

Supplementary Material for:

Brain activations during pain: a neuroimaging meta-analysis
of pain patients and healthy controls

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Supplementary Figure 1: Complete brain coverage of Figure 1.

Supplementary Figure 2: Complete brain coverage of Figure 2

Supplementary Figure 3: Complete brain coverage of Figure 3.

Supplementary Table 1: List of studies including healthy controls.

Supplementary Table 2: Number and distribution of brain foci originating from healthy subjects regarding different stimulation methods and body parts.

Supplementary Table 3: List of studies including patients.

Supplementary Table 4: Number and distribution of brain foci originating from patients with different conditions, stimulation methods, and stimulated part of the body.

Supplementary Tables 5: Activation likelihood estimates for different painful stimulation methods (**a** – thermal pain, **b** – distention, **c** – electrical) across all functional imaging studies between 1990 and 2014 in healthy subjects ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Supplementary Tables 6: Activation likelihood estimates for different stimulated body parts (**a** – arm, **b** – hand, **c** – leg) across all functional imaging studies between 1990 and 2014 in healthy subjects ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

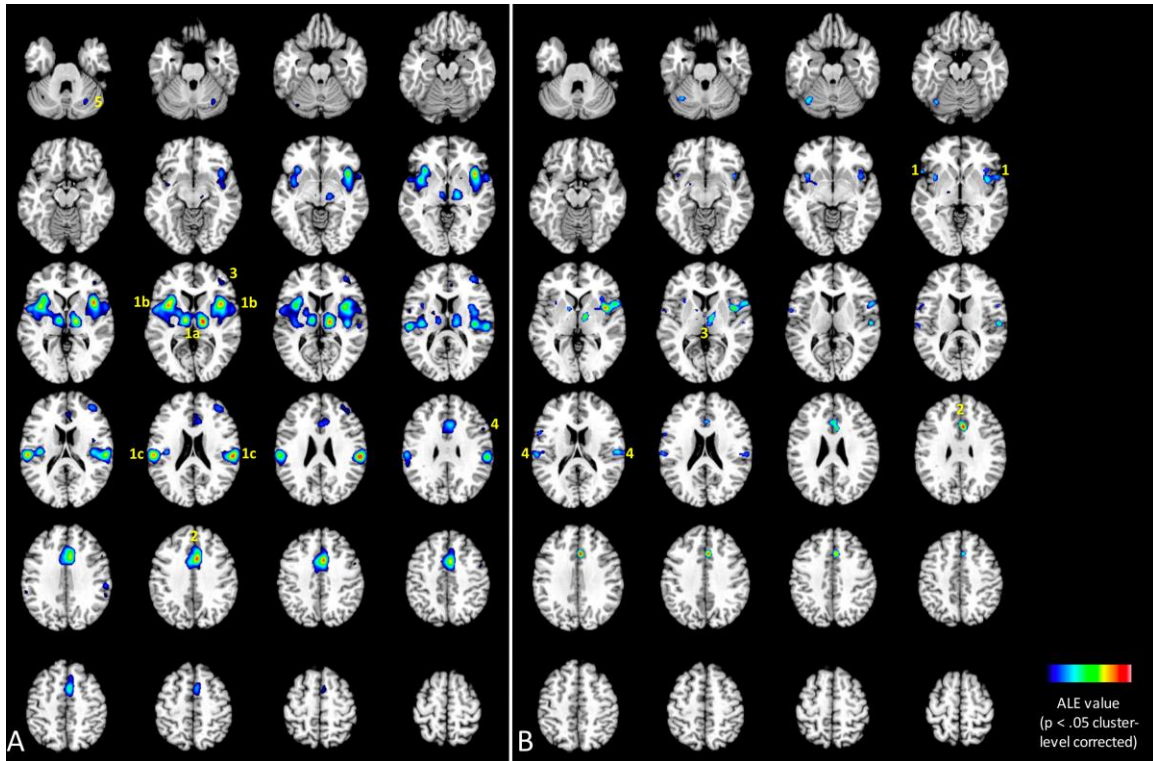
Supplementary Tables 7: Activation likelihood estimates for different patient groups (**a** – fibromyalgia, **b** – IBS, **c** – headache) across all functional imaging studies between 1990 and 2014 ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Supplementary Tables 8: Activation likelihood estimates for different painful stimulation methods (**a** – pressure, **b** – distention, **c** – thermal pain) across all functional imaging studies between 1990 and 2014 in patients ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

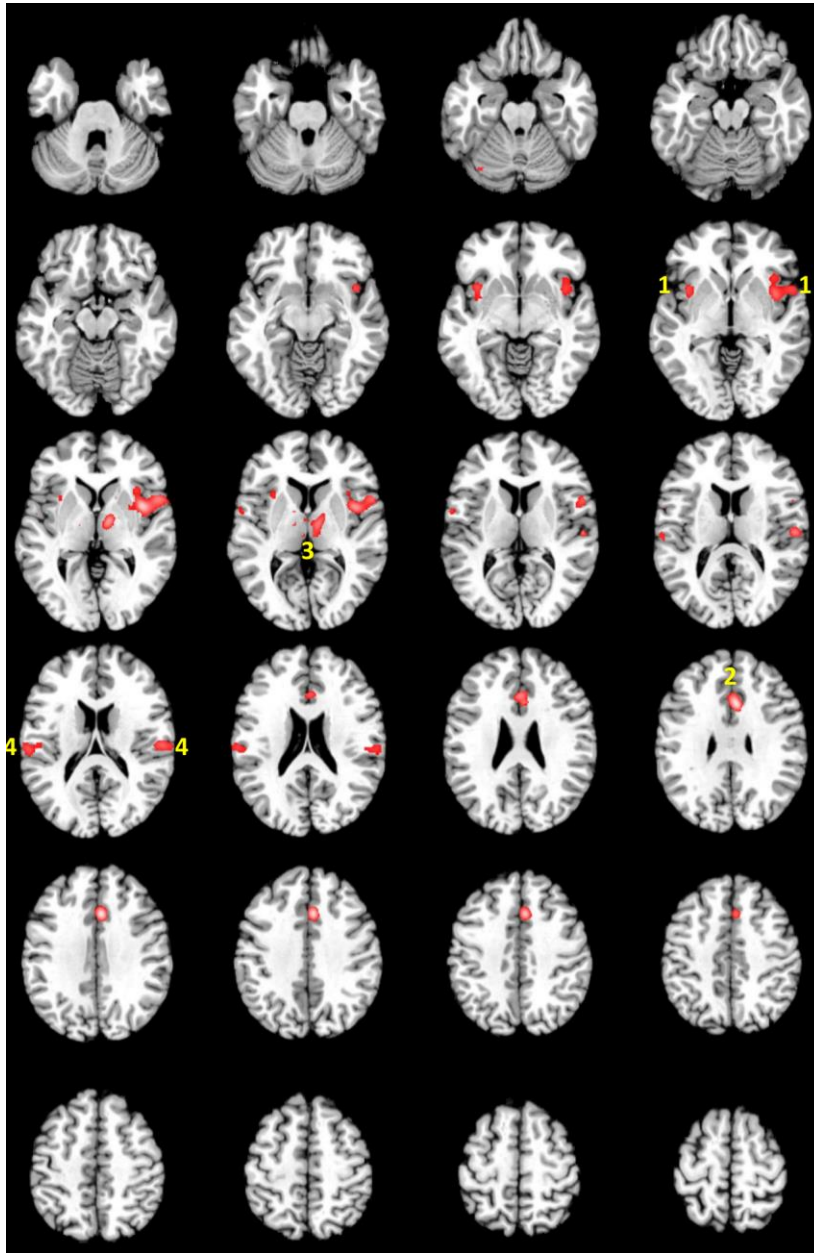
Supplementary Tables 9: Activation likelihood estimates for different stimulated body parts (**a** – hand, **b** – face, **c** – rectum) across all functional

imaing studies between 1990 and 2014 in patients ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

