10 (ROI) Talairach Brodmann (BA) ROI A

3D FLASH(fast low-angle shot) sequence(sagittal orientation, TE/TR=4/9.7 msec, FA=12°, slice thickness=1.25mm, 256×192 in-plane matrix)

(right anterior cingulate gyrus), (right superior frontal gyrus), (left medial frontal lobe) 가 가 ,

SPM99(<http://www.fil.ion.ucl.ac.uk>)

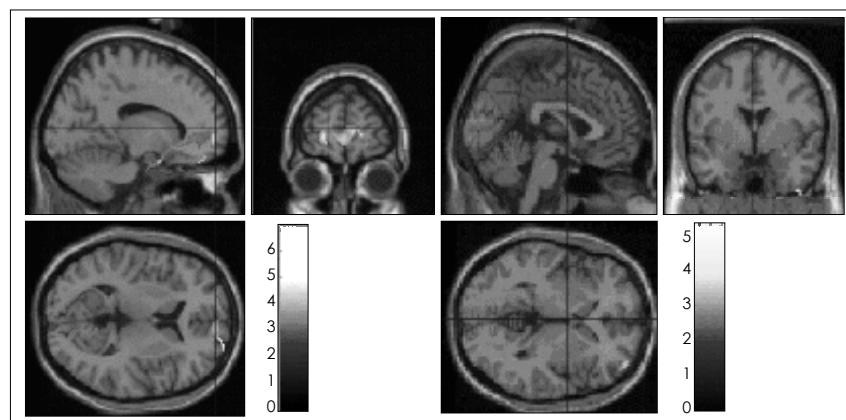
B (right middle frontal gyrus), (right inferior parietal lobule), (right posterior cerebellar tonsil), (right posterior cerebellar semi-lunar lobule) ( 1).

Talairach, 6mm FWHM(full-width-at-half maximum) 3D 가 (Gaussian kernel) (smoothing)

A, B

SPM (general linear model)

T



**Fig. 1.** Functional Brain Activation before Ad-libitum Smoking during Exposure to the Film Scenes of Smoking in Mr. A(smoker, left) and Mr. B(non-smoker, right).

## 고찰

가  
Due<sup>8)</sup> fMRI  
(visuospatial circuit)가

가

가

9)10) Posner 11)

12)13) Reiman 14)

가

가 가

(dorsolateral prefrontal - parietal working  
memory circuit)

1

가

가

가 가

가

중심 단어 :

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