type II neurons and enhances inhibitory synaptic transmission to type II neurons in the dlBNST. We also demonstrated the critical role of CRF neurotransmission within the dlBNST in aversive responses induced by formalin-evoked pain. However, the roles of CRF within the dlBNST in the regulation of negative emotions under the chronic pain condition remain to be elucidated. In this study, we examined the effects of CRF and a CRF receptor antagonist on the synaptic currents in the dlBNST neurons using the whole-cell patch-clamp recordings. Brain slices including the dlBNST were prepared from chronic pain model rats in which neuropathic pain was induced by spinal nerve ligation (SNL). In sham-operated rats, spinal nerves were exposed without ligation. Bath application of CRF significantly increased the amplitude of evoked excitatory post synaptic current (eEPSC) in type II dlBNST neurons. The frequency of sIPSC in type II neurons of the sham-operated rats, but not of the SNL model rats. By contrast, the amplitude of eEPSC was significantly decreased by bath application of NBI27914 (CRF1 receptor antagonist) in type II neurons of SNL model rats, but not of the sham-operated rats. Next we examined the spontaneous inhibitory synaptic current (sIPSC) in type II dlBNST neurons. The frequency of sIPSC in type II neurons of the sham-operated rats was increased by bath application of CRF, but not of the SNL model rats. Furthermore, the frequency of basal sIPSC in type II neurons of the SNL model rats was higher than that of the sham-operated rats. These data suggest that neurotransmission via CRF1 receptors within the dlBNST are continuously activated under the chronic pain condition. (283 words)

PT633
Involvement of astrocyte Activation in Locus Coeruleus on the Exacerbation of Neuropathic Pain by Maternal Separation and Social Isolation Stress
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Abstract
In our previous study, emotional dysfunction associated with early life stress exacerbated nerve injury-induced mechanical allodynia, but the mechanism remains unclear. In this study, we investigated the involvement of astrocytes in emotional dysfunction and enhancement of nerve injury-induced mechanical allodynia in mice subjected to maternal separation combined with social isolation (MSSI) as an early life stress. The glial fibrillary acidic protein (GFAP) expression in the locus coeruleus (LC) of female, but not of male mice, significantly increased in MSSI mice corresponding to the behavioral changes at 7–9 weeks of age. Intra-LC injection of conditioned media from cultured astrocytes treated with lipopolysaccharide (LPS) increased GFAP expression, anxiety-like behavior and mechanical allodynia in both male and female mice. These findings demonstrate that emotional dysfunction and enhanced nerve injury-induced mechanical allodynia after exposure to MSSI are mediated, at least in part, by dysfunctional astrocytes in the LC. However, male mice, but not female mice, might show the resistance to MSSI stress during growing.

PT634
Alleviation of neuropathic pain treated with opioid by electroconvulsive therapy
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Abstract
There are a number of reports which indicate electroconvulsive therapy (ECT) has an analgesic effect on neuropathic pain. Some of them reported that a demanded amount of opioid to alleviate their pain was decreased after ECT. But there is no report that examines the relationship between the analgesic effect of ECT and an amount of opioid administered at ECT.

We investigated the charts of eleven neuropathic pain patients who received ECT at our institute to alleviate their pain from March, 2003 to March, 2012 with using opioid. We searched in their charts for their illnesses which caused their pain; currently treated psychiatric diseases; body weights; ages of onsets; ages of ECT; past experiences of ECT; medications to alleviate pain including opioid, antidepressants, anticonvulsants, and cyclooxygenase; and scores on Numerical Rating Scale (NRS) before/after ECT.

We examined their prescriptions, the latest one before and the earliest one after ECT, and the averaged daily doses of opioid were calculated according to them. These doses were converted into the doses of equianalgesic oral morphine to compare each other.

Interestingly, there is a strong positive correlation between the ratios of decrements of NRS to the scores before ECT and the doses of opioids administered before ECT. This result suggests that ECT and opioid may complementarily alleviate on neuropathic pain.

PT635
Opposite associations between the rs3845446 single-nucleotide polymorphism of the CACNA1E gene and postoperative pain-related phenotypes in gastrointestinal surgery versus previously reported orthognathic surgery
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Abstract
Ca2.3 (R-type) voltage-activated Ca2+ channels (VACCs), encoded by the CACNA1E gene, are responsible for transmission of somatic inflammatory pain, and activation of antinociception elicited by visceral inflammatory pain stimuli. The rs3845446 single-nucleotide polymorphism (SNP) of the CACNA1E gene is an intrinsic Tag SNP in the linkage disequilibrium block from intron 46 to exon 47, a region that contains a stop codon. Carriers of the minor G allele of the rs3845446 SNP had less opioid requirements for controlling pain after orthognathic surgery, suggesting that this SNP downregulates Ca2.3 VACCs functions responsible for transmission of somatic inflammatory pain. Unknown is whether this SNP influences pain-related phenotypes after splanchic organ surgery involving both somatic and visceral inflammatory pain, where visceral inflammatory pain stimuli should activate Ca2.3 VACC-mediated antinociception. In the present study, two groups of patients who underwent gastrointestinal surgery were examined. Group 1 included 351 patients who underwent laparoscopic colectomy and postoperative intravenous patient-controlled analgesia with opioid.
Group 2 included 112 patients who underwent open gastrectomy or open colectomy and postoperative continuous epidural analgesia. In both groups, patients with chronic pain or severe systemic disease, patients who took any analgesics, psychotherapeutic drugs, anti-anxiety drugs, or anticonvulsants were excluded. There was no difference in age, body height or weight between patients with or without the minor G allele of the rs3845336 SNP in both groups. Carriers of the minor G allele had higher opioid requirements in Group 1, while reporting higher pain scores in Group 2. Altogether, carriers of the minor G allele exhibited enhanced pain-related phenotypes after gastrointestinal surgery, in contrast to reduced pain-related phenotypes after orthognathic surgery. These results suggest that this SNP enhances pain-related phenotypes after gastrointestinal surgery, possibly through impairment of Ca v2.3 VACCs responsible for activation of visceral inflammatory pain stimulus-elicited antinociception.