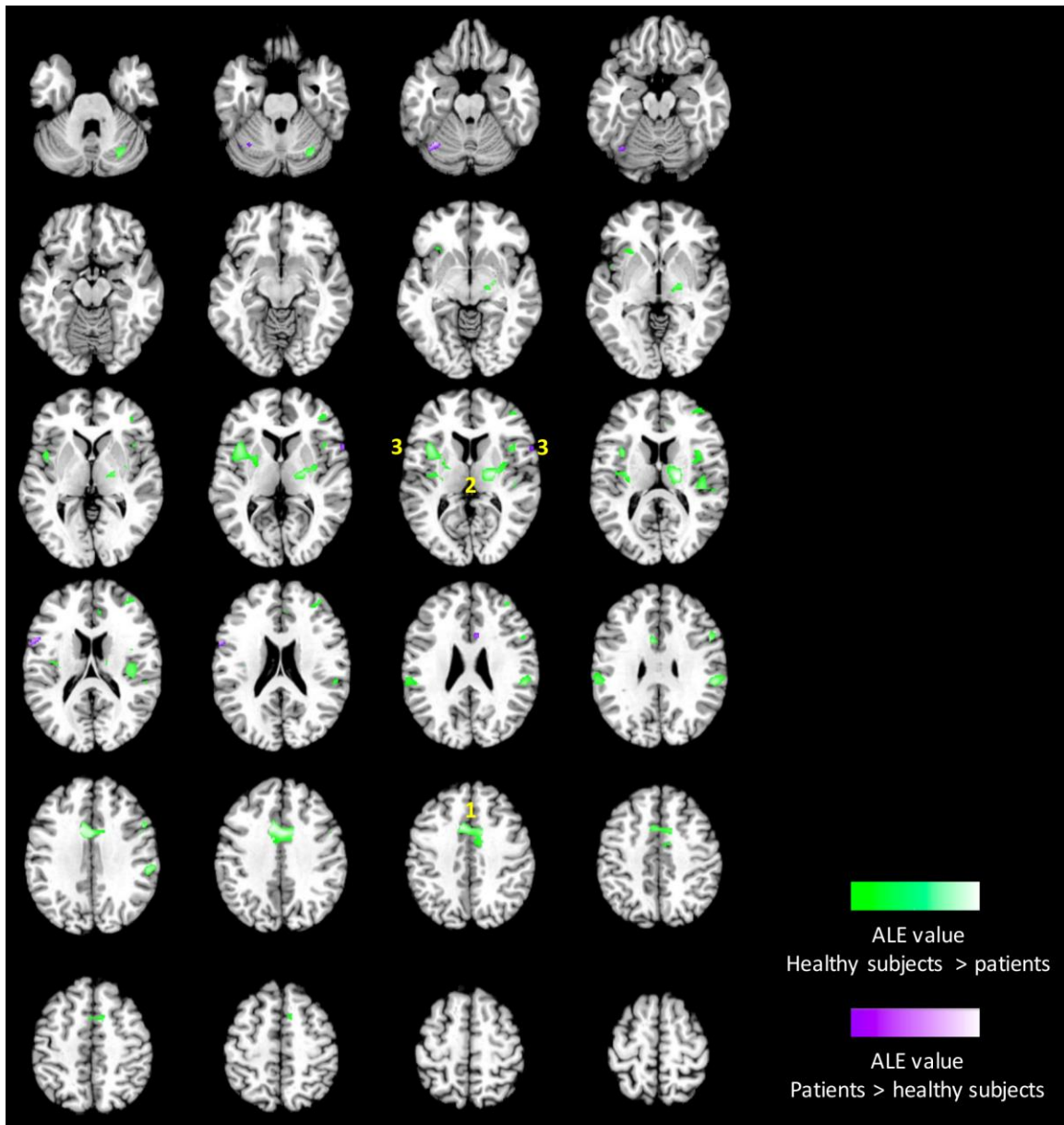
Supplementary Figure 1: Activation likelihood estimates (ALE) for noxious stimulation across all functional imaging studies between 1990 and 2014. **A)** ALE results of noxious stimulation in *healthy* individuals. **B)** ALE results of noxious stimulation in *pain patients*. In both A and B significant ALE clusters ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold) are projected onto an MNI template provided on the Ginger ALE website. The numbers in the figure correspond to the cluster numbering in the corresponding tables (letters were introduced in case multiple foci within one cluster are reported – in Figure 1A: 1a=thalamus, 1b=insula, 1c=primary and secondary somatosensory cortex).



Supplementary Figure 2: Representation of significant ALE maps. A conjunction of all foci from both healthy subjects and patients is shown. The activation likelihood maps are projected onto an MNI template provided on the Ginger ALE website. The numbers in the figure correspond to the cluster numbering in the corresponding table.



Supplementary Figure 3: Results of the subtraction analysis of significant ALE maps. The cluster maps show the contrast where healthy subjects have higher ALE values than patients in green color-coding. The contrast where patients have higher ALE values than healthy subjects is shown in purple color-coding. The activation likelihood maps are projected onto an MNI template provided on the Ginger ALE website. The numbers in the figure correspond to the cluster numbering in the corresponding table.



Supplementary Table 1: List of studies including healthy controls.

#	First author	Journal	Year	PET or fMRI?	n (m/f)	Mean age (range)	Stimulation method	Part of body	No. of contrasts	No. of foci
1	Adler, Gyulai	Anesth Analg	1997	PET	9 (5/4)	33	Heat	Arm	1	4
2	Albuquerque, de Leeuw	Pain	2006	1.5T fMRI	8 (0/8)	50.3	Heat	Face	1	12
3	Andersson, Lilja	Exp Brain Res	1997	PET	6 (6/0)	22-27	Injection	Hand	1	4
4	Aziz, Andersson	Gastroenterol	1997	PET	8 (7/1)	24-47	Distension	Esophagus	2	6
5	Baer, Wagner	Biol Psychiatr	2007	1.5T fMRI	13 (0/13)	34	Heat	Arm	1	18
6	Baliki, Chialvo	J Neurosci	2006	3.0T fMRI	11 (5/6)	48.7 (28-54)	Heat	Back	1	16
7	Becerra, Breiter	Neuron	2001	1.5T fMRI	8 (8/0)	29 (21-40)	Heat	-	2	81
8	Bensafi, Iannilli	Neuroscience	2008	1.5T fMRI	8 (0/8)	27.5	Intranasal trigeminal	Nostril	1	10
9	Benson, Kotis	Eur J Pain	2012	1.5T fMRI	30 (15/15)	25.8	Distension	Rectum	2	7
10	Bingel, Lorenz	Pain	2006	1.5T fMRI	18	24 (19-34)	Heat	Hand	1	20
11	Bingel, Quante	Neuroimage	2003	1.5T fMRI	14 (13/1)	25.8 (21-41)	Heat	Hand	2	20
12	Bingel, Quante	Pain	2002	1.5T fMRI	14 (13/1)	25.8 (21-41)	Heat	Hand	1	12
13	Bingel, Rose	Neuron	2007	3.0T fMRI	16 (16/-)	26 (22-30)	Heat	Hand	1	11
14	Binkofski, Schnitzler	Ann Neurol	1998	1.5T fMRI	5 (5/0)	31-45	Distension	Esophagus	1	9
15	Botvinick, Jha	Neuroimage	2005	1.5T fMRI	12 (0/12)	20-30	Heat	Hand	1	11
16	Bouhassira, Moisset	Neurogastroenterol Motil	2013	1.5T fMRI	11 (0/11)	41.5	Distension	Rectum	1	17
17	Boyle, Heinke	Chem Senses	2007	1.5T fMRI	15 (15/0)	35.3 (23-59)	Intranasal trigeminal	Nostril	2	22
18	Brefel-Courbon, Payoux	Mov Disorders	2005	PET	9 (6/3)	59	Cold	Hand	1	4
19	Brooks, Nurmikko	Neuroimage	2002	1.5T fMRI	18 (12/6)	21-43	Heat	Hand	2	23
20	Casey, Svensson	J Neurophysiol	2000	PET	11 (11/0)	18-28	Cold	Hand	1	9
21	Chen, Babiloni	Neuroimage	2008	1.5T fMRI	9	19-26	Electrical	Arm	1	1
22	Christmann, Koeppel	Neuroimage	2007	1.5T fMRI	6 (3/3)	27 (24-37)	Electrical	Hand	1	10
23	Coen, Kano	Gastroenterology	2011	3.0T fMRI	31 (15/16)	30 (22-38)	Distension	Esophagus	1	25
24	Coghill, Talbot	J Neurosci	1994	PET	9 (9/0)	27 (20-35)	Heat	Arm	1	14
25	Cole, Farrell	Brain	2006	1.5T fMRI	15 (9/6)	79	Pressure	Hand	1	20
26	de la Fuente-Sandoval, Favila	Psychiatry Research: Neuroimaging	2010	3.0T fMRI	13 (10/3)	26.1	Heat	Hand	1	8
27	de Leeuw, Davis	Oral Surg Oral Med Oral Pathol Oral Radiol Endod	2006	1.5T fMRI	9 (0/9)	26	Heat	Face	1	16
28	Derbyshire, Jones	J Neurol Neurosurg Psychiatr	1994	PET	6 (0/6)	54 (47-69)	Heat	Hand	1	6
29	Derbyshire, Jones	Pain	1998	PET	12 (12/-)	28 (19-47)	Heat	Hand	1	8
30	Dube, Duquette	Neuroimage	2009	1.5T fMRI	12	30-45	Heat	Leg	1	24
31	Ducreux, Attal	Brain	2006	1.5T fMRI	6		Cold	Hand	1	25
32	Ettlin, Bruegger	Eur J Oral Sci	2009	3.0T fMRI	17 (10/7)	26-45	Electrical	Tooth	1	9
33	Farmer, Coen	Pain	2013	3.0T fMRI	29 (15/14)	20-53	Distension	Esophagus	2	37

