ERK1/2-containing MPs from diabetic mice induce endothelial dysfunction via the vascular ERK1/2 activity.

Nozomu Kaneko, Kumiko Taguchi, Kazuki Magota, Rio Maeda, Shun Nishiura, Kana Funami, Chisato Ito, Mie Sasaki, Takayuki Matsumoto, Tsuneo Kobayashi

Dept. Physiol. and Morphol., Inst. Med. Chem., Hoshi Univ.

Microparticles (MPs) which are micro vesicles shed from the membrane of vascular and blood cells are considered as one of the causes of endothelial dysfunction in the diabetic vascular complications. In this study, we examined the effect of MPs derived from diabetes mice on vascular function, focusing on extracellular signal-regulated kinases (ERK)1/2-conteining MPs. MPs were prepared from streptozotocin (STZ)-induced diabetic mice (STZ), controls (Cont) and STZ and Cont mice treated with ERK1/2 inhibitor, PD98059 (PD). Vascular reactions and protein expressions were examined. STZ-derived MPs (STZ MPs) were found to have increased amounts of MP and to be attached to the endothelial cells as compared to Cont-derived MPs (Cont MPs). Furthermore, we found that ERK1/2 was contained in the MPs, especially STZ MPs. In addition, ERK1/2 activity and expression were increased in Cont vessels treated with STZ MPs. STZ PDMPs (PD-treated STZ derived MPs) improved the attenuated endothelial dependent relaxation in aortic rings. On the other hand, direct treatment of PD in STZ aortic rings did not improve the attenuated endothelial dependent relaxation. These results suggested that ERK1/2-containing MPs regulate ERK1/2 activity in blood vessels and cause endothelial dysfunction during diabetes.