OS9-5  Mechanical circulatory supportのための磁気浮上血液ポンプ
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Main features of magnetically suspended blood pump for mechanical circulatory support
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Rotary blood pumps are used as blood pumps in the recent mechanical circulatory support, MCS. The magnetic suspension technique is a key to develop durable and bio-compatible rotary blood pumps for MCS. One of advantages of the magnetically suspended blood pump, MSBP, is a wide blood gap with the active magnetic suspension mechanism. The magnetic suspension mechanism can maintain wide blood gap between the rotated impeller and the fixed inner casing with a range of several hundreds micrometers. The wide blood gap guarantees better anti-hemolysis and anti-thrombogenicity properties of the pump with an enhanced blood stream in the gap. Also, the suspension of the impeller can be maintained under a wide range of rotating speeds from low speeds to high speeds. This feature contributes easier operation and wider usage of the mechanical circulatory support. The MSBP with a magnetic bearing has been designed based on the finite element simulation methods in magnetic field and fluid mechanics. The MSBP has indicated sufficient suspended performance and pump performance.

OS9-6  Non Invasive Evaluation of the Renal blood flow during left ventricular assistance
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Non Invasive Evaluation of the Renal blood flow during left ventricular assistance with the Non-pulsatile blood pump
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Non pulsatile blood pump is one of the most important therapeutic option for the patients with profound heart failure. However, multiple organ failure has been the limiting factor for the prognosis of the patients after implantation. Non invasive measurements may be the good option to evaluate the organ function. Charge-Coupled Device image sensors will be one of the solution for the measurement with economical advantage. In this study, Charge-Coupled Device image sensors had been used for the evaluation of the renal blood flow in the animal experiments with left ventricular assistance using non pulsatile blood pump. As the results, useful evaluation of the renal blood flow had been embodied, suggesting the clinical usefulness of this device.

OS10-1  生体信号による運転ストレスの評価
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Evaluation of driver’s stress using the Vital signs
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In late years accidents due to health and the state of the driver increase. For those accident prevention, we developed the steering sensor which could measure the Vital signs of the driver for non-restriction. This sensor measures an electrocardiogram (the first instruction) and the pulse wave of the driver by holding a steering with both hands. Using two indexes, RRI and PTT (pulse wave propagation time) provided from these electrocardiograms and pulse waves, we tried the stress evaluation of the driver this time. First, we gave plural stress (mental workload) to five subjects in a laboratory and evaluated a change of RRI and PTT and confirmed that stress was discriminative. Then, we acquired RRI and PTT in plural driving environment and compared them with the subjectivity evaluation. As a result, we found the possibility that can distinguish plural driver’s stress by using the steering sensor which we developed.