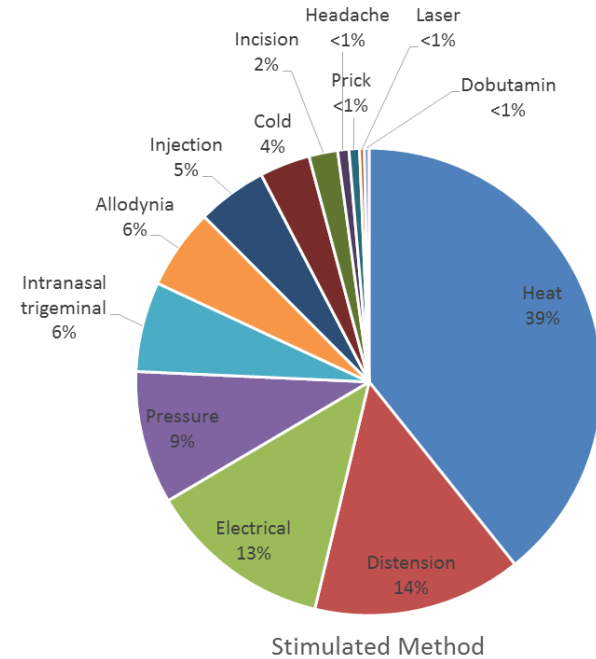
34	Faymonville, Laureys	Anesthesiol	2000	PET	11 (7/4)	31.7 (27-55)	Heat	Hand	1	10
35	Frankenstein, Richter	Neuroimage	2001	1.5T fMRI	12 (6/6)	23 (19-39)	Cold	Foot	1	10
36	Freund, Klug	Somatosens Mot Res	2009	1.5T fMRI	15 (8/7)	32 (19-47)	Heat	Hand	2	10
37	Freund, Stuber	Somatosens Mot Res	2007	1.5T fMRI	15 (10/5)	35 (25-64)	Electrical	Hand	2	11
38	Gelnar, Krauss	Neuroimage	1999	1.5T fMRI	9		Heat	Hand	1	9
39	Giesecke, Gracely	Arthritis Rheum	2004	1.5T fMRI	11 (7/4)	41	Pressure	Hand	2	8
40	Gopinath, Gandhi	NeuroToxicology	2012	3.0T fMRI	14 (14/0)	61	Heat	Arm	1	33
41	Gracely, Petzke	Arthritis Rheumatism	2002	1.5T fMRI	16 (1/15)	45.8	Pressure	Hand	1	23
42	Gyulai, Firestone	Anesthesiology	1997	PET	9 (3/6)	28.5 (22-44)	Heat	Arm	1	8
43	Hall, Kamath	Neurogastroenterol Motil	2010	3.0T fMRI	6 (0/6)	30-40	Distension	Rectum	1	10
44	Henderson, Rubin	Human Brain Mapping	2011	3.0T fMRI	13	19-48	Injection	Arm/Hand	3	52
45	Hofbauer, Rainville	J Neurophysiol	2001	PET	10 (4/6)	24 (20-35)	Heat	Hand	1	2
46	Hsieh, Hannerz	Pain	1996	PET	7 (5/2)	45	Headache	Head	1	19
47	Hummel, Oehme	Hum Brain Mapp	2009	PET	12 (12/0)	36 (30-58)	Intranasal trigeminal	Nostril	1	10
48	Iadarola, Berman	Brain	1998	PET	13(8/5)	24-50	Injection/Allodynia	Arm	2	52
49	Iannilli, Del Gratta	Pain	2008	1.5T fMRI	18	31	Intranasal trigeminal	Nostril	1	21
50	Iannilli, Gerber	Brain Res	2007	1.5T fMRI	12	61	Intranasal trigeminal	Nostril	1	20
51	Ibinson, Small	Anesthesiol	2004	1.5T fMRI	6 (3/3)	31 (25-48)	Electrical	Arm	1	7
52	Jantsch, Kempainen	Pain	2005	1.5T fMRI	8 (4/4)	21-28	Pressure/Electrical	Hand/Tooth	4	84
53	Kanazawa, Hamaguchi	Neurogastroenterol Motil	2010	PET	32 (32/0)	22 (19-29)	Distension	Rectum	2	9
54	Kattoor	PLOS ONE	2013	3.0T fMRI	19	24.06	Distension	Rectum	1	6
55	Kobayashi, Kurata	Spine	2009	fMRI	14 (8/0)	29 (22-42)	Pressure	Back	2	5
56	Kong, Jensen	Pain	2013	3.0T fMRI	46	-	Heat	Arm	1	15
57	Kong, Loggia	Pain	2010	3.0T fMRI	61 (28/33)	26.6	Heat	Arm	2	21
58	Kong, White	Human Brain Mapping	2006	3.0T fMRI	16 (8/8)	27	Heat	Arm	1	13
59	Korotkov, Ljubisavljevic	Neurosci Lett	2002	PET	16 (16/-)	24.3 (18-40)	Injection	Arm	2	2
60	Koyama, McHaffie	PNAS	2005	3.0T fMRI	10 (8/2)	30 (24-46)	Heat	Leg	1	17
61	Kupers, Svensson	Pain	2004	PET	10 (6/4)	24	Injection	Face	1	19
62	Kwan, Diamant	Neurology	2005	1.5T fMRI	20 (3/6/4/7)	32 (24-49)	Distension	Rectum	1	28
63	Ladabaum, Minoshita	Gastroenterol	2001	PET	15 (6/9)	21-49	Distension	Stomach	3	29
64	Longo, Iannetti	J Neurosci	2012	1.5T fMRI	14 (11/3)	19-44	Laser	Hand	1	8
65	López-Solà, Pujol	Neuropsychopharmacology	2010	1.5T fMRI	20 (5/15)	47.2	Heat	Arm	1	8
66	Lorenz, Cross	Neuron	2002	PET	14 (14/-)	23.9	Heat	Arm	2	10
67	Lorenz, Egger	Br J Anesthes	2008	1.5T fMRI	11 (11/-)	28	Pressure	Leg	1	24
68	Lu, Wu	Neurogastroenterol Motil	2004	3.0T fMRI	10 (8/2)	23	Distension	Stomach	1	48

