**P1-2-22-B** 視覚刺激の輝度が運動学習に与える影響の評価 -過重力下での運動学習促進効果との関係
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**Evaluation of the effect of visual stimulus brightness on motor learning -Relationship with the enhanced motor learning under hypergravity environment**
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Our previous studies have shown that motor learning is acquired faster with greater memory retention in hyper-gravity (G) environments for both goldfish and humans. This learning occurred during prism adaptation in humans, and oculomotor neural integrator (NI) adaptation in goldfish in which hyper-G was created by centrifugation. An augmented gravitation input would significantly increase vestibular input to both the goldfish and human cerebellum, in particular the vestibulocerebellum (VCB). Thus, an increase in Purkinje cell (Pkc) activity forms the basis of our working hypothesis for accelerated motor learning under hyper-G. In that event it should be possible to accelerate motor learning by using another stimulus that up-regulates Pkc activity as has been observed in the primate VCB (flocculus) in which Pkc exhibit higher dc firing rates in light than in dark. We conducted an experiment in goldfish using a white point to a black background (Darker stimulus) or black spot on a white background (Brighter stimuli). After two hours the learning curves of NI adaptation were compared and the brighter stimulus was found to induce significantly faster learning than the darker stimulus.

**P1-2-23-B** ヒトと魚における視運動性眼球運動の周期同調と眼球速度蓄積機構の関わり
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**On the relationship between predictive optokinetic eye movement and the velocity storage mechanism in human and fish**
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The optokinetic response (OKR) of the eye is induced to follow a large field visual motion. The gain of the OKR (eye velocity / visual motion velocity) is about 0.6 at 1/8Hz in naive goldfish. If the same periodic visual stimulus is given continuously, the OKR gain increases up to 1.0. In addition to the gain increase, goldfish were found to acquire a ‘predictive’ OKR behavior that was named period tuning (PT). Thus OKR velocity decreased before the change in OKS direction as if predicting the OKS timing (Marsh & Baker, 1997). Even if the animal is exposed to complete darkness after the acquisition of PT, its eye velocity follows the similar trajectory to that during training for a while without any visual stimulation. This eye movement in the dark may share a common mechanism with optokinetic after nystagmus (OKAN), and considered to reflect characteristics of the velocity storage mechanism (VSM). To investigate the possible relationship between PT and VSM, we carried out a series of behavioral experiments in goldfish, carp, medaka, zebrafish, and human. We demonstrate that ability to acquire PT is highly dependent on OKAN. This result suggests that VSM is a key mechanism for PT.

**P1-2-24-B** 眼球と身体の動きを検出するアイウェアの開発
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**Development of eyewear to detect movement of eyes and body**
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We have been developing the JINS MEME, an eyewear with a capability to detect eye and body movements. The horizontal and vertical EOG (electrooculogram) signals are measured and amplified with three metal dry electrodes placed near nasion and both sides of rhinion, of which positions correspond to the bridge and nose pads of eyewear, respectively. The user's mental states like drowsiness, fatigue, or interest to objects can be identified by the movements and blinking of the eyes extracted from the measured EOG. And the six-axis motion sensor (three-axis accelerometer and three-axis gyroscope) mounted in the eyewear measures the body motion. As the sensor located near the head is on the body axis, this eyewear is suitable to measure user’s movement or shift of center of gravity during physical exercise with a high precision. The measured signals are used to extract various events of eye and body movement by the mounted MPU chip, or can be transmitted to the external devices via Bluetooth communication. In this presentation, the outline of the eyewear is introduced and some possible applications are shown.