1910 A Dual Oscillator System in the Procerebral Lobe of *Limax* Brain

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Oscillatory activities were studied by recordings of field potential at multiple sites in an olfactory center, the procerebral lobe, of the terrestrial slug *Limax marginatus* brain. The cell mass of the procerebral lobe shows an about 1 Hz oscillation in its local fieldpotential. Multiple site-recordings showed that the terminal mass of the lobe also exhibited an oscillation synchronized with the cell mass oscillation, and that the terminal mass oscillation was decoupled from the cell mass oscillation by an application of serotonin or by a taste stimulation with quinidine sulfate to the lip. These results suggest that the terminal mass oscillators differ from the cell mass oscillators and such a novel oscillator system is localized in the terminal mass. Both types of oscillations were also modulated by an odor stimulation to the olfactory epithelium. Therefore, it is likely that a dual oscillator system in the procerebral lobe is involved in processing of olfactory information in slugs.

1911 Dynamical oscillatory properties of a slug brain

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The olfactory center of a terrestrial slug, procerebrum (PC), shows oscillatory activity. In this study, modulation in the frequency and the speed of wave propagetion from apical to basal end were observed using three transmitters, ACh, serotonin and glutamate. ACh and serotonin increased the frequency. Glutamate transiently decreased and then increased it. On the other hand, the wave propagetion speed was decreased by serotonin and increased by glutamate. From these results, dynamical properties of the PC nonlinear oscillator network was discussed. Relation between left and right PC was also discussed.

1912 TUNING SPECIFICITIES TO VARIOUS ODORANTS IN MOUSE OLFACTORY RECEPTOR NEURONS

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We examined the responsivity to a panel of various odorants in individual olfactory receptor neurons of mouse. The odorant panel includes two homologous series of n-aliphatic odorants and several odorants with benzene ring. Odor responses were recorded optically by measuring intracellular calcium increases with fura-2. Tuning specificities to n-aliphatic odorants were dependent on both the carbon chain length and the functional group (carboxyl and hydroxyl). Most olfactory neurons responded to a few odorants with partly similar stereochemical structure. Our results suggested the tuning specificity of the olfactory receptor neuron is determined by the 3-dimensional arrangement of intermolecular interactions.