69	Lu, Hsieh	Pain	2010	3.0T fMRI	14 (5/9)	23.9	Distension	Stomach	1	27
70	Lui, Duzzi	Pain	2008	1.5T fMRI	14 (8/6)	25 (21-46)	Pressure	Hand	1	20
71	Maeda, Ono	J Anesth	2011	1.5T fMRI	12 (7/5)	24-56	Pressure	Leg	2	22
72	Maihofner, Handwerker	Neuroimage	2005	1.5T fMRI	12 (11/1)	32.2(24-47)	Prick/Allodynia	Arm	4	51
73	Maihofner, Herzner	Eur J Neurosci	2006	1.5T fMRI	14 (6/8)	25 (20-33)	Heat/Pressure	Arm	2	39
74	Maihofner, Schmelz	Eur J Neurosci	2004	1.5T fMRI	11 (10/1)	28 (21-41)	Allodynia	Arm	1	7
75	Maihofner, Seifert	Neuroimage	2011	1.5T fMRI	12 (6/6)	26.5	Pressure	Hand	1	16
76	Maihofner, Ringler	Eur J Neurosci	2007	1.5T fMRI	14 (8/6)	27 (20-39)	Pressure/ Allodynia	Arm	2	27
77	May, Kaube	Pain	1998	PET	7 (7/-)	30 (25-35)	Injection	Face	1	8
78	Mayhew, Hylands-White	Neuroimage	2013	3.0T fMRI	13	-	Heat	Leg	1	19
79	Mobascher, Brinkmeyer	Neuroimage	2009	3.0T fMRI	20 (20/-)	29	Heat	Hand	1	17
80	Mobascher, Brinkmeyer	Neuroimage	2009b	3.0T fMRI	12 (12/-)	27	Heat	Hand	1	17
81	Mochizuki, Sadato	Neuroimage	2007	3.0T fMRI	14 (14/-)	26	Cold	Arm	1	7
82	Mohr, Leyendecker	Pain	2008	1.5T fMRI	15 (15/-)	27 (21-46)	Allodynia	Hand	1	6
83	Moisset, Bouhassira	European Journal of Pain	2010	1.5T fMRI	11 (0/11)	38.4	Distension	Rectum	1	21
84	Morrison, Lloyd	Cognitive, Affective, & Behavioral Neurosci	2004	1.5T fMRI	14 (5/9)	23	Prick	Hand	2	9
85	Naglatzki, Schlamann	European Journal of Pain	2012	1.5T fMRI	13 (8/5)	34 (19-47)	Electrical	Arm	1	8
86	Nemoto, Nemoto	Neuroreport	2003	PET	12 (6/6)	21-24	Heat	Arm	1	13
87	Niddam, Yeh	Neuroimage	2002	3.0T fMRI	10 (10/-)	26.8	Electrical	Arm	1	30
88	Ochsner, Ludlow	Pain	2006	3.0T fMRI	13 (6/7)	29 (19-42)	Heat	Arm	1	19
89	Oertel, Preibisch	Clin Pharmacol	2008	3.0T fMRI	16 (8/8)	27	Intranasal trigeminal	Nostril	1	24
90	Paulson, Minoshima	Pain	1998	PET	20 (10/10)	18-39	Heat	Arm	2	20
91	Perini, Bergstrand	The Journal of Neuroscience	2013	3.0T fMRI	18 (9/9)	21-33	Heat, Cold	Hand	1	7
92	Petrovic, Kalso	Science	2002	PET	9	20-27	Heat	Hand	1	6
93	Peyron, Kupers	Neurophysiol Clin	2007	1.0T fMRI	9 (9/-)	19	Electrical	Leg	1	12
94	Pogatzki-Zahn, Wagner	Anesthesiology	2010	3.0T fMRI	30 (30/0)	25	Incision	Arm	3	49
95	Pujol, Lopez-Sola	PLoS One	2009	1.5T fMRI	9 (0/9)	47	Pressure	Hand	1	12
96	Pukall, Striga	Pain	2005	1.5T fMRI	14 (0/14)	-	Pressure	Vulva	1	2
97	Remy, Frankenstein	Neuroimage	2003	3.0T fMRI	12 (6/6)	24	Heat	Hand	1	6
98	Roberts, Papadaki	BMC Anesthesiol	2008	1.5T fMRI	10(4/6)	27 (22-35)	Heat	Arm	1	17
99	Rosen, Paulesu	Heart	2002	PET	8 (3/5)	56	Dobutamin	Chest	1	8
100	Rottmann, Jung	Eur J Pain	2009	3.0T fMRI	17 (17/-)	19-28	Electrical	Hand	1	20
101	Russo, Tessitore	J Neurol	2012	3.0T fMRI	16 (8/8)	27.5	Heat	Face	2	29
102	Scheef, Jankowski	Pain	2012	3.0T fMRI	20 (20/0)	39	Heat	Arm	2	58
103	Schulz-Stubner, Krings	Reg Anesth Pain Med	2004	1.5T fMRI	12		Heat	Arm	1	24
104	Seifert, Maihofner	Neuroimage	2007	1.5T fMRI	12 (7/5)	27	Cold/Allodynia	Arm	2	41

