analyze the dynamic bifurcation of neuronal oscillator. Especially, we analyze the dynamics of neurons in period doubling and tangent bifurcation regimes.

3P-236 身体感覚の喪失実験：実在感の測定

Loss of Body Sensation :Feeling of Reality Measurement Experimentation

Shimpei Tatsumi (1), Yuta Nishiyama (1) and Yukio-Pegio Gunji (2). (1: Dept Earth & Planet Sci, Grad School of Sci, Univ of Kobe; 2: Dept Earth & Planet Sci, Faculty of Sci, Univ of Kobe)

We suggest a method of objective observers' determining the subjective feeling of reality in Loss of Body Sensation (LBS). A novel phenomenon LBS, in which the subjects lose the sense of reality of ownership of their parts of body, was investigated by the method. LBS is the opposite phenomenon to the Rubber-Hand illusion, in which subjects feel to own a visible dummy hand as a part of their body when it is touched synchronously with hidden own hand.

While we often lose accurate controls of our own body in dairy life, LBS obviously occurs in particular situation that subjects sense contradictory information of somatic, visionary and tactile stimulus. In this experience subjects looked at their real-time figure in a limited bird-eye's view via a head-mounted display showing the figure captured by a video camera. When their one arm was hidden from his bird-eye and his hand was visible but not placed on natural position, the subjects felt not to own the hand. At the same time, they sensed being touched when it was touched.

How can we observers apparently verify evidences of LBS? We focused on the integration process of multisensory information, and supposed that abilities to solve visionary problem reduce when conflicting tactile information are given because it's necessary to solve the contradiction. On the other hand, when LBS occurs subjects was able to keep the resolution without being confused by tactile clues. Results about ambiguity of the hand are discussed in terms of mutuality between self-attribution and ownership.

3P-237 NMDA刺激によるマウス脳海馬のカルシウム信号の成分とそれに対するコルチコステロンの急性作用

Components of NMDA-induced Ca^{2+} signal in mouse hippocampal slices and acute effects of corticosterone on each component

Akiyoshi Suzuki(1), Hiromi Osanai(1), Yoshimasa Komatsuzaki(1), Ayumi Hirano-Iwata(2), Suguru Kawato(3), Minoru Saito(1). (1:Department of Correlative Study in Physics and Chemistry, Graduate School of Integrated Basic Sciences, Nihon University; 2:Graduate School of Biomedical Engineering, Tohoku University; 3:Department of Biophysics and Life Sciences, Graduate School of Arts and Sciences, The University of Tokyo)

NMDA stimulation is usually used to investigate a series of neuronal mechanism involved in NMDA receptor-mediated Ca^{2+} signal. We here examined by using Ca^{2+} imaging technique whether the NMDA-induced Ca^{2+} signal is due to the exclusive activation of NMDA receptors or activation of voltage-dependent calcium channels (VDCCs) together with NMDA receptors in mouse hippocampal slices. In order to isolate each component of the Ca^{2+} signal, we used sodium channel antagonist tetrodotoxin (TTX), which prevents dendritic spikes and the following activation of VDCCs, and L-type VDCC antagonist nifedipine. We obtained the following results: (1) Almost a half of the Ca^{2+} signal was attributed to direct Ca^{2+} influx via NMDA receptors, while the other half attributing to indirect Ca^{2+} influx via VDCCs in the CA1 region. (2) In the dentate gyrus, the Ca^{2+} signal was the direct component via NMDA receptors in almost areas, but the indirect component via VDCCs was included in some areas. (3) The indirect Ca^{2+} component was almost via L-type VDCCs. We further examined the effects of corticosterone (CORT), which is a principal glucocorticoid, on each component of the Ca^{2+} signal. It has been reported that CORT acutely (nongenomically) suppresses the NMDA-induced Ca^{2+} signal in the CA1 region. The present results, however, showed that CORT could not decrease or rather increase direct Ca^{2+} influx via NMDA receptors and the suppressive effect of CORT reported so far should be attributed to the effect on indirect Ca^{2+} influx via VDCCs.

3P-238 マウス海馬におけるAMPA型グルタミン酸受容体活性化によるカルシウムシグナルに対するコルチコステロンの急性作用

Corticosterone rapidly modulates Ca^{2+} signals induced by AMPA receptor activation in mouse hippocampal slices

Wakako Sawada(1), Yuka Shirakawa(1,3), Yoshimasa Komatsuzaki(1), Suguru Kawato(2), Minoru Saito(1). (1: CHS, Nihon Univ; 2: Dept of Biophys & Life Sci, Grad Sch of Arts & Sci, Univ of Tokyo; 3: Dept Life Sci & Biotech, Grad Sch of Eng, Tokyo Univ of Agriculture & Technology)

The hippocampus is an important target of circulating adrenal cortical hormones. Corticosterone (CORT) secreted in the adrenal cortex reaches the brain and acts on its receptors that are abundant in the hippocampus, thereby regulating neuronal function. In our previous study, we used NMDA stimulation which caused a transient elevation of intracellular Ca^{2+} concentration. The NMDA-induced Ca^{2+} signal was rapidly suppressed in the CA1 region by 30 min incubation with 1 μM CORT (stress-induced level) in adult mouse hippocampal slices. The Ca^{2+} signals resulted from activation of both NMDA receptors and voltage-dependent calcium channels (VDCCs) because the Ca^{2+} elevation was reduced by incubation with nifedipine (a blocker of L-type VDCC) and/or with Ni^{2+} (a blocker of T-type VDCC), and CORT did not affect the direct Ca^{2+} influx via NMDA receptors. Here, we tested the hypothesis that CORT should reduce VDCC-mediated Ca^{2+} influx after AMPA receptor activation. In the present study, we found that application of AMPA also caused a transient elevation of intracellular Ca^{2+}

concentration in hippocampal CA1 and DG regions, and this elevation resulted from Ca^{2+} influx mediated by VDCCs. We further examined the effect of CORT on AMPA-induced Ca^{2+} signals. Details will be shown on this annual meeting.

