

## 急性運動の強度が動脈血栓形成能に及ぼす影響

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### **Effects of Exercise at Different Intensities on the Thrombotic Tendency**

by

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#### **ABSTRACT**

Platelets play an important role in the pathogenesis of cardiovascular diseases. It is believed that regular low-intensity exercise can reduce the risk of cardiovascular diseases but high-intensity exercise provokes some cardiac events such as angina, myocardial infarction, and sudden death. The aim of the present study was to investigate the effects of exercise at different intensities, low and high on the basis of ventilatory threshold (VT), on platelet reactivity and coagulation using a novel *in vitro* method, haemostatometry.

Seven healthy young men ( age: 20-29 years ) performed bicycle ergometer exercise tests of 30-min duration at intensities of 90% ( EX-90%VT ) and 130% ( EX-130%VT ) to each individual VT. The exercise was performed at the same time of the day on two separate days. Blood samples were collected from the antecubital vein before( at rest ) , immediately after and 30 minutes after exercise. Haemostatometry: The instrument ( haemostatometer ) was built in the Laboratory of Physiology, Faculty of Nutrition, Kobe Gakuin University and was identical with the original one described by P. Görög and I.B.Kovacs ( 1989-92 ). The unique features of this method are in using non-anticoagulated ( native ) blood and forming platelet-rich thrombus by shear-induced platelet activation.

Blood cell counts ( erythrocytes, leucocytes, platelets ) , haematocrit, blood lactic acid and plasma catecholamine levels were slightly but significantly increased after EX-90%VT and markedly after EX-130%VT. Subsequently these were restored to the resting levels at 30 minutes after both EX-90%VT and EX-130%VT. Platelet reactivity and coagulation were significantly enhanced immediately after and 30 minutes after EX-130%VT. But EX-90%VT did not change significantly both platelet reactivity and coagulation.

The present study demonstrated that high-intensity exercise induced platelet hyperreactivity and hypercoagulable state, which might be related to the increased risk of cardiovascular disease by acute exercise. It was also confirmed that low-intensity exercise did not affect the thrombotic state.

## 要 旨

本研究は、各個人の換気性作業域値 ( VT ) に基づく運動強度の違いが血小板反応性および凝固能に及ぼす影響を検討することを企図した。若年健康者7名に、各被験者のVT強度の130% ( EX-130%VT ) , および90% ( EX-90%VT ) に相当する強度の30分間の運動を負荷した。各強度の運動前、運動終了直後、運動終了30分後に採血し、血小板反応性、凝固能、血球数、ヘマトクリット値、血中乳酸値、血漿カテコールアミン濃度を測定した。血小板反応性、凝固能の測定にはHaemostatometer法を用いた。運動終了直後の血球数、ヘマトクリット値、乳酸値、カテコールアミン濃度は、EX-90%VTによって有意ではあるが僅かに、EX-130%VTによって顕著に上昇した。これらの測定値は両強度の運動とも終了30分後

には運動前のレベルに低下した。血小板反応性、凝固能は、EX-90%VTで有意な変化はなく、EX-130%VTではどちらも有意に亢進した。この亢進は運動終了30分後も維持された。これらのことから、運動実施により誘引される冠動脈疾患のリスク上昇に運動強度が関与していることが示唆された。