selective lesions and recorded single units from the CA3 as the rat performed a visual contextual memory task using different types of modified visual scenes. Rat chose either the left or right arm of a T-maze based on the visual background presented on three LCD monitors. Once rats were trained to criterion, colchicine-induced DG lesions were conducted with 24-tetrode-carrying hyperdrive implantation targeting the dorsal CA3. Once recording started, rats experienced the following visual scenes sequentially across days in the same task: familiar visual contexts, blurred version of the familiar contexts, familiar contexts superimposed on each other, familiar contexts partially occluded by visual masks, and novel visual contexts. Compared to controls ($n = 4$), rats with DG lesions ($n = 4$) were impaired in the blurred or novel contextual conditions, whereas their performance was relatively normal in other conditions. Preliminary analysis of our electrophysiological data indicates that both firing rate and spatial selectivity were lower in CA3 cells when recorded in the absence of the DG. Spatial selectivity of CA3 cells recorded from the DG-lesion group improved across days in the familiar contexts, but not in the novel contexts. These results suggest that the computational relationships between the DG and CA3 may interact with the novelty of the visual surrounding.

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P00.24

Differential coding of motivational context between the dorsal and ventral areas of the hippocampus

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The dorsal hippocampus (dHP) has been extensively studied for its critical functions in spatial navigation and memory. By contrast, relatively little is known for the roles of the ventral hippocampus (vHP) although several studies have shown anatomical, physiological, and functional differences between the dHP and vHP. We hypothesize that the vHP is specialized in the coding of motivational significance of an event and its associated place, whereas the dHP processes mostly the physical location information of the animal. To test this hypothesis, we recorded single units from both the dHP and vHP simultaneously using a high-density recording drive while rats ($n = 6$) alternated between two adjacent arms of a radial-maze. During training, rats obtained the same type of reward, sunflower-seeds (SS) in both arms (baseline condition). Afterward, in the main task, both arms were baited with less desired reward, Cheerios (CC) in certain blocks interleaved with the baseline conditions. Single units in the dHP showed stable place fields across the sessions, whereas those from the vHP remapped their place fields immediately after reward changes. Our preliminary findings suggest that changes in the motivational context activates immediate information coding in the vHP, but not in the dHP. Next, we tested whether such differences between the dHP and vHP might manifest in different forms in a mnemonic task. For this purpose, rats were trained in a spatial food-preference task in which two arms of a T-maze were baited SS and CC. After the rat chose the SS-baited arm for 12 of the last 15 trials, the types of reward associated with the arms were reversed. Our preliminary analysis shows that that the firing patterns of the vHP cells might be to represent motivational or valence context of the environment, whereas those of the dHP is related to forming a cognitive map of space.

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P00.25

Defining latent place fields based on theta phase precession in the subiculum

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The subiculum is located at the critical junction between the hippocampus and its associated cortical areas. Electrophysiological studies have reported that spatial firing activities of subicular neurons are more broadly tuned and persistent than those of hippocampal neurons. However, the field has been struggling with understanding the broad spatial tuning of subicular neurons because the activity pattern is very different from that of the adjacent hippocampal cells, and we used spiking-phase relationships to address this issue in this study. That is, it is well known that the timing of spikes gradually shifts to the earlier phases of the theta cycle in the hippocampus as the rat traverses a place field (i.e., theta phase precession). Prior studies used the borders at which a cycle of theta phase precession occurred as the boundaries of a place field, and we adopted this strategy to find whether latent place fields existed within the seemingly continuous field in the subiculum. In the current study, rats were trained to choose either left or right arm in a T-maze as a visual scene was presented on LCD monitors. Once the rat was trained to criterion, a multi-electrode drive was implanted in the subiculum. Single-unit spiking activities and local field potential were simultaneously acquired while rats performed the task. Our preliminary analysis shows that multiple theta phase-precession cycles underlie a continuous spatial firing distribution of a subicular neuron. To define the spatial field boundaries based on the phase-precession cycle, we applied a semi-automatic clustering algorithm called DBSCAN (density-based spatial clustering of application with noise) to phase-position scatter data so that the spikes associated with individual phase-precession cycles were differentially labeled. We plan to examine the neural correlates of individual fields identified in this manner.