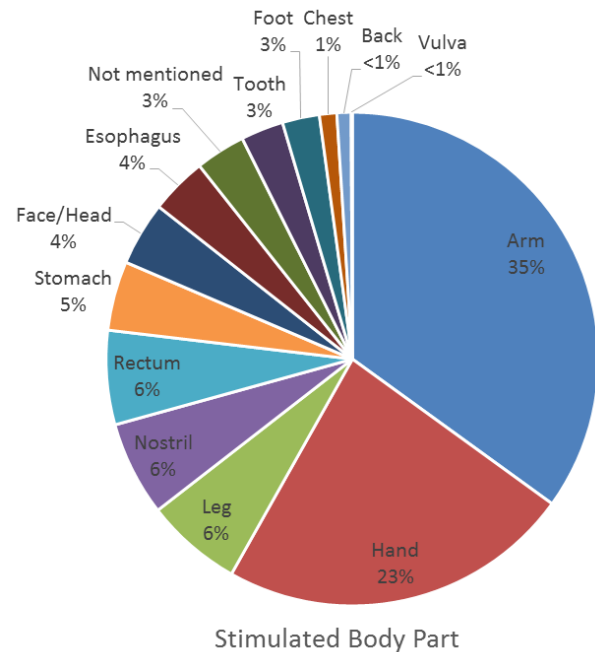
105	Seminowicz, Davis	Pain	2006	1.5T fMRI	22 (10/12)	25	Electrical	Arm	2	23
106	Seminowicz, Mikulis	Pain	2004	1.5T fMRI	16 (8/8)	26 (19-34)	Electrical	Arm	1	6
107	Shukla, Torossian	Molecular Pain	2011	3.0T fMRI	10 (4/6)	-	Heat	Leg	1	6
108	Singer, Seymour	Science	2004	1.5T fMRI	16 (-/16)	25	Electrical	Hand	1	8
109	Smith, Humes	Neurogastroenterol Motil	2011	3.0T fMRI	14 (0/14)	29 (19-53)	Distension	Rectum	3	34
110	Smith, Ploghaus	Br J Psychiatry	2002	3.0T fMRI	8 (0/8)	-	Heat	Hand	1	13
111	Song, Venkatraman	Pain	2006	3.0T fMRI	12 (0/12)	23 (SE=0.92)	Distension	Rectum	1	20
112	Sprenger, Valet	Anesth Analg	2006	1.5T fMRI	12 (12/-)	27 (23-36)	Heat	Arm	1	20
113	Stankewitz, Voit	Cephalalgia	2010	3.0T fMRI	20	-	Intranasal trigeminal	Nostril	1	23
114	Strigo, Duncan	J Neurophys	2003	1.5T fMRI	7 (4/3)	25.8 (19-34)	Distension/Heat	Esophagus/ Chest	2	35
115	Strigo, Matthews	Transl Psychiatry	2013	3.0T fMRI	22 (11/11)	26.8	Heat	Arm	1	9
116	Svensson, Johannsen	Eur J Pain	1998	PET	10 (10/-)	27	Heat	Arm	1	2
117	Svensson, Minoshima	J Neurophysiol	1997	PET	11 (11/-)	30.4	Heat/Electrical	Arm	2	6
118	Ter Minassian, Ricalens	Human Brain Mapping	2013	1.5T fMRI	20 (15/5)	35 (26-56)	Electrical	Arm	1	73
119	Thunberg, Lyskow	Eur J Pain	2005	PET	19 (19/-)	26	Injection	Back	1	2
120	Tolle, Kaufmann	Ann Neurol	1999	PET	12 (12/-)	49 (23-75)	Heat	Arm	1	6
121	Tracey, Becerra	Neurosci Lett	2000	1.5T fMRI	6 (6/-)	31	Cold/Heat	Hand	2	25
122	Tseng, Tseng	Human Brain Mapping	2010	3.0T fMRI	12 (6/6)	41 (25-67)	Heat	Foot	1	31
123	Uematsu, Shibatab	Neuroscience Research	2011	1.5T fMRI	17 (10/7)	23-33	Pressure	Leg	1	17
124	Valet, Sprenger	Pain	2004	1.5T fMRI	7 (6/1)	32 (23-44)	Heat	Arm	1	16
125	van den Bosch, van Hemmen	European Journal of Pain	2013	1.5T fMRI	18 (8/10)	22.9 (21-29)	Heat	Hand	2	12
126	Vandenbergh, Dupont	Gastroenterol	2005	PET	11 (5/6)	23	Distension	Stomach	1	8
127	Vanhaudenhuyse, Boly	Neuroimage	2009	3.0T fMRI	13 (8/5)	24	Heat	Hand	1	10
128	Veldhuijzen, Nemenov	Pain	2009	3.0T fMRI	9	29.7	Heat	Foot	1	10
129	Vogt, Derbyshire	Eur J Neurosci	1996	PET	7 (7/-)	26	Heat	Hand	1	8
130	Wiech, Farias	Pain	2008	3.0T fMRI	12 (4/8)	24	Electrical	Hand	1	21
131	Wiech, Seymour	Neuroimage	2005	1.5T fMRI	15 (10/5)	26 (20-47)	Allodynia	Arm	1	3
132	Wise, Lujan	Magnetic Res Imaging	2007	3.0T fMRI	8 (8/-)	25	Heat	Hand	1	14
133	Witting, Kupers	Neurology	2001	PET	8 (6/2)	23 (21-25)	Injection/Allodynia	Arm	2	18
134	Xu, Fukuyama	Neuroreport	1997	PET	6 (6/-)	19-37	Heat	Hand/Foot	2	22
135	Yang, Symonds	NeuroReport	2012	3.0T fMRI	16 (0/16)	19-22	Electrical	Hand	1	4
136	Yoshino, Okamoto	Neuroimage	2009	1.5T fMRI	15 (9/6)	25	Electrical	Arm	1	9
137	Zambreanu, Wise	Pain	2005	3.0T fMRI	12 (6/6)	27	Allodynia	Leg	1	15
138	Ziv, Tomer	Human Brain Mapping	2010	3.0T fMRI	10 (5/5)	-	Heat	Arm	1	15

Supplementary Table 2: Number and distribution of brain foci originating from healthy subjects regarding different stimulation methods (note that foci of one study are not included in this table since they only calculated a contrast of painful stimulation across heat and cold stimulation), and stimulated parts of the body.

Stimulation Method	No. of foci
Heat	965
Distension	356
Electrical	314
Pressure	226
Intranasal trigeminal	130
Allodynia	137
Injection	119
Cold	86
Incision	49
Headache	19
Prick	18
Laser	8
Dobutamin	8



Stimulated Body Part	No. of foci
Arm	862
Hand	572
Leg	156
Nostril	130
Rectum	152
Stomach	112
Face/Head	103
Esophagus	92
Not mentioned	81
Tooth	69
Foot	60
Chest	28
Back	23
Vulva	2



Supplementary Table 3: List of studies including patients

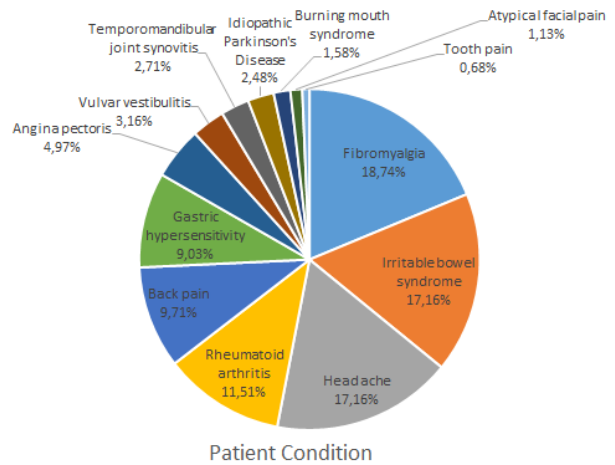
#	First author	Journal	Year	PET or fMRI?	n patients (m/f); n healthy (m/f)	Mean age (range)	Patient condition	Stimulation method	Part of body	No. of contrasts	No. of foci
1	Albuquerque, de Leeuw	Pain	2006	1.5T fMRI	8 (0/8)	49.1	Burning mouth syndrome	Heat	Face	1	7
2	Baliki, Chialvo	J Neurosci	2006	1.5T fMRI	11 (5/6)	50 (29-68)	Back pain	Heat/ Spontaneous pain	Back	2	18
3	Bouhassira, Moisset	Neurogastroenterol Motil	2013	1.5T fMRI	20 (0/20)	43.9	IBS	Distension	Rectum	1	18
4	Brefel-Courbon, Payoux	Mov Disorders	2005	PET	9 (6/3)	65	Idiopathic PD	Cold	Hand	1	4
5	Brefel-Courbon, Ory-Magne	Parkinsonism and Related Disorders	2013	PET	9 (6/3)	61	Idiopathic PD	Cold	Hand	1	3
6	Dellapina, Ory-Magne	Pain	2012	PET	8	65.1	Idiopathic PD	Heat	Hand	1	4
7	Derbyshire, Jones	J Neurol Neurosurg Psychiatr	1994	PET	6 (0/6)	53 (42-65)	Atypical facial pain	Heat	Hand	1	5
8	Derbyshire, Jones	Eur J Pain	1999	PET	6(6/0)	24	Tooth pain	Heat	Hand	1	3
9	Giesecke, Gracely	Arthritis Rheum	2004	1.5T fMRI	11 (3/8); 16 (4/12)	44 (24-54); 45	Back pain; Fibromyalgia	Pressure	Hand	2	24
10	Gracely, Geisser	Brain	2004	1.5T fMRI	29 (10/19)	18-60	Fibromyalgia	Pressure	Hand	2	27
11	Gracely, Petzke	Arthritis Rheumatism	2002	1.5T fMRI	16 (1/15)	52.6	Fibromyalgia	Pressure	Hand	1	13
12	Hall, Kamath	Neurogastroenterol Motil	2010	3.0T fMRI	7 (0/7)	(30-40)	IBS	Distension	Rectum	2	13
13	Jensen, Kosek	Pain	2012	1.5T fMRI	40 (0/40)	-	Fibromyalgia	Pressure	Hand	1	6
14	Jensen, Petzke	Arthritis Rheum	2010	1.5T fMRI	83	43.8	Fibromyalgia	Pressure	Hand	1	10
15	Kobayashi, Kurata	Spine	2009	3.0T fMRI	6	33 (22-44)	Back pain	Pressure	Back	2	13
16	Kwan, Diamant	Neurology	2005	1.5T fMRI	9 (3/6)	38 (23-55)	IBS	Distension	Rectum	1	27
17	Lieberman, Jarcho	Neuroimage	2004	PET	23 (10/13)	41 (25-60)	IBS	Distension	Rectum	1	7
18	Maniyar, Sprenger	Brain	2014	PET	8 (3/5)	30 (19-47)	Headache	Nitroglycerin	Head	1	9
19	Matharu, Cohen	Ann Neurol	2006	PET	7 (3/4)	51	Headache	Spontaneous pain	Head	1	17
20	May, Baha	Neurology	2000	PET	17	25-64	Headache	Nitroglycerin	Head	1	10
21	Pujol, Lopez-Sola	PLoS One	2009	1.5T fMRI	9 (0/9)	47	Fibromyalgia	Pressure	Hand	1	12
22	Pukall, Striga	Pain	2005	1.5T fMRI	14 (0/14)	25 (19-39)	Vulvar vestibulitis syndrome	Pressure	Vulva	1	14
23	Rosen, Paulesu	Heart	2002	PET	8 (2/6)	59	Angina pectoris	Dobutamine	Chest	1	9
24	Rosen, Paulesu	Lancet	1994	PET	12 (9/3)	43-72	Angina pectoris	Dobutamine	Chest	1	13
25	Russo, Tessitore	J Neurol	2012	3.0T fMRI	16 (8/8)	27.8	Headache	Heat	Face	2	33
26	Schweinhart, Kalk	Neuroimage	2008	3.0T fMRI	20 (6/14)	57	Rheumatoid arthritis	Heat/Pressure	Arm/Hand	2	51
27	Song, Venkatraman	Pain	2006	3.0T fMRI	12 (0/12)	23 (SE=0.39)	IBS	Distension	Rectum	1	11
28	Vandenberghe	Gastroenterology	2007	PET	13 (3/10)	30.6	Gastric hypersensitivity	Distension	Stomach	1	19
29	Van Oudenhove, Vandenberghe	Am J Gastroenterol	2010	PET	25 (5/20)	33	Gastric hypersensitivity	Distension	Stomach	1	21
30	Weiller, May	Nature Med	1995	PET	9 (2/7)	29-57	Headache	Spontaneous pain	Head	1	7
31	Wik, Fischer	Int J Neurosci	2007	PET	8 (0/8)	47	Fibromyalgia	Pressure	Arm	1	3
32	Zhao, Jin	Chin Med J	2011	2.0T fMRI	14 (3/11)	32 (18-56)	Temporomandibular joint synovitis	Pressure	Face	2	12

