time (PTT) and physical characteristic parameter. PTT can be obtained by electrocardiogram (ECG) and photoplethysmogram (PPG).

Materials and Methods: The detection system is composed of the monitoring part and measurement part which is composed ECG and PPG measurement part. The wireless sensor measured physiological signal such as the ECG, SPO_2, pulse rate, heart rate, skin temperature and 3D posture. The bio-signals measured with the system were essential data for healthcare, so it was possible to monitor a user from a server based on real-time transmission of the data via wireless network.

Results: By wireless gateway, thesignal data measured at the ECG sensor and the PPG sensor of this system were sent to and stored in a PC in real time. ECG / SPO_2 signals were processed statistically in real time and displayed in graphs. HR, skin temperature and BP values were displayed as numeric data. Based on user data, the system generated various alarm messages according to situations such as bradycardia, tachycardia, hypothermia, or cardiac arrest. In the derived equation, the experimental systolic pressure result is 111 mmHg and at the same time the measured blood pressure result by sphygmomanometer is 115 mmHg.

Conclusions: By measuring physiological signals with the wireless sensor, it was possible to minimize restrictions imposed to everyday activities of animal. Also, the use of low-power wireless sensors reduced the time toreplace batteries in the wireless sensors required to monitor data in realtime.

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Effectiveness of Ultraviolet Blood Irradiation on Blood Glucose in Diabetics Rabbit Model

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Introduction: In this study, we would like to evaluate the effects of ultraviolet blood irradiation on the diabetes by using physical methods with UV light rather than drug therapy such as insulin injection in order to get over diabetes causing serious problems.

Materials and Methods: Type 1 diabetes was induced by intravenous (IV) injection of alloxan monohydrate 110 mg/kg into New Zealand white rabbits weighing 2-2.5 Kg. A UV-C lamp with light intensity of 4 W and wavelength of 260 nm was used to irradiate UV to the blood. After 10 ml blood was collected from diabetic rabbits and UV was irradiated to the blood, UV irradiated blood was transfused back to the original rabbits. The ultraviolet blood irradiation (UBI) treatment was performed a total of 8 times. We evaluated the effects of the UBI treatment on diabetes through hematological analysis before and after UBI treatment were performed.

Results: Body weight does not decrease on day 3 after alloxan injection. However, the body weight of diabetic rabbits tends to decrease while the UBI treatment is performed 8 times. It still decreases in 8 weeks after the UBI treatment is discontinued. However, it tends to increase over 8 weeks after the UBI treatment is discontinued. In addition, glucose (Glu) levels are changed as follows: Glu level is 600 ± 74.73 mg/dL prior to the UBI treatment over 3 days after alloxan injection. Glu level is 471.1 ± 102.5 mg/dL while the UBI treatment is performed 8 times. The Glu level significantly decreases after the UBI treatment is performed. Glu level is 433.3 ± 118.3 mg/dL over 8 weeks after the UBI treatment is discontinued. It significantly decreases when compared to that prior to the UBI treatment.

Conclusions: This study is the preliminary study to evaluate the effects of ultraviolet blood irradiation on diabetes in a type 1 diabetic rabbit model by using the autotransfusion. We evaluate the effects of the UBI treatment on diabetes through hematological analysis of diabetic rabbits by performing the UBI treatment. The results of experiments confirm that the β-cell is damaged by alloxan injection. Since insulin is not released due to damage of β-cell, blood Glu levels are elevated. However, blood Glu levels and blood K^+ concentration are reduced is increased in the diabetic rabbits undergoing the UBI treatment. The reason why Glu levels are reduced is that the UBI treatment promotes the re-esterification process by facilitating the metabolism of glucose, which increases glycerol 3-phosphate produced from glucose.

