

Response to experimental stress in cocaine dependence with comorbid depression: role of brain-derived neurotrophic factor

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Introduction

A major challenge in cocaine dependent subjects is to know if a concomitant major depression episode is independent or induced by the substance. Brain-derived neurotrophic factor (BDNF) is related to cerebral plasticity and impairment caused by substance abuse and depression.

Objective

To evaluate the changes in BDNF in stress response in cocaine dependent patients with independent or substance-induced major depression.

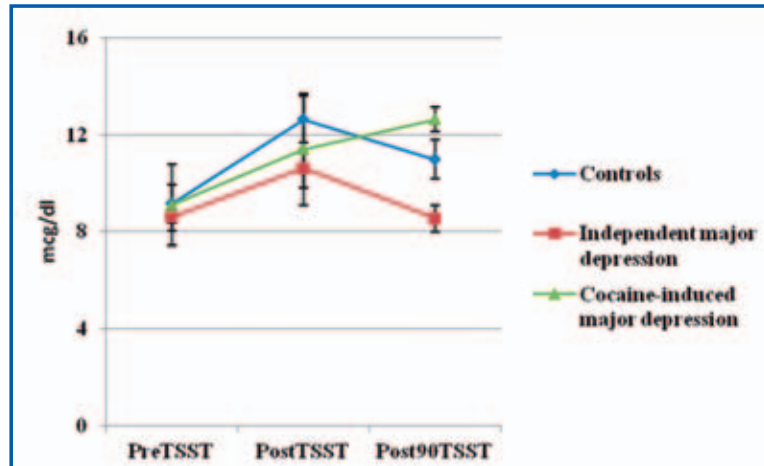
Materials and methods

24 cocaine dependent (CD) patients (DSM-IV-TR) (15 with comorbid independent major depression and 9 with comorbid cocaine-induced major depression) and 21 healthy controls. We used the Trier Social Stress Test (TSST) to evaluate the acute stress response in humans. BDNF serum levels and anxiety scores were measured before TSST, immediately after TSST and 90 minutes later. The data were analyzed with repeated measures ANOVA, One-Way ANOVA and post hoc analysis.

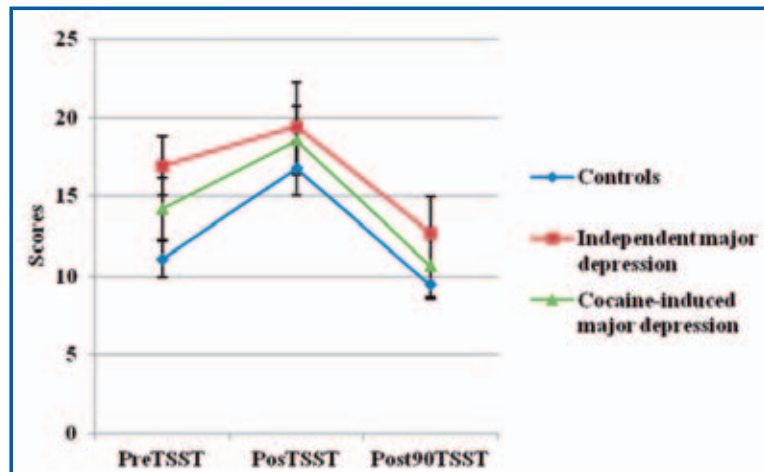
Results

In cocaine dependent subjects, those with independent depression showed a stress response different to cocaine-induced depression later (graphic 1, 2, 3). BDNF and Cortisol levels were statistically significant differences in patients with CD + comorbid independent major depression and CD + comorbid cocaine-induced major depression 90 minutes later TSST ($P=0,025/p=0,004$) (Table 1).

Graphic 1. Changes in cortisol concentrations during TSST



Graphic 2. Changes in STAI-S scores during TSST



Graphic 3. Changes in BDNF concentrations during TSST

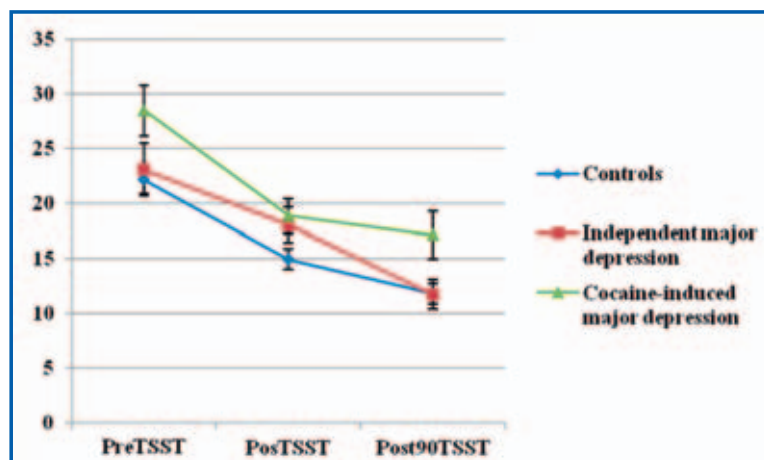


Table 1:

	TpreTSST M±S.D	TpostTSST M±S.D	Tpost90'TSST M±S.D	ANOVA	
				P	*Bonferroni
Controls					
BDNF (n=20)	22,18±5,61	14,94±4,02	11,81±4,21	0,001	a, b, c
Cortisol (n=21)	9,15±3,57	12,64±4,42	10,98±3,67	0,001	a
STAI-S	11,09±5,20	16,76±7,96	9,48±4,12	0,001	a, c
CD + comorbid independent major depression					
BDNF (n=14)	23,09±9,00	18,05±6,15	11,72±5,05	0,001	b, c
Cortisol (n=15)	8,61±2,25	10,61±3,15	8,54±2,10	0,132	
STAI-S	16,93±7,90	19,47±10,84	12,67±8,88	0,036	c
CD + comorbid cocaine-induced major depression					
BDNF (n=9)	28,52±6,87	18,85±4,66	17,14±6,58	0,001	a, b
Cortisol	9,09±5,00	11,40±6,95	12,64±1,54	0,078	
STAI-S	14,22±5,92	18,55±6,54	10,67±5,92	0,012	b
One-way ANOVA	(p/*)	(p/*)	(p/*)		
BDNF	0,09	0,029/e	0,025/e, f		
Cortisol	0,898	0,436	0,004/d, f		
STAI-E	0,030/d	0,651	0,347		

*Bonferroni test: ^a = statistically significant differences pre-TSST and post-TSST, ^b = statistically significant differences pre-TSST and post-90'TSST, ^c = statistically significant differences post-TSST and post-90'TSST, ^d = statistically significant differences controls and CD + comorbid independent major depression, ^e = statistically significant differences controls and CD + comorbid cocaine-induced major depression, ^f = statistically significant differences CD + comorbid independent major depression and CD + comorbid cocaine-induced major depression.

Conclusions

These preliminary results show a different response to acute stress between patients with independent or cocaine-induced major depression.

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