Supplementary Table 4: Number and distribution of brain foci originating from patients with different conditions, stimulation methods, and stimulated part of the body.

Patient condition

Fibromyalgia	83
Irritable bowel syndrome	76
Head ache	76
Rheumatoid arthritis	51
Back pain	43
Gastric hypersensitivity	40
Angina pectoris	22
Vulvar vestibulitis	14
Temporomandibular joint synovitis	12
Idiopathic Parkinson's Disease	11
Burning mouth syndrome	7
Atypical facial pain	5
Tooth pain	3

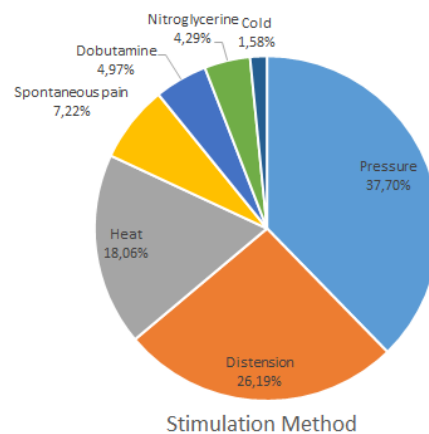
No. of foci



Stimulation Method

Pressure	167
Distension	116
Heat	80
Spontaneous pain	32
Dobutamine	22
Nitroglycerine	19
Cold	7

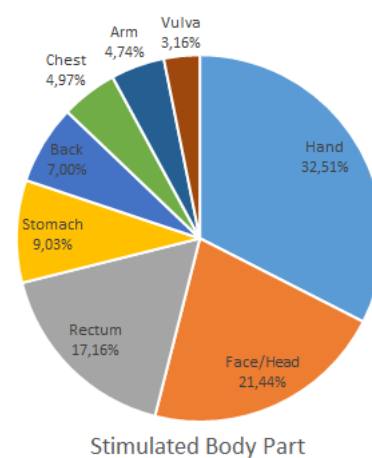
No. of foci



Stimulated body part

Hand	144
Face/Head	95
Rectum	76
Stomach	40
Back	31
Chest	22
Arm	21
Vulva	14

No. of foci



Supplementary Table 5a: Activation likelihood estimates for different painful stimulation methods (a – thermal pain) across all functional imaging studies between 1990 and 2014 in healthy subjects ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	49.9	-12	-12	4	Thalamus
	47.7	-64	-22	22	Postcentral gyurs
	44.9	-34	18	4	Insula
	43.9	-40	8	4	Insula
	43.9	-40	-18	14	Insula
	25.6	-54	6	4	Superior temporal gyrus
	23.1	-26	-4	4	Putamen
	19.2	-58	-38	30	Inferior parietal lobule
2	60.9	56	-24	24	Inferior parietal lobule
	54.1	36	8	8	Clastrum
	52.2	40	-18	14	Insula
	40.3	38	20	-2	Insula
	29.8	56	-40	34	Inferior parietal lobule
	25.1	22	10	-4	Putamen
	21.6	44	-8	-6	Insula
	20.5	54	-36	46	Inferior parietal lobule
	19.2	42	32	0	Inferior frontal gyrus
3	65.8	4	12	38	Cingulate gyrus
	31.9	6	14	52	Superior frontal gyrus
	20.0	8	26	22	Anterior cingulate gyrus
4	52.3	14	-14	8	Thalamus
	19.0	-2	-22	-6	Brain stem
5	41.9	36	50	14	Middle frontal gyrus
	22.1	42	44	6	Middle frontal gyrus
6	33.8	-36	-58	-34	Cerebellum
	24.8	-28	-66	-36	Cerebellum
7	32.4	28	-64	-30	Cerebellum
8	23.8	50	6	34	Precentral gyrus
	21.1	48	2	44	Precentral gyrus
9	23.3	10	44	12	Anterior cingulate gyrus

Supplementary Table 5b: Activation likelihood estimates for different painful stimulation methods (b – distention) across all functional imaging studies between 1990 and 2014 in healthy subjects ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	27.8	-12	-12	8	Thalamus
	24.2	-34	8	4	Clastrum
	22.6	-22	-2	4	Putamen
	20.0	-30	0	0	Putamen
	18.4	-22	0	18	Putamen
	16.7	-18	-6	16	Thalamus
	16.6	-36	20	2	Insula
	14.1	-34	22	-4	Insula
2	31.3	14	-10	2	Thalamus
	19.1	36	14	2	Clastrum
	17.5	32	8	8	Clastrum
	15.9	12	-4	10	Thalamus
	14.3	34	2	-4	Putamen
	13.4	28	-2	4	Putamen
	12.5	26	-10	6	Putamen
3	28.3	60	-24	26	Inferior parietal lobule
	27.4	62	-32	18	Insula
4	18.9	-54	-20	16	Insula
	18.8	-62	-24	24	Postcentral gyrus
	18.2	-60	-18	24	Inferior parietal lobule
5	17.7	56	-6	4	Precentral gyrus
	13.8	62	-8	6	Superior temporal gyrus
	13.5	64	-8	16	Postcentral gyrus
6	17.1	8	12	34	Cingulate gyrus
7	16.4	0	10	44	Cingulate gyrus

Supplementary table 5c: Activation likelihood estimates for different painful stimulation methods (c – electrical) across all functional imaging studies between 1990 and 2014 in healthy subjects ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	25.4	48	-26	18	Insula
	20.9	58	-24	22	Postcentral gyurs
2	20.9	58	2	8	Precentral gyrus
	19.4	46	2	2	Insula
	19.0	42	18	-4	Insula
	13.3	42	-2	14	Insula
	11.5	58	12	-8	Superior temporal gyrus
3	18.6	-6	6	36	Cingulate gyrus
	16.1	6	4	44	Cingulate gyrus
4	22.2	-62	-20	20	Postcentral gyrus
5	19.2	16	-18	4	Thalamus
6	18.5	-56	6	0	Superior temporal gyrus
7	15.1	-36	10	6	Insula
	12.2	-40	4	0	Clastrum
8	14.3	-44	-8	-8	Insula
	12.8	-46	-8	0	Insula
9	15.6	-42	-22	18	Insula
10	15.9	-2	40	20	Anterior cingulate gyrus

