

Supplementary figures and tables:

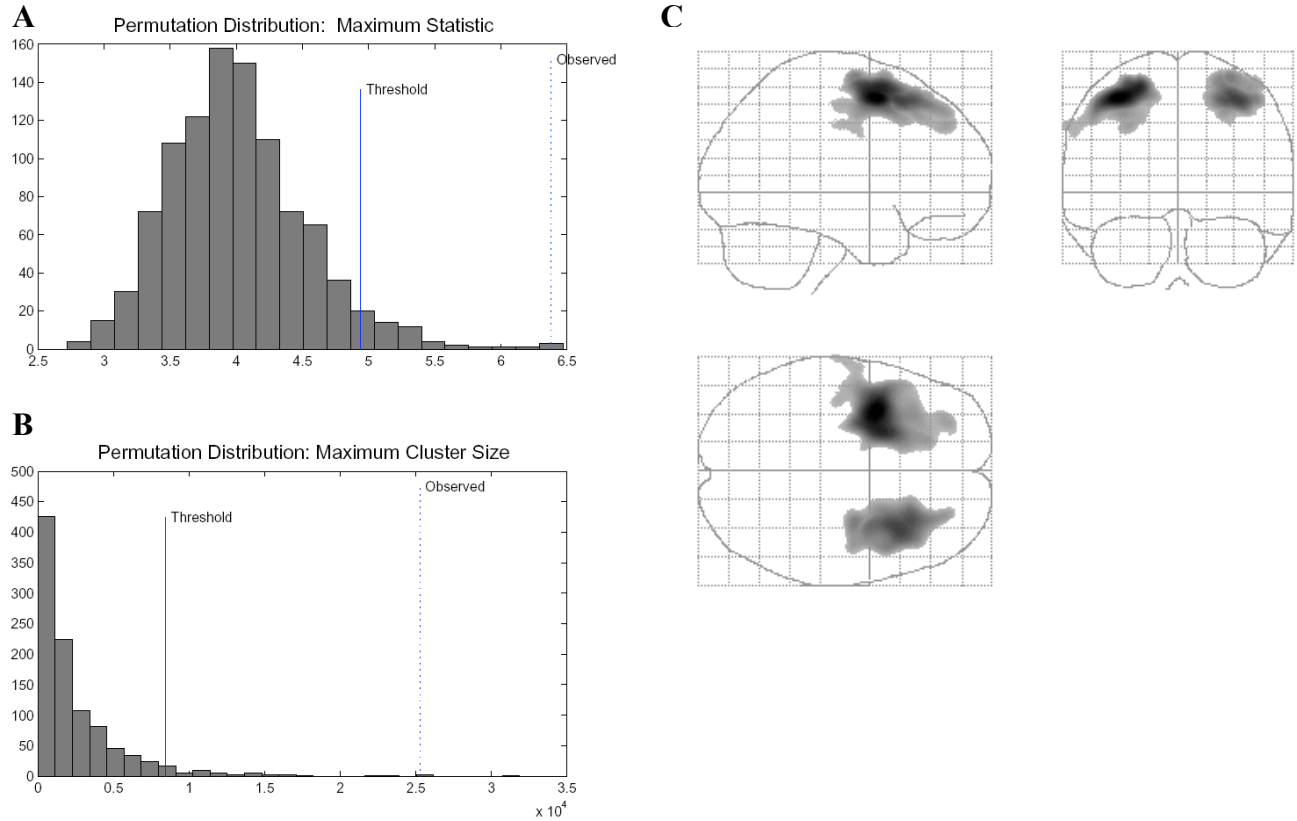
Supplementary Table 1. Demographics of patients and corresponding matched normal volunteers. Number of chronic back pain patients (CBP) and corresponding matched control volunteers (Cnt), their age distribution (mean and standard deviation in parenthesis), sex (male, M, or female, F), subtype of CBP pain: neuropathic (nu) or non-neuropathic (Non-nu), and MR scan type: “no-flow” or “fast” are indicated.

CBP	Age	Sex	nu/Non-nu	Cnt	Age	Sex	Scan
7	43.3(12.4)	5 M	nu	7	42.3(10.0)	5 M	NOFLOW
		2 F				2 F	
10	47.0(12.6)	3 M	Non-nu	10	45.5(14.5)	3 M	NOFLOW
		7 F				7 F	
4	43.3(8.2)	0 M	nu	4	43.8(6.8)	0 M	FAST
		4 F				4 F	
5	38.0(12.1)	2 M	Non-nu	5	40.0(11.9)	2 M	FAST
		3 F				3 F	

Supplementary Table 2. Pain related parameters in CBP patients. Mean and standard deviation (in parenthesis) are shown for neuropathic (nu) and non-neuropathic (non-nu) CBP. Pain duration is in years. Pain intensity is mean pain reported at MR scan time, based on verbal analog scale (0-10, 0= no pain, 10 = maximal imaginable pain). Sensory and affective pain parameters are from Short-Form of McGill Pain Questionnaire (SF-MPQ). Anxiety and depression are from Beck's Depression and Anxiety Inventories. Medication Quantification Scale (MQS) provides a single parameter that gauges use of diverse medications over time. Of the 17 subjects where reliable drug use data was available, 2 subjects (10%) were taking no drugs, 7 (40%) were taking drugs with no psychoactive properties, 5 (30%) were taking drugs with known psychoactive properties (such as antidepressants and anticonvulsants) and 5 (30%) were taking opioids. All pain parameters, except intensity, are slightly higher in nuCBP as compared to non-nuCBP. However, none of these differences are statistically significant.

CBP	Pain Duration (years)	Pain Intensity (VAS)	SF-MPQ Sensory	SF-MPQ Affective	Beck's Anxiety	Beck's Depression	Drug Use* (MQS)
nu n=11	11.3(11.4)	5.5(2.5)	13.9(8.5)	4.4(4.3)	12.9(9.5)	13.9(12.5)	13.5(21.2)
non-nu n=14	5.2(3.7)	6.6(2.0)	10.6(5.7)	1.7(3.0)	10.4(10.9)	11.1(12.5)	5.8(6.6)