3P-239 嗅覚中枢における律動的神経活動を調節するGABAおよび

FMRFamideについての薬理的解析

GABAergic and FMRFamidergic modulation of oscillatory activity in molluscan olfactory system

Suguru Kobayashi, Mariko Hattori, Ryota Matsuo and Etsuro Ito. (Lab Functional Biol, Kagawa Schl Pharmaceut Sci, Tokushima Bunri Univ)

The molluscan olfactory center, the procerebrum, has network oscillation, which is considered to encode the odor information. Previous immunohistochemical studies showed that gamma-amino butyric acid (GABA)-like immunoreactive neurons and Phe-Met-Arg-Phe- NH_2 (FMRFamide)-like immunoreactive neurons exist in the central nervous system and these neurons may be involved in the control of neuronal activity in the terrestrial mollusk *Limax valentianus*. In the present study, we examined the effects of GABA and FMRFamide on the generation of periodic oscillation of local field potential in the procerebrum. Application of GABA-receptor antagonists to the whole CNS decreased the frequency of the local field potential oscillation. Application of GABA-receptor agonists increased the frequency for 2 minutes, but prolonged application of agonists decreased the frequency. On the other hand, FMRFamide decreased the frequency of the local field potential oscillation in a dose dependent manner. In the cultured procerebrum neurons, increase in Ca^{2+} concentration was often observed by the application of GABA. These results suggest that the GABAergic and FMRFamidergic synaptic transmission is involved in the oscillatory neural network of the procerebrum in *Limax* and may play modulatory roles in the generation of the local field potential oscillation.

3P-240 自分の手のリアリティ

The reality of one's own hand

Yuta Nishiyama (1), Shimpei Tatsumi (1) and Yukio-Pegio Gunji (2). (1: Dept Earth and Planetary Sciences, Graduate School of Sciences, Univ of Kobe; 2:Dept Earth and Planetary Sciences, Faculty of Sciences, Univ of Kobe.)

A man can mistake a rubber hand (fake hand) with a real hand, if the fake and real hands are stroked simultaneously. In contrast to the rubber-hand illusion, we here show that a man can feel a real hand as the fake one. A subject wears the head mounted display on which real time visions of his own body filmed from unusual angle are projected, and sees his own hand in the implausible position through the display. So as to estimate the reality of one's own hand in the implausible position, we compare the reaction time of the key press to the light cue under the three different conditions. In the first condition a subject sees his own hand located in the plausible position. A subject can feel that he can press the key by the real hand. In the second, he sees his hand in the implausible position, and feels that he presses the key by the fake hand. In the third, he sees the other one's hand and he makes him press the key. It elicits the illusion of proprioception as if my hand is not mine.

3P-241 2神経細胞の自発活動ダイナミクス

Dynamics of spontaneous firings in two neuron

Ikurou Suzuki(1), Junko Hayashi(1) and Kenji Yasuda (1). (1:Dept Biomedical Information, Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University)

Neural dynamics depends on spatial factors such as the network's topography as well as on temporal factors such as activity-dependent modifications. One of the best approaches to understanding the mechanism of neuronal dynamics is to characterize the neuronal network system by monitoring and stimulating individual neurons in a topologically defined network at single cell level and doing this for extended periods of time. We therefore previously developed an on-chip multi-electrode array (MEA) system combined with an array of agarose microchambers (AMCs). It is possible to record the firing at multiple cells simultaneously for long term and topographically control the cells position and their connections at a single cell level. In our present study, we succeeded to record spontaneous firing of cultured single neuron over 2 weeks and have detected three firing pattern of cultured single neuron. In many neurons, burst spiking was observed. In a few neurons, high frequency firing at single spike and the spiking pattern containing burst spike and single spike were observed. It was revealed that Individual neuron not input from other neuron keeps with one's firing pattern, because these firing patterns were preserved during measurement time over 2 weeks. Then we measured the spontaneous firing of cultured two neurons on the electrode and detected the influence input from other neuron and the dynamics between two activities state. In the meeting we will report in detail about dynamics of two neurons.

3P-242 視覚認識におけるトップダウン処理に関わる脳部位

The brain regions involved in top-down processing of visual object recognition

M. ODA(1), (2), T. MURATA(2), M. KATO(2), Y. NARUSE(2), T. YANAGIDA(1)(1:Osaka Univ, Suita, Japan; 2:Kobe Advanced ICT Research center, NiCT, Kobe, Japan)

Top-down processing in the brain has been thought to play crucial roles in flexibility of recognition of objects. When we see a black-and-white image degraded by binarization, it seems meaningless for the first time. However, we can recognize hidden objects after we observe the original color version of the