Supplementary Table 6a: Activation likelihood estimates for different stimulated body parts (a – arm) across all functional imaging studies between 1990 and 2014 in healthy subjects ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	49.9	-12	-12	4	Thalamus
	47.7	-64	-22	22	Postcentral gyrus
	44.9	-34	18	4	Insula
	43.9	-40	8	4	Insula
	43.9	-40	-18	14	Insula
	25.6	-54	6	4	Superior temporal gyrus
	23.1	-26	-4	4	Putamen
	19.2	-58	-38	30	Inferior parietal lobule
2	60.9	56	-24	24	Inferior parietal lobule
	54.1	36	8	8	Clastrum
	52.2	40	-18	14	Insula
	40.3	38	20	-2	Insula
	29.8	56	-40	34	Inferior parietal lobule
	25.1	22	10	-4	Putamen
	21.6	44	-8	-6	Insula
	20.5	54	-36	46	Inferior parietal lobule
	19.2	42	32	0	Inferior frontal gyrus
3	65.8	4	12	38	Cingulate gyrus
	31.9	6	14	52	Superior frontal gyrus
	20.0	8	26	22	Anterior cingulate gyrus
4	52.3	14	-14	8	Thalamus
	19.0	-2	-22	-6	Brain stem
5	41.9	36	50	14	Middle frontal gyrus
	22.1	42	44	6	Middle frontal gyrus
6	33.8	-36	-58	-34	Cerebellum
	24.8	-28	-66	-36	Cerebellum
7	32.4	28	-64	-30	Cerebellum
8	23.8	50	6	34	Precentral gyrus
	21.1	48	2	44	Precentral gyrus
9	23.3	10	44	12	Anterior cingulate gyrus

Supplementary table 6b: Activation likelihood estimates for different stimulated body parts (b – hand) across all functional imaging studies between 1990 and 2014 in healthy subjects ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	44.2	58	-20	16	Insula
	40.5	36	8	8	Clastrum
	32.1	40	18	-2	Insula
	31.8	50	-26	20	Insula
	26.0	58	10	-2	Superior temporal gyrus
	25.8	38	-16	16	Insula
	24.8	42	4	-6	Clastrum
	16.8	20	10	-4	Putamen
	12.6	58	-40	22	Superior temporal gyrus
2	38.5	-60	-24	20	Postcentral gyrus
	31.8	-40	-18	18	Insula
	31.3	-38	8	4	Insula
	31.2	-32	20	0	Clastrum
	22.3	-46	-8	2	Insula
	18.7	-56	8	-2	Superior temporal gyrus
	18.3	-38	-2	12	Insula
	17.4	-54	-4	8	Precentral gyrus
	14.9	-60	-34	12	Superior temporal gyrus
3	28.0	4	12	36	Cingulate gyrus
	23.4	-2	-8	54	Medial frontal gyrus
	21.3	8	26	24	Cingulate gyrus
	19.2	-8	4	38	Cingulate gyrus
	17.6	0	28	34	Cingulate gyrus
	16.3	-2	18	46	Medial frontal gyrus
	12.5	4	8	58	Medial frontal gyrus
4	35.2	-10	-12	2	Thalamus
	31.9	14	-16	6	Thalamus
5	28.5	38	48	16	Middle frontal gyrus
6	20.5	20	-2	-16	Parahippocampal gyrus
7	13.9	44	-54	54	Superior parietal lobule
	13.7	52	-46	52	Inferior parietal lobule
	12.4	54	-52	46	Inferior parietal lobule
	12.4	48	-32	52	Inferior parietal lobule
	12.2	46	-38	56	Inferior parietal lobule
8	22.3	30	-64	-30	Cerebellum
9	15.5	-32	-70	-20	Cerebellum
	11.2	-30	-78	-28	Cerebellum

Supplementary table 6c: Activation likelihood estimates for different stimulated body parts (c – leg) across all functional imaging studies between 1990 and 2014 in healthy subjects ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	16.6	8	24	36	Cingulate gyrus
	11.4	-6	12	42	Cingulate gyrus
	8.9	-4	24	36	Cingulate gyrus
	8.6	4	16	46	Medial frontal gyrus
	8.5	2	14	40	Cingulate gyrus
	7.5	4	16	56	Superior frontal gyrus
	7.5	-12	26	30	Cingulate gyrus
	6.8	0	2	44	Cingulate gyrus
2	13.0	-36	6	8	Insula
	10.3	-24	12	10	Putamen
	7.8	-48	10	6	Precentral gyrus
	7.5	-56	8	12	Inferior frontal gyrus
	7.5	-40	-4	-2	Insula
	7.2	-40	4	-4	Insula
3	16.1	-56	-30	24	Inferior parietal lobule
	10.6	-60	-36	32	Supramarginal gyrus
	7.3	-62	-44	26	Inferior parietal lobule
4	14.8	-2	-6	6	Thalamus
	9.5	6	-18	0	Thalamus
	7.7	20	-18	10	Thalamus
5	15.1	28	0	6	Putamen
6	11.6	60	-30	26	Inferior parietal lobule
7	12.8	-36	-20	12	Insula
8	11.7	-28	22	-6	Clastrum
9	10.7	44	30	-6	Inferior frontal gyrus
10	7.9	56	-44	30	Inferior parietal lobule
	7.6	50	-42	46	Inferior parietal lobule
11	11.6	16	-42	68	Paracentral lobule
12	7.7	-18	-34	70	Postcentral gyrus
	7.4	-18	-40	72	Postcentral gyrus
	6.8	-22	-32	62	Parietal lobe (BA 40)
13	9.1	62	-42	8	Superior temporal gyrus
14	9.3	38	16	34	Precentral gyrus
15	9.8	-28	-74	-28	Cerebellum

Supplementary table 7a: Activation likelihood estimates for different patient groups (a – fibromyalgia) across all functional imaging studies between 1990 and 2014 ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	24.2	40	6	2	Clastrum
	11.5	56	6	-2	Superior temporal gyrus
	11.4	28	6	-2	Putamen
	6.4	18	14	-8	Putamen
2	16.9	-34	-60	-26	Cerebellum
	12.7	-34	-68	-22	Cerebellum
3	15.8	68	-20	18	Postcentral gyrus
	15.4	62	-10	40	Precentral gyrus
	15.3	58	-10	44	Postcentral gyrus
	12.8	56	-16	10	Transverse temporal gyrus
	8.9	60	-16	30	Postcentral gyrus
4	10.9	-68	-20	20	Postcentral gyrus
	10.6	-40	-18	16	Insula
	9.8	-62	-22	14	Superior temporal gyrus
	6.5	-50	-18	18	Insula
	6.4	-68	-16	10	Transverse temporal gyrus
5	15.7	10	-6	2	Thalamus
	10.6	0	-6	6	Thalamus
6	11.8	-52	-8	8	Precentral gyrus
	10.9	-54	0	0	Superior temporal gyrus
7	13.7	4	20	36	Cingulate gyrus
8	12.8	-24	0	-8	Putamen
9	9.1	-2	-18	32	Cingulate gyrus

Supplementary table 7b: Activation likelihood estimates for different patient groups (b – IBS) across all functional imaging studies between 1990 and 2014 ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	9.7	-36	16	-10	Insula
	9.6	-38	8	-2	Clastrum
2	9.3	4	22	42	Medial frontal gyrus
3	8.9	-12	-10	10	Thalamus
4	9.8	24	4	6	Putamen
5	10.7	-40	46	12	Middle frontal gyrus
6	10.8	54	-16	16	Postcentral gyurs
7	11.9	-32	22	6	Insula

