

Anticoagulant/fibrinolytic effect of new natto extract

¹)Department of Legal Medicine, Dokkyo University School of Medicine, ²)Faculty of Policy Informatics, Chiba University of Commerce, ³)Central Clinical Laboratory, Jikei University Hospital, ⁴)The Jikei University School of Medicine

○ Masahito Hitosugi¹), Munehiro Niwa²), Masaru Koike³), Kazunobu Omura¹), Tetsuo Yufu⁴), Naoko Iida⁴), and Shogo Tokudome¹)

<Introduction>

Natto, a traditional food rich in various proteases, has been watched as a healthy food in recent years. We studied the anticoagulant and fibrinolytic actions of a new substance extracted from a natto culture (abbreviated as NKCP).

<Method>

A natto culture without *Bacillus subtilis natto* cells or vitamin K was applied to gel filtration using Toyopearl HW-40F and NKCP with a molecular weight of 45 kDa was extracted. NKCP had hydrolyzing activity of 10 IU/mg per minute to the plasmin-specific synthetic substrate S-2251. NKCP in a physiological saline was added to human blood immediately after collection to determine laboratory parameters related to coagulation and fibrinolysis: blood immediately after collection was added to 30 μ l of the NKCP solution to make 3 ml and they were gently blended, followed by incubation at 37°C for 5 minutes. After stopping the reaction with sodium citrate, measurement using plasma was carried out for fibrinogen (Fbn), thrombin-antithrombin III complex (TAT), fibrin monomer (FM), D-dimer (D-d), and α_2 plasmin inhibitor/plasmin complex (PIC). The positive controls were heparin sodium with anticoagulant activity and alteplase with fibrinolytic activity and the negative control was physiological saline.

<Results>

NKCP treated blood had decreased TAT and FM, showing that NKCP has an anticoagulant activity similar to that of heparin. D-d increased and Fbn decreased, showing that NKCP has a fibrinolytic activity similar to that of alteplase. Differently from alteplase, however, NKCP treatment did not increase PIC, suggesting a plasmin-independent fibrinolytic effect. The higher the concentration of NKCP was, the stronger the fibrinolytic effect was.

<Conclusion>

A new substance with a molecular weight of 45 kDa, extracted from natto culture liquid was demonstrated to have anticoagulant and plasmin-independent fibrinolytic effects on human blood. This substance shows promise for clinical applications as a thrombosis-preventative agent.

Acknowledgement: We thank Roche Diagnostics for cooperation in determination of fibrin monomer.