PT636
Association between the rs7583431 single-nucleotide polymorphism close to the activating transcription factor 2 (ATF2) gene and the analgesic effect of fentanyl in the preoperative cold pressor-induced pain test
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Abstract
Background: Activating transcription factor 2 (ATF2) is a member of the leucine zipper family of DNA-binding proteins and is widely distributed in tissues. Several recent studies have demonstrated that this protein is involved in mechanisms related to pain and inflammation. However, polymorphisms of the ATF2 gene are unclear that encodes the human ATF2 influence pain sensitivity. The ATF2 gene is known to be highly polymorphic. Thus the present study examined associations between the analgesic effect of fentanyl in the preoperative cold pressor-induced pain test and polymorphisms in the ATF2 gene in 355 Japanese patients who underwent orthognathic surgery.

Result: In the present study, 39 single nucleotide polymorphisms (SNPs) were polymorphic, and a total of 2 linkage disequilibrium blocks with 7 Tag SNPs (rs1153711, rs1153702, rs7583431, rs2302663, rs3845744, rs1205399, and rs268214) were observed in the region within and around the ATF2 gene. Thus, we further analyzed associations between these 7 tag SNPs and clinical data. Result of multiple testing such as Bonferroni adjustments, for the rs7583431 SNP, the analgesic effect of fentanyl in the preoperative cold pressor-induced pain test of the subjects in the AA group was significantly greater than in the AC + CC group (Mann-Whitney U-test, P = 0.007).

Conclusion: These findings may contribute to adequate postoperative pain relief in individual patients. Although more research on the genetic factors that influence opioid sensitivity is necessary, postoperative analgesic requirements may be predicted before surgery by analyzing the ATF2 SNP, together with other polymorphisms in the genes that are reportedly associated with opioid sensitivity, such as OPRM1 and GIRK2.

PT637
[11C]-(R)-PK11195 positron emission tomography in patients with complex regional pain syndrome: a pilot study
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Abstract
Complex regional pain syndrome is characterized by severe and chronic pain, but the pathophysiology of this disease is not clearly understood. The primary aim of our study was to explore neuroinflammation in patients with complex regional pain syndrome (CRPS) using positron emission tomography (PET), with an 18kDa translocator protein (TSPO) specific radioligand [11C]-(R)-PK11195. [11C]-(R)-PK11195 PET scans were acquired for eleven patients with CRPS (age, 30–55 years) and twelve control subjects (age, 30–52 years). Parametric image of distribution volume ratio (DVR) for each participant was generated by applying a relative equilibrium-based graphical analysis. The DVR of [11C]-(R)-PK11195 in the caudate nucleus (t(21) = -3.209, p = 0.002), globus pallidus (t(21) = -2.045, p = 0.027), putamen (t(21) = -2.492, p = 0.011), nucleus accumbens (t(21) = -2.218, p = 0.019), thalamus (t(21) = -2.395, p = 0.013), postcentral gyrus (t(21) = -1.966, p = 0.03) and precerebral gyrus (t(21) = -1.839, p = 0.04) were significantly higher in CRPS patients than in healthy controls. In patients with CRPS, there was a strong positive correlation between the DVR of [11C]-(R)-PK11195 in the caudate nucleus and the pain score, the Visual Analogue Scale (r = 0.639, p = 0.034) and affective subscales of McGill Pain Questionnaire (r = 0.604, p = 0.049). We demonstrated that neuroinflammation in CRPS patients from basal ganglia (BG) to cortical region. Our results suggest that microglial pathology can be an important pathophysiology of CRPS. Association between the level of caudate nucleus and pain severity indicated that neuroinflammation in this region might play a key role. These results may be essential for developing effective medical treatments.

PT638
Translational research of chronic pain patients using human blood-induced microglia-like (iMG) cells
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Abstract
Fibromyalgia is a refractory disease characterized by chronic pain, the cause of which has not yet been elucidated due to its complex pathology. Recently, activation of immune cells in the brain called microglia has attracted attention as a potential underlying pathological mechanism in chronic pain. Until recently, however, technological and ethical considerations have limited the ability to conduct research using human microglia. We have developed a technique to create human-induced microglia-like (iMG) cells from human peripheral blood monocytes.

This study was conducted to observe microglia activation in patients with fibromyalgia at the cell level using IMG technique. IMG cells were created from 14 patients with fibromyalgia and 10 healthy individuals, and analyzed at the molecular cell level. No significant difference in phagocytic capacity was observed between iMG cells derived from healthy participants and patients with fibromyalgia. Interestingly, however, TNF-α gene expression level and protein concentrations significantly increased in ATP-stimulated IMG cells from patients with fibromyalgia compared to cells from healthy individuals. Moreover,