Supplementary table 7c: Activation likelihood estimates for different patient groups (c – headache) across all functional imaging studies between 1990 and 2014 ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	12.4	6	18	28	Cingulate gyrus
	8.1	4	28	20	Anterior cingulate gyrus
2	10.3	-20	-10	-2	Medial globus pallidus
3	9.3	-42	0	-10	Insula
	8.5	-42	12	-14	BA 13
4	10.0	10	-8	2	Thalamus
	8.0	14	-20	4	Thalamus
5	8.4	54	-40	4	Middle temporal gyrus
6	8.8	0	-18	-12	Brain stem
7	8.4	44	0	52	Precentral gyrus
8	8.1	-6	-38	-22	Cerebellum
	6.3	2	-36	-24	Cerebellum

Supplementary table 8a: Activation likelihood estimates for different painful stimulation methods (a – pressure) across all functional imaging studies between 1990 and 2014 in patients ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	26.2	40	8	2	Clastrum
	12.7	52	14	2	Precentral gyrus
	12.2	56	6	-2	Superior temporal gyrus
	11.6	28	6	-2	Putamen
	11.6	54	12	10	Precentral gyrus
	9.5	16	8	0	Putamen
	8.4	32	20	0	Clastrum
2	13.6	-62	-24	16	Postcentral gyrus
	13.4	-64	-16	10	Transverse temporal gyrus
	12.8	-68	-16	12	Transverse temporal gyrus
	12.5	-52	-16	16	Postcentral gyrus
	11.9	-52	-8	8	Precentral gyrus
	10.9	-40	-18	16	Insula
	10.9	-54	0	0	Superior temporal gyrus
	9.6	-38	-2	6	Clastrum
	8.5	-36	-26	10	Transverse temporal gyrus
3	19.5	60	-12	42	Postcentral gyrus
	17.4	68	-20	18	Postcentral gyrus
	16.6	60	-18	16	Postcentral gyrus
	9.0	62	-32	18	Insula
	7.8	54	-6	10	Precentral gyrus
4	20.6	-34	-60	-24	Cerebellum
5	20.5	4	20	38	Cingulate gyrus
6	15.7	10	-6	2	Thalamus
	10.7	0	-6	6	Thalamus
7	11.4	-56	12	14	Inferior frontal gyrus
8	19.4	-14	6	2	Putamen
9	9.2	-2	-18	30	Cingulate gyrus
	8.9	0	-28	26	Posterior cingulate gyrus
10	11.1	-28	-24	70	Postcentral gyrus
	8.6	-34	-18	64	Precentral gyrus
11	12.8	-24	0	-8	Putamen

Supplementary table 8b: Activation likelihood estimates for different painful stimulation methods (b – distention) across all functional imaging studies between 1990 and 2014 in patients ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	13.5	-58	18	-4	Inferior frontal gyrus
	11.4	-64	4	10	Precentral gyrus
	10.4	-62	8	2	Precentral gyrus
2	9.7	-36	16	-10	Insula
	9.6	-38	8	-2	Clastrum
3	10.0	38	4	-6	Clastrum
	8.8	42	12	-10	Insula
	6.4	42	-4	-10	Clastrum
4	12.5	-32	66	-4	Superior frontal gyrus
	12.5	-32	64	-12	Superior frontal gyrus
	10.8	-38	62	-10	Superior frontal gyrus
5	9.3	4	22	42	Medial frontal gyrus
6	12.2	-54	34	-8	Inferior frontal gyrus
7	8.9	-12	-10	10	Thalamus
8	9.8	24	4	6	Putamen
9	10.7	-40	46	12	Middle frontal gyrus
10	11.3	64	12	2	Precentral gyrus
11	11.9	-32	22	6	Insula
12	10.8	54	-16	16	Postcentral gyrus
13	9.7	-56	12	-24	Superior temporal gyrus
14	10.0	56	34	-10	Inferior frontal gyrus

Supplementary table 8c: Activation likelihood estimates for different painful stimulation methods (c – thermal pain) across all functional imaging studies between 1990 and 2014 in patients ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	9.5	-14	-10	2	Thalamus
	9.0	-14	-16	-4	Thalamus
	8.6	-12	2	4	Putamen
	8.5	-6	-20	6	Thalamus
	5.2	-18	-16	10	Thalamus
2	10.5	-34	14	0	Clastrum
	9.6	-42	0	-8	Insula
3	12.2	6	20	30	Cingulate gyrus
4	8.7	38	22	-4	Insula
	7.9	42	32	2	Inferior frontal gyrus
	7.1	36	18	6	Insula
5	11.1	-26	58	-4	Superior frontal gyrus
6	7.2	50	4	8	Precentral gyrus
	6.5	48	10	0	Insula
7	8.8	14	4	4	Lateral globus pallidus
	8.0	14	-4	2	Thalamus
8	9.2	8	-18	6	Thalamus
	8.8	12	-20	4	Thalamus
9	9.3	4	4	50	Medial frontal gyrus
10	9.4	-60	-28	18	Superior temporal gyrus
11	8.3	36	-36	42	Inferior parietal lobule
12	8.5	54	-42	30	Inferior parietal lobule
	7.0	62	-36	24	Insula

Supplementary table 9a: Activation likelihood estimates for different stimulated body parts (a – hand) across all functional imaging studies between 1990 and 2014 in patients ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	26.1	40	8	2	Clastrum
	12.2	56	6	-2	Superior temporal gyrus
	11.6	28	6	-2	Putamen
	9.5	16	8	0	Putamen
	9.2	42	16	-10	Insula
	6.9	62	14	10	Inferior frontal gyrus
2	19.5	60	-12	42	Postcentral gyrus
	17.2	68	-20	18	Postcentral gyrus
	15.2	60	-18	16	Postcentral gyrus
	9.0	60	-16	30	Postcentral gyrus
	8.8	62	-32	18	Insula
3	20.6	-34	-60	-24	Cerebellum
4	15.6	-60	-24	16	Postcentral gyrus
	12.7	-68	-16	12	Transverse temporal gyrus
	11.0	-40	-18	16	Insula
	8.7	-36	-26	10	Transverse temporal gyrus
5	15.7	10	-6	2	Thalamus
	10.7	0	-6	6	Thalamus
6	17.7	4	20	38	Cingulate gyrus
7	10.9	-2	-16	34	Cingulate gyrus
	8.9	0	-28	26	Anterior cingulate gyrus
8	11.8	-52	-8	8	Precentral gyrus
	10.9	-54	0	0	Superior temporal gyrus
9	13.2	-24	0	-8	Putamen
10	11.1	-28	-24	70	Postcentral gyrus
	8.6	-34	-18	64	Precentral gyrus
11	13.9	-12	4	2	Lateral globus pallidus
12	10.8	26	-56	-24	Cerebellum
	8.8	32	-52	-30	Cerebellum

Supplementary table 9b: Activation likelihood estimates for different stimulated body parts (b – face) across all functional imaging studies between 1990 and 2014 in patients ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	18.1	6	18	28	Cingulate gyrus
	15.5	4	28	22	Anterior cingulate gyrus
2	10.3	-20	-10	-2	Medial globus pallidus
3	9.6	-42	0	-10	Insula
4	10.0	10	-8	2	Thalamus

Supplementary table 9c: Activation likelihood estimates for different stimulated body parts (c – rectum) across all functional imaging studies between 1990 and 2014 in patients ($p < .05$ cluster-level corrected inference using $p < .001$ uncorrected at voxel-level as the cluster-forming threshold).

Cluster #	ALE value (*10 ⁻³)	MNI coordinates			Anatomical label
		x	y	z	
1	9.7	-36	16	-10	Insula
	9.6	-38	8	-2	Clastrum
2	9.3	4	22	42	Medial frontal gyrus
3	8.9	-12	-10	10	Thalamus
4	9.8	24	4	6	Putamen
5	10.7	-40	46	12	Middle frontal gyrus
6	10.8	54	-16	16	Postcentral gyrus
7	11.9	-32	22	6	Insula