

Table S1. Body part described as the main site of pain among the participants with chronic pain (n = 565)

Body part described as the main pain site	No. participants	Frequency (%)
Low back	189	33.5
Knees	139	24.6
Shoulders	81	14.3
Feet	38	6.7
Arms	25	4.4
Neck	20	3.5
Teeth	12	2.1
Head	10	1.8
Entire body	8	1.4
Back	8	1.4
Abdomen	6	1.1
Pelvic	6	1.1
Buttocks	6	1.1
Face	3	0.5
Chest	3	0.5
Genital area	0	0.0
Tongue	0	0.0
Other part	11	2.0
Total	565	100.0

Table S2. Multivariable-adjusted mean values of the other regional brain volumes according to the status of chronic pain (n = 1,106)

Status of chronic pain	No. participants	Multivariable-adjusted mean values (95% confidence intervals)					
		Model 1	<i>P</i> value	Model 2	<i>P</i> value	Model 3	<i>P</i> value
Caudate nucleus, %ICV							
No chronic pain	541	0.422 (0.417–0.427)	(ref.)	0.422 (0.417–0.427)	(ref.)	0.422 (0.417–0.427)	(ref.)
Chronic pain in body parts other than the lower back	376	0.423 (0.416–0.428)	1.00	0.423 (0.417–0.429)	0.96	0.423 (0.417–0.429)	0.99
Chronic low back pain	189	0.424 (0.416–0.432)	0.87	0.422 (0.414–0.430)	1.00	0.421 (0.413–0.430)	0.99
Putamen, %ICV							
No chronic pain	541	0.558 (0.552–0.564)	(ref.)	0.559 (0.553–0.565)	(ref.)	0.559 (0.553–0.565)	(ref.)
Chronic pain in body parts other than the lower back	376	0.555 (0.548–0.562)	0.79	0.555 (0.548–0.562)	0.65	0.555 (0.548–0.562)	0.63
Chronic low back pain	189	0.552 (0.542–0.562)	0.46	0.549 (0.539–0.559)	0.18	0.549 (0.539–0.559)	0.17
Pallidum, %ICV							
No chronic pain	541	0.241 (0.238–0.243)	(ref.)	0.241 (0.238–0.243)	(ref.)	0.241 (0.238–0.243)	(ref.)
Chronic pain in body parts other than the lower back	376	0.240 (0.237–0.242)	0.82	0.240 (0.237–0.242)	0.85	0.240 (0.237–0.242)	0.89
Chronic low back pain	189	0.241 (0.237–0.244)	1.00	0.241 (0.237–0.244)	1.00	0.241 (0.237–0.244)	0.99
Nucleus accumbens, %ICV							
No chronic pain	541	0.052 (0.051–0.053)	(ref.)	0.051 (0.050–0.051)	(ref.)	0.052 (0.051–0.053)	(ref.)
Chronic pain in body parts other than the lower back	376	0.050 (0.047–0.052)	0.18	0.050 (0.049–0.051)	0.60	0.052 (0.051–0.054)	0.90
Chronic low back pain	189	0.053 (0.051–0.055)	0.81	0.050 (0.048–0.051)	0.26	0.051 (0.050–0.053)	0.62
Entorhinal cortex, %ICV							
No chronic pain	541	0.273 (0.270–0.277)	(ref.)	0.273 (0.270–0.277)	(ref.)	0.273 (0.269–0.276)	(ref.)
Chronic pain in body parts other than the lower back	376	0.275 (0.271–0.279)	0.77	0.275 (0.271–0.279)	0.71	0.276 (0.271–0.280)	0.51
Chronic low back pain	189	0.274 (0.268–0.279)	0.99	0.273 (0.267–0.279)	1.00	0.274 (0.268–0.280)	0.92
Parahippocampal gyrus, %ICV							
No chronic pain	541	0.238 (0.235–0.240)	(ref.)	0.238 (0.235–0.241)	(ref.)	0.238 (0.235–0.240)	(ref.)
Chronic pain in body parts other than the lower back	376	0.240 (0.236–0.243)	0.62	0.240 (0.236–0.243)	0.62	0.240 (0.237–0.243)	0.53
Chronic low back pain	189	0.237 (0.233–0.242)	0.98	0.237 (0.233–0.242)	0.96	0.238 (0.233–0.242)	1.00

Abbreviation: ICV, intracranial volume.

Values are calculated as follows: $([\text{left} + \text{right}] \text{ regional brain volume} / \text{ICV}) \times 100 (\%)$.

Model 1: Adjusted for age and sex.

Model 2: Adjusted for age, sex, educational status, marital status, subjective economic status, hypertension, diabetes, serum total cholesterol, body mass index, current smoking, current drinking, regular exercise, cerebrovascular lesions on magnetic resonance imaging, and activities of daily living disability. Five participants with missing data on some covariates were excluded.