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The ratio of blood ionized calcium per magnesium in experimental cardiomyopathy

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Introduction: Magnesium ions (Mg^{2+}) are pivotal in the transfer, storage and utilization of energy; Mg^{2+} regulates and catalyzes more 325 enzyme systems in mammals. There is an accumulating body of evidence to suggest that Mg^{2+} plays an important role in the pathogenesis of ischemic heart disease, congestive heart failure, sudden cardiac death, cardiac arrhythmias, hypertension, hypertrophy, myocardial infarction and vascular complications of some diseases etc. However most clinical laboratories only assess the total magnesium, which consists of all three Mg^{2+} fractions (ionized, complexed and protein-bounded form), it is desirable to directly measure the levels of ionized Mg^{2+}(iMg^{2+}). In the present study, we attempted to determine the valuesof plasma ionized Ca^{2+} (iCa^{2+}), iMg^{2+} and theratio of iCa^{2+}/iMg^{2+} in experimental myocardial infarction and cardiac hypertrophy in rats.

Materials and Methods: Myocardial infarction induced by coronary artery ligation and cardiac hypertrophy induced by transverse aortic clamping of rats (male Sprague-Dawley, 200-250 g). Blood samples were obtained after 3, 7 and 30 day after operation and were analyzed whole ions using Nova Stat Profile 8 CRT (NOVA Biomedical Corp, Waltham,MA, USA) including the plasma pH, blood gas compositions and the concentrations of ionized Na^+, Cl^-, K^+, Ca^{2+}, $Mg^{2+}$and $lactate^-$. Hematocrit (Hct) was measured by conductivity. The concentration of HCO_3^- was calculated using the Henderson-Hasselbach equation. The anion gap values were calculated by the formula; $[Na^+-(Cl^-+HCO_3^-)]$.

Results: Blood iMg^{2+}, iCa^{2+} and the ratio of iCa^{2+}/iMg^{2+}in healthy rats (n=9) were 0.76±0.02 mM, 1.47±0.05 and 1.92±0.06 mM (mean±SE), respectively. In rats with myocardial infarction (n=14), the iMg^{2+} was decreased at 3 (0.66±0.05 mM, $p<0.01$), 7 (0.66±0.03 mM, $p<0.01$) and 30 days (0.53±0.02 mM, $p<0.01$). Although the iCa^{2+} at 3 (1.27±0.07 mM, $p<0.05$) and 7 days (1.32±0.07 mM, $p<0.05$) were decreased, it was recovered at 30 days (1.40±0.05 mM). So the ratio of iCa^{2+}/iMg^{2+}at 30 days (2.54±0.07, $p<0.01$) was elevated. In rats with cardiac hypertrophy (n=5, at 14 days), although plasma iCa^{2+} (1.36±0.05 mM) was not statistically different from control, iMg^{2+} (0.50±0.02 mM,$p<0.01$) was decreased and the ratio of iCa^{2+}/iMg^{2+} (2.79±0.11 mM, $p<0.01$) was elevated.

Conclusions: Our data suggest that cardiomyopathies could decrease in plasma $iMg^{2+}$and increase in iCa^{2+} and the ratio of iCa^{2+}/iMg^{2+}.Our results point to important uses for iMg^{2+} and the ratio of ionized iCa^{2+}/iMg^{2+} during the diagnosis and treatment of cardiac disease in medicine.

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A study to evaluate the effects of ultraviolet blood irradiation in a diabetic rabbit model

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Introduction: The purpose of this study is to evaluate the effects of ultraviolet blood irradiation on the blood when a low dose of ultraviolet C (UV-C) is directly irradiated to the blood in a diabetic rabbit model and to evaluate the effects on treatment for diabetes.

Materials and Methods: Type 1 diabetes was induced by intravenous (IV)injection of alloxan monohydrate 110 mg/kg into New Zealand white rabbits weighing 2-2.5 Kg. A UV-C lamp with light intensity of 4 W and wavelength of 260 nm was used to irradiate UV to the blood. After 10 ml blood was collected from diabetic rabbits and UV was irradiated to the blood, UV irradiated blood was transfused back to the original rabbits. The ultraviolet blood irradiation (UBI) treatment was performed a total of 8 times. We evaluated the effects of the UBI treatment on diabetes through hematological analysis before and after UBI treatment were performed

Results: Our results indicate that the reduced body weight is increased and blood glucose levels are significantly reduced after the UBI treatment is performed when compared to those