F-12

Presence of soy-derived peptides in animal and human blood after ingestion of enzymatic hydrolysate of soy proteins

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It has been demonstrated that ingestion of enzymatic hydrolysate of soy protein can improve lipid metabolism and attenuate inflammatory diseases. Some peptides with *in vitro* activities have been assumed to be responsible for beneficial activities by ingestion. However, contents of these peptides in body are far lower than those necessary for the *in vitro* assay. The objective of the present study was to identify food-derived peptides in body after ingestion of enzymatic hydrolysate of soy protein. Whister strain rat was orally administered soy protein hydrolysate (Hinute AM) at 300 mg/kg. Before and 1 h after ingestion, inner content of intestine, liver, jejunum, ileum, *Rectus fermoris* muscle, and bloods were collected. Blood was also collected from human volunteers before and after ingestion of the hydrolysate. To identify indigestible peptides, peptides in the hydrolysate were further digested with leucine aminopeptdase and carboxypeptidase B. The indigestible peptides were resolved by size exclusion and reversed phase (RP)-HPLCs. To improve resolution and detection, peptides were derivatized with PITC before RP-HPLC. To detect pyroglutamyl peptides, pyroglutamate amino peptidase digestion was carried out before the derivatization. Contents of the indigestible peptides in bloods and tissue extracts were determined by LC-MS/MS in MRM mode.

DS, DQ, DP, IP, LP, FP, RP, PP, pEL, and pEEL were identified as indigestible peptide. These peptides were also detected in rat body. Among them, pEL was contained extensively higher levels in intestine and bloods after the ingestion compared to other peptides. pEL significantly increased (up to 4 nM at 1 h) in human blood compared to vehicle control. pEL has been demonstrated to moderate hepatitis, colitis, and dysbiosis in animal models by oral administration. These facts suggest that pEL is at least partially responsible for the beneficial effects by ingestion of soy protein hydrolysate.