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P00.26

Social decision making network involved in intrasexual aggression in zebrafish

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The neural substrate of social behavior has been described as a "social behavior network" (SBN), and each brain area is involved in multiple forms of social behavior which are reciprocally connected, including aggression. Moreover, the mesolimbic reward system and the SBN are better understood as an integrated social decision-making (SDM) network regulating responses to salient stimuli. Aggression and the neural mechanisms involved in fighting behaviors are usually studied in males but not in females, despite the fact that in different species both sexes show aggressive behavior. The aim of this study is to compare male and female intrasexual aggression in agonistic encounters, and to compare patterns of brain activation in the SDM network in winners and losers from both sexes. We exposed adult zebrafish to social interaction with an opponent of the same sex ($n = 20$ contests per sex). We recorded the encounter and, after distinguishing a winner and

a loser, samples were collected to determine brain activation by immunohistochemistry of the phosphorylated ribosomal protein pS6. The latency did not vary between sexes, while the time of resolution is shorter in females. Our results suggest that in both sexes, animals exposed to social interaction had higher overall brain activation than non-interacting controls. Moreover, females show more overall brain activation than males. In order to study how brain activation is interconnected among different areas in each social group, we performed network analysis. Our analysis suggests that female winners have a brain network with majority of positive correlations, while brain network in female losers is more similar to males, with mainly negative correlations. These results suggest that, even though intrasexual aggression follows similar structure and behavioural displays in both sexes, females solve conflict faster than males and this could be related to differential pattern of brain activation.

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P00.27

Task-related component analysis of electroencephalogram signals during emotional face recognition: A case study of ERP

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Introduction: Facial emotion has an important role in human non-verbal communications and its recognition is needed for effective social interaction formation. In this research, this cognitive process is investigated by estimating the emotion-related brain sources' activity.

Method: EEG signals (64-channels) used in this research was recorded from a healthy boy while performing an emotional face recognition task (Angry, Happy, Neutral and Sad face images from Extended Cohn-Kanade database). After preprocessing, Task-Related Component Analysis (TRCA) was used to estimate the activity of emotion- related brain sources for each of the four emotion epochs. Then Event- Related Potentials (ERPs) were calculated for emotion- related brain sources by averaging the epochs time-locked to the stimulus onset.

Results: All emotion- related brain sources showed activity in right central regions while the angry-related source showed more activity in left frontal and the sad-related and happy-related ones showed activity in right frontal regions as well.

In the ERP of all four emotions the N170 and P300 components could be seen. The N170 delay was less for negative and neutral emotions than for happy one. The amplitude of N170 component was larger for angry emotion than happy, and both of them were larger than the sad and neutral ones. For P300 component although the amplitudes did not show observable difference the P300 delay was less for happy emotion than for negative and neutral ones.

Conclusion: According to the results, the right central lobe can be considered as the activity region for facial emotion recognition. As N170 component is known to be elicited in response to face stimuli, it can be said that neutral and negative faces are recognized faster than happy ones. Moreover, based on the P300 delay results the positive emotion of happiness is presumably recognized faster.

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P00.28

Anti-oxidant and behavioural effects of aqueous extract of *Terminalia macroptera*

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The treatment of mood and anxiety disorders by nutraceuticals is gaining growing awareness. The aqueous extract of *Terminalia macroptera* Linn (Combratacaec), exceptionally abundant in diverse phenolic compounds, have been known for various health benefits (e.g. anti-diabetic, anti-inflammatory, antimicrobial, and anticancer). This study was designed to investigate the in vitro anti-oxidant effect of *T. macroptera* using 2,2-azinobis (3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) and Ferric Reducing Ability of Plasma (FRAP) assays. The behavioural effects of the aqueous leaf extract of *T. macroptera* (100–400 mg/kg) in mice were investigated on the elevated plus maze to determine the anxiolytic effects and on the forced swim test and tail suspension test in mice, to determine the antidepressant effects. The extract demonstrated potent antioxidant activity compared to Trolox, (6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid a water-soluble analog of vitamin E), it also alleviated the anxiety-like behaviour and reduces depression-like behaviour of the mice. These findings demonstrated the beneficial behavioural effects of the aqueous extract of *T. macroptera* in anxiety and depression. In an additional in vitro assays, we found that the phenolic compounds of the extract inhibited human monoamine oxidase A (MAO-A) activity. The antidepressant/anxiolytic properties of *T. macroptera* extracts could involve MAO-A.

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P00.29

The function of the fasciola cinereum in object-place recognition memory

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The fasciola cinereum (FC) is a subregion of the hippocampus, sharing the distal border of the CA1. We have shown that the FC receives afferent projections from the lateral entorhinal cortex and perirhinal cortex, and projects to the dentate gyrus in the hippocampus (Park et al., 2016). These anatomical connectivities suggest that the FC may play critical roles in representing a novel context and its association with objects. To test such a functional hypothesis, we used a spontaneous object exploration paradigm to compare rats with lesions in the FC with normal controls. Specifically, rats were tested for their capability in object recognition and object-place association. First, rats sampled two same objects appearing at the same locations across multiple sampling phases (5 min/phase) and were tested if they recognized the displacement of one of the objects to a novel location in the test phase. In another session, rats sampled two different objects at the fixed locations across the sampling period and were expected to notice if one of the objects was replaced with the copy of the remaining object during the test. Furthermore, rats experienced 3 objects during the sampling period and were required to detect the two objects that swapped their locations with each other. To test novel object preference, rats sampled two identical objects during the sampling