Model 3: Adjusted for the covariates included in model 2 plus depressive symptoms. Eight participants with missing data on some covariates were excluded.

Table S3. Association between the pain visual analog scale and regional brain volume (n = 726)

Brain regions of interest	Pain visual analog scale		
	β	95% confidence intervals	<i>P</i> value
No chronic pain and chronic low back pain			
Ventrolateral prefrontal cortex	-0.0007	(-0.0011, -0.0002)	0.006
Dorsolateral prefrontal cortex	-0.0017	(-0.0031, -0.0004)	0.01
Posterior cingulate cortex	-0.0002	(-0.0004, -0.0001)	0.009
Amygdala	-0.0001	(-0.00018, -0.00003)	0.03

726 participants in the no chronic pain group and chronic low back pain group were included in the analysis, after excluding four participants with missing data on some covariates.

Adjusted for age, sex, educational status, marital status, subjective economic status, hypertension, diabetes, serum total cholesterol, body mass index, current smoking, current drinking, regular exercise, cerebrovascular lesions on magnetic resonance imaging, and activities of daily living.

Table S4. Multivariable-adjusted mean values of the regional brain volumes according to age group (n = 726)

Status of chronic pain	Age 65–74 years (n = 522)		Age ≥ 75 years (n = 204)		<i>P</i> for heterogeneity
	No. participants	Multivariable-adjusted mean values (95% confidence intervals)	No. participants	Multivariable-adjusted mean values (95% confidence intervals)	
Ventrolateral prefrontal cortex, %ICV					
No chronic pain	393	1.243 (1.230–1.256)	145	1.196 (1.178–1.214)	0.94
Chronic low back pain	129	1.209 (1.186–1.231)	59	1.161 (1.131–1.190)	
<i>P</i> value		0.01		0.048	
Dorsolateral prefrontal cortex, %ICV					
No chronic pain	393	4.964 (4.928–5.000)	145	4.782 (4.719–4.844)	0.36
Chronic low back pain	129	4.854 (4.790–4.918)	59	4.725 (4.626–4.826)	
<i>P</i> value		0.004		0.36	
Orbitofrontal cortex, %ICV					
No chronic pain	393	1.667 (1.654–1.679)	145	1.611 (1.593–1.630)	0.29
Chronic low back pain	129	1.639 (1.617–1.661)	59	1.606 (1.575–1.636)	
<i>P</i> value		0.03		0.75	
Postcentral gyrus, %ICV					
No chronic pain	393	1.080 (1.069–1.091)	145	1.059 (1.044–1.075)	0.63
Chronic low back pain	129	1.060 (1.041–1.079)	59	1.053 (1.028–1.078)	
<i>P</i> value		0.08		0.66	
Insular cortex, %ICV					
No chronic pain	393	0.892 (0.884–0.898)	145	0.868 (0.855–0.880)	0.20
Chronic low back pain	129	0.874 (0.860–0.887)	59	0.866 (0.846–0.885)	
<i>P</i> value		0.04		0.85	
Thalamus, %ICV					
No chronic pain	393	0.839 (0.833–0.845)	145	0.815 (0.804–0.826)	0.42
Chronic low back pain	129	0.833 (0.823–0.844)	59	0.816 (0.799–0.833)	
<i>P</i> value		0.35		0.93	
Anterior cingulate cortex, %ICV					
No chronic pain	393	0.472 (0.465–0.478)	145	0.463 (0.452–0.474)	0.34
Chronic low back pain	129	0.459 (0.458–0.480)	59	0.470 (0.452–0.487)	
<i>P</i> value		0.67		0.53	
Posterior cingulate cortex, %ICV					
No chronic pain	393	0.381 (0.376–0.385)	145	0.374 (0.366–0.381)	0.86
Chronic low back pain	129	0.371 (0.363–0.378)	59	0.357 (0.346–0.369)	
<i>P</i> value		0.03		0.02	
Amygdala, %ICV					

No chronic pain	393	0.188 (0.186–0.190)	145	0.172 (0.168–0.176)	0.007
Chronic low back pain	129	0.180 (0.176–0.183)	59	0.175 (0.169–0.181)	
<i>P</i> value		< 0.001		0.41	
Hippocampus, %ICV					
No chronic pain	393	0.503 (0.499–0.508)	145	0.472 (0.465–0.481)	0.12
Chronic low back pain	129	0.491 (0.483–0.499)	59	0.472 (0.459–0.484)	
<i>P</i> value		0.009		0.90	

Abbreviation: ICV, intracranial volume.

Values are calculated as follows: ([left + right] regional brain volume / ICV) × 100.

726 participants in the no chronic pain group and chronic low back pain group were included in the analysis, after excluding 4 participants with missing data on some covariates.

Values are adjusted for age, sex, educational status, marital status, subjective economic status, hypertension, diabetes, serum total cholesterol, body mass index, current smoking, current drinking, regular exercise, cerebrovascular lesions on magnetic resonance imaging and activities of daily living disability.