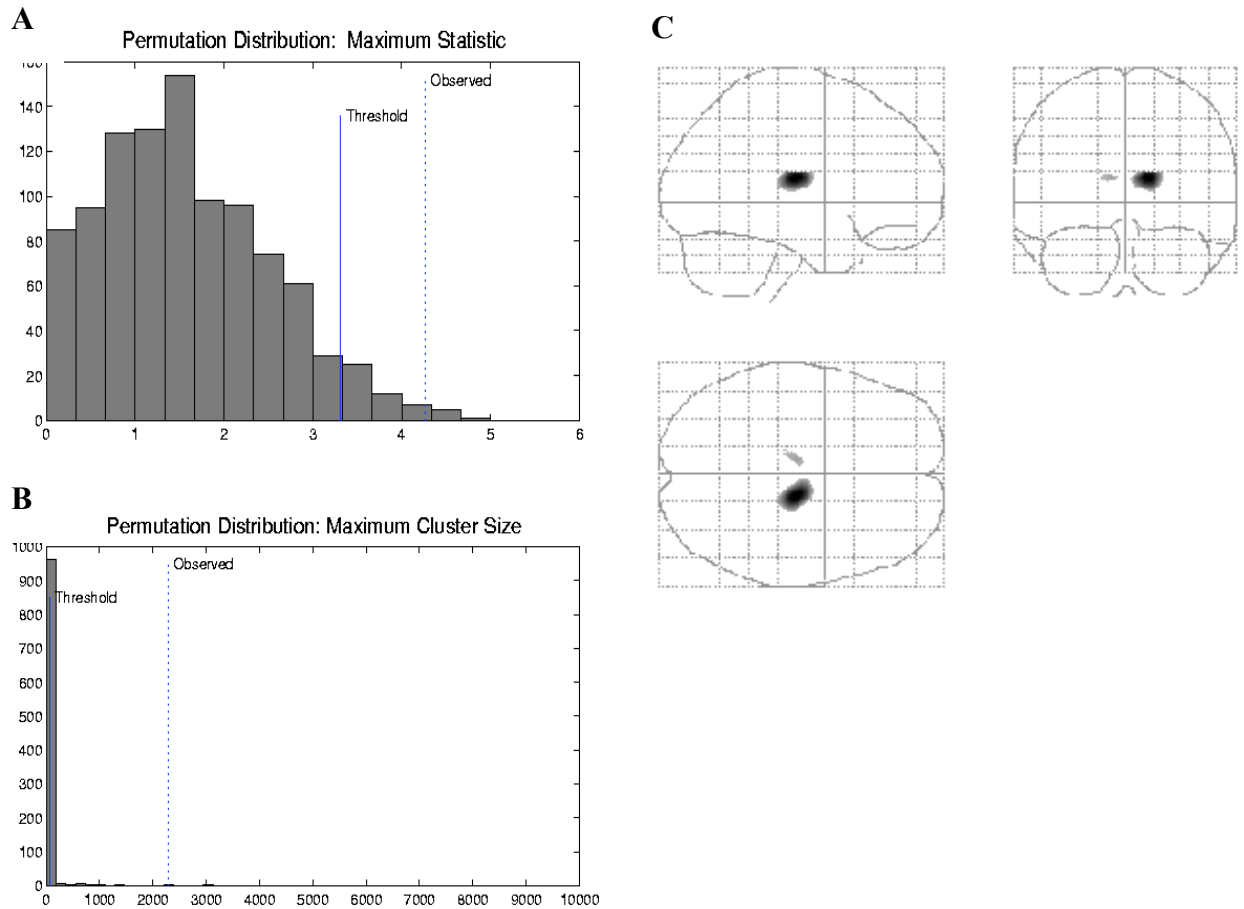
* Reliable drug use data were available for 9 non-nuCBP and 8 nuCBP.



Supplementary Figure 1. Nonparametric analysis for regional distribution of gray matter density decrease in CBP as compared to matched normal subjects, SnPM results calculated over all brain gray-matter voxels. (A) Distribution of the maximum pseudo- t -statistic, generated by permutation test. The critical corrected threshold was calculated to be 4.93, showing that the probability for the maximal pseudo- t -value to be greater than 4.93 is less than 0.05 in the given cortical volume. The maximum observed value in the unpermuted volume, dotted line, was 6.5. (B) A cluster-level test was also performed with a primary threshold of pseudo- $t = 3.0$. The distribution of the maximum cluster size indicates that the critical corrected cluster size was calculated to be 8437 voxels. Two

clusters were found in the unpermuted volume to exceed this threshold, dotted line. (C)

Position and extent of clusters that pass voxel-level threshold and cluster-level threshold are shown in a glass-brain format in each orthogonal view, where voxels with decreased gray-matter density are integrated throughout the brain as if it were a transparent structure. Dark values represent highly significant decreases in gray-matter volume in CBP.



Supplementary Figure 2. Nonparametric analysis for thalamic gray matter density decrease in CBP as compared to matched normal subjects, SnPM results after masking to preserve just the thalami. (A) Distribution of the maximum pseudo- t -statistic, generated by permutation test. The critical corrected threshold was 3.31. The maximum observed value in the unpermuted volume, dotted line, was 4.26. (B) A cluster-level test was performed with a primary threshold of pseudo- $t = 3.0$. The critical corrected cluster size was 61 voxels. One cluster was found in the unpermuted volume to exceed this threshold, dotted line. (C) The cluster is centered in anterior right thalamus. Another cluster in the right thalamus passes pseudo- t -statistic threshold